Pattern Languages for Public Problem-Solving
Cultivating New Seeds for Social Change

Douglas Schuler
The Evergreen State College, Olympia, Washington, USA
The Public Sphere Project, Seattle, Washington, USA

Abstract

The pattern languages perspective for the design and development of the built environment was popularized by Christopher Alexander and his colleagues in the late 1970s. Although many people have adopted the pattern language philosophy and framework in a variety of design / problem domains, there is a small but growing awareness that this orientation could serve a much broader and influential function than it currently does: organizing around and with pattern languages could provide much needed support for addressing complex problems, by supporting direct and indirect distributed collective action with more flexibility and respect for local context. Eleven "seeds" that could help improve our public problem solving capacity with pattern languages are presented. These seeds promote better understanding of our work, enhanced sharing approaches, publicizing the work, and organizing and enhancing our own communities.

Patterns and Problems

With the publication of A Pattern Language in 1977 the world was introduced to the concept of a pattern language. Christopher Alexander and his colleagues presented 253 "patterns" that could be used to design and build structures for human habitation that were both beautiful and "alive." The assertion that each pattern "describes a problem that occurs over and over again in our environment, and then describes the core of the solution to the problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice" is especially relevant for public problem-solving. In the years after the original publication, the pattern language perspective has been proposed and adopted in a variety of fields, including human-computer interaction (Gamma, Helm, Johnson and Vlissides,1995), object-oriented programming (Tidwell, 1999), conservation economy (ConservationEconomy.net -- The Pattern Map), communication for liberation (Schuler, 2008), creative collaboration (Iba 2014), group processes (Bresson et al), transition culture (http://transitionculture.org/2010/06/04/rethinking-transition-as-a-pattern-language-an-introduction/), distance learning (Angel et al, 2014), costumes (Fehling 2014), systemic transformation (Finidori 2014), and many, many others. In spite of the broad popularity, there seems to be a growing feeling that the potential uses of the pattern language philosophy and framework are critical and vast, yet relatively undeveloped. Its potential as a tool for global thinking and for thinking globally will require extensive thinking, discussing, and experimenting, if that potential is to be realized.

Figure 1. Designing for the International Pattern Language Conference: Design Workshop Using Liberating Voices Pattern Cards

I share the assumptions and aspirations of the original pattern language work (Alexander et al 1977) that pattern languages can be useful in our efforts to make the world more livable and more beautiful. That was certainly the idea behind my work coordinating the Liberating Voices pattern language project. The effort to develop the initial pattern language took place over an eight year period. During that time 85 authors developed 136 patterns for social engagement and social

change that were included in our book (Schuler 2008). Since then I've been involved in numerous related projects including design workshops (Fig. 1), online games, and *anti*-pattern work that I coordinated in an undergraduate educational setting (Wagaman et al 2013). This paper is basically a prolegomenon to what I believe are the major aspects of our focus on the pursuit of pattern languages for societal change. My intent in this article is to help support the general formulation of our collective enterprise.

For over a decade I've been exploring and developing the concept of civic intelligence (Schuler 2001), the ability of people working together to address shared challenges effectively and equitably. I have also written (Schuler 2010) on the particular suitability of pattern languages for advancing civic intelligence. This is basically for three reasons: (1) The problems we face today, from environmental degradation and climate change to inequality and the threats of pandemics and war are urgent, severe complex, and distributed. They show up differently in different locations, each with its own set of contextual circumstances. The problems are more-or-less fractal, they exist at small scales as well as large ones. The problems can't be solved *simply*, nor do the solutions require the attention of a one (or other small number of) disciplines or sectors. (2) People are needed to address the problems yet they speak different languages, are separated via distance and experience level; and have different tasks. They need to work together but they don't communicate effectively, work at cross purposes, and are often not motivated. (3) We need shared plans. These must combine thought and action, the must be provisional and not overly prescriptive. They need to be accessible and be amenable to local customization.

For many reasons pattern languages have the potential to provide ways for people to directly organize around complex issues as well as ways to *indirectly* coordinate with other people and groups. Pattern languages have an intentional inclination towards thought and action. They have specific features that help make sense of the problem domain while also pointing toward meaningful action. The embracing of disparate, interrelated elements (namely, the multiple patterns that constitute a pattern language) rejects simple-minded, universalist "solutions" to social challenges. Pattern languages are systemic, agnostic as to discipline, open-ended, flexible, fractal, and generative. Their inclination towards holism helps promote completeness of the system; pattern language developers notice (and look for) gaps in their pattern languages and strive to plug them, i.e. with another pattern. Moreover, pattern languages have intrinsic appeal — at least to many of us! They appeal to the need for an orderly presentation of knowledge; they seem to represent "whole" systems; they are *illuminating* in that they often bring together disparate facts or observations and provide coherent meaning. Incidentally this was very clear with the anti-pattern work in which my students — undergraduates in my Evergreen classes that focus on civic intelligence — and I identified and described the *patterns* that ensured continued social domination and environment degradation). In this enterprise we observed that many of the problems that we collectively face are not necessarily eternal but are actively maintained and reinvented each day, both consciously and unconsciously.

With the pattern language approach ends and means often overlap and are not easily separable. In other words, pattern languages offer a potentially powerful intellectual approach that is best advanced through ongoing interactions of ends and means. As with any organization, medium, meme, perspective, artifact, or technology, that is seen to be rich in *potential*, latent capacity which is ready to be used and relied upon, to enable a next step, it is only when that thing is used that it influences the future. In the case of pattern language use, the intent is to steer away from undesirable directions in which we appear to be heading.

The body of this paper consists of *seeds* regarding patterns and pattern languages (which in this paper I'll generally treat as one thing and abbreviate as pattern languages). I believe that collectively addressing these seeds intellectually and through actions will be critical to any degree of success in our pursuit. Seeds, of course, are instruments for life and growth. For me, the purpose of each seed in this paper is to help explore how to make the pattern language approach more useful in our pursuit of positive societal change. As one might expect the seeds are deeply interconnected. Addressing one of them will often help address the others. For example, how we want to use pattern languages will help define audiences for the pattern languages or suggesting new forms that the pattern languages take.

Eleven Seeds

Seed 1: Diverse Users and Uses
If we are to promote the pattern language approach, we need to gain a deeper understanding of who, what, and why people use — or might use — pattern languages. For one thing we may be underestimating the breadth of the audience. For example we make assumptions about the users of pattern languages but my students more than once have suggested that developing pattern languages for elementary school children, a group generally not considered, would be a useful endeavor. We need to have a better understanding about how pattern languages are actually used and also about ways they could *potentially* be used. For example, my students, when using the Liberating Voices pattern cards in design workshops, have on occasion changed the title of a pattern when they felt it better suited their needs. Others used the title but changed the narrative of the pattern while keeping the essence of the pattern intact.

We know — or at least strongly suspect — that there are many more uses to be considered than we generally acknowledge. We also know that the list of uses is already quite diverse. The University of Oregon, for example, uses a pattern language as the master plan for its campus (University of Oregon). Miguel Angel Pérez Alvarez and his colleagues are using a pattern languages as a *lingua franca* for consolidating their shared knowledge on distance education in Mexican higher education (Alvarez et al 2014). Personally I'd like to explore pattern languages as they might apply to theory and action networks and to public / civic alternatives to Facebook or Google.

Figure 2 — Playing Student-designed "Urban Vision" Game Based on *Liberating Voices* Pattern Language

My belief is that we are still just scratching the surface in terms of workshops, games, and other structured social encounters using pattern languages. In classroom settings and at conferences, we have convened workshops with the Liberating Voices pattern language. These are generally focused on conceptualizing response to a design prompt, that is sometimes supplied by the conveners, sometimes by the participants, and sometimes randomly via a set of focus cards and product cards (references). One of the more creative projects was for students to design civically intelligent games based on the cards such as the Urban Vision game shown in figure 2. And while I have involved students in design workshops using the patterns and having students develop patterns and pattern languages, one thing I have not tried is having student teams to design their own workshops using ideas from participatory design (Schuler and Namioka 1993).

Seed 2: Pattern languages as Social Objects

Figure 3 — Conclusions from the Online Activist Mirror Game

The expression "social object" can be used in many ways. Here we mean a "thing", material or virtual, that can be used by people is social settings. In addition to written forms like books which are generally ready by individuals, pattern languages can be manifested in various other forms including as *social objects*. Successful social objects help engender

creative, focused, productive dialogue. Schuler (2011) suggests that "accessibility, transferability, annotatability, manipulability, promiscuity (the ability to interact with many other patterns), clarity, interaction promoting, and learning promoting," are potentially important features for successful social objects. The Liberating Voices and the Group Works pattern language projects, for example, both created physical card decks which can readily be used "socially." And while these decks generally lend themselves to face-to-face uses such as workshops or games, we've also used the Liberating Voices patterns in an online "Activist Mirror" game in which players find out what type of activist role they are likely to assume (Moyer 1987) and which Liberating Voices patterns might be interesting to them. This game employs the patterns in an active way but is currently used by one person at a time although, of course, more than one person can be playing the game at the same time simply by watching the screen and commenting on the questions. On the other hand, we do view the current activist game as helping to lay the foundation for interactive systems in which two or more play people work (or play) together with their patterns online. Another form is a poster (see Figure 3, poster by Jaime Alarcon, including the original English text and Spanish translation (also done by Alarcon 2013).
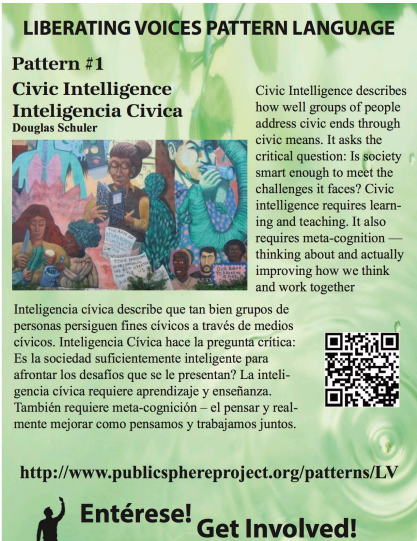
Figure 4 — Bilingual Civic Intelligence Pattern Poster (Artist and Spanish translator: Jaime Alarcon)

Seed 3: Life-Cycle and Methodology
Looking at the life-cycle of patterns and pattern languages — development, test, use, evaluation, etc. — would be useful in understanding the strengths and weaknesses of the pattern language approach. For example, it may be true that people are inspired by pattern languages but then rely on some other approach to actually realize the intended outcome. If, for example, we had that information, we could try to help people with the integration of the two approaches. We could also possibly transform the style or structure of the patterns in some way so they continued to inspire and inform pattern users throughout other phases of the life cycle as well.

Ken Gillgren, a long-time contributor to the Liberating Voices project developed several very engaging and educational workshops. After the development of the pattern language he developed and convened several workshops with my evergreen students using the pattern language. Gillgren developed several useful worksheets that were intended to move including timing, use of resources and intermediate and final deliverables. incrementally from initial conception of a project into a more fully realized design and corporate planning elements including timing, use of resources and intermediate and final deliverables.

Figure 5 — Pattern Deployment Planning and Action Planning Worksheets (Author: Ken Gillgren)

While different groups are likely to take different approaches for dealing with pattern languages, it still would be worthwhile to pool our wisdom (or at l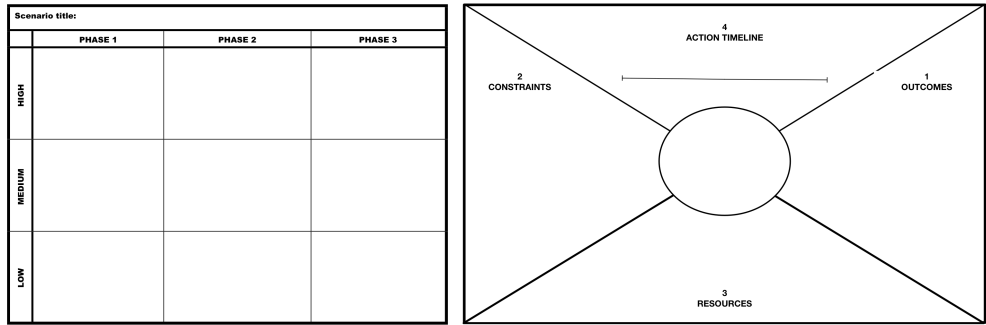east pool it better) and codify our best practices into a methodology that could be widely shared. Alexander's approach, the Group Works Pattern Language, Liberating Voices (and the anti-patterns), and the Pattern Language of Programs Design (PLoP) community all seem to take different approaches. Perhaps it would be most useful to better document what we do find useful and to see where we fall short. Approaches that employed aspects of each other could be developed. Alternatively, a reference model that was basically a superset of features from the variety of approaches used could be developed. I should mention that the Oregon Experiment (Alexander 1975) in which the pattern language approach is used in the development of all new University of Oregon buildings provides an example of both a life-cycle approach and an innovative approach to pattern language use.

Seed 4: Barriers and Opportunities

There are a wide ranges of barriers as well as opportunities to the development and use of pattern languages. And diminishing the impact of the barriers is probably as important as providing additional opportunities. Some barriers may be absolutely intrinsic — I've heard criticisms, for example, that pattern languages are too general and that they are too specific. Maybe that's a function of its "middle-range" focus, but maybe there are workarounds even for that. For example, if there were good examples of how pattern languages were used and there was easy access to them, then the problem about a lack of specificity would be diminished. At any rate, we need to become cognizant of the barriers, be they personal or institutional, intrinsic or artificial, if we are to develop strategies for overcoming them. Some barriers, such as lack of motivation, may not just be barriers to the use of pattern languages but to broader social problems including rejection of engaging in social change or, even, to any meaningful social dialogue at all. We need to think about making pattern languages more useful. Letting the world know about pattern languages would obviously help, and pointing to successes would also be useful. Making appropriate patterns and pattern languages easier to find (and integrate) would also be important. And once people find them, examples, ideas for use, additional resources, and other useful commentary couldn't hurt.

Also, presumably, the advent of the computer and online environments provides opportunities for making pattern languages more available and accessible. The development and user communities are now more likely to be distributed and online systems should help with that. But new distributed methodologies may come at a price: Can the virtual digital world support the same rich, social interplay that using patterns in synchronous in-person environments does? Online systems allow substantial opportunities for using patterns as hubs, or a focus of discussion:

> There is a need to create useful information spaces and, in general, build on new technological opportunities. These include support for annotations, workspaces, and community building, each of which is strongly related to the others. We are using the term "annotation" to describe any comment, question, or reference that a user associates with a given pattern on the website. A user, for example, might annotate the Activist Road Trip pattern (LV 134) with the URL of an organization that takes people to see the aftermath of open pit mining. Another user might have a question about using the Mirror Institution pattern (LV 94) or some advice on how to use Experimental Schools (LV 89). (Schuler, 2009)

Online systems could also provide workspaces:

> We are also developing capabilities that will allow groups for groups to establish workspaces related to a specific goal or topic that they are interested in. This will allow them to build pattern languages from scratch or with existing patterns that they can optionally annotate. Users of a particular workspace will be able to establish the ownership approach that best suits their needs, from an individual orientation towards pattern ownership and modification rights to a more community-oriented Wiki-style approach. (Schuler, 2009)

We also must remember that the Wiki approach itself was developed as a platform for pattern language development and, also, that the creator of the Wiki, Ward Cunningham, is also still active in the development of workspaces for pattern language development (Sustasis).

Seed 5: Meta Pattern Languages

Basically meta pattern languages are pattern language whose domain is pattern languages. In theory this pattern language could be used to help design workshops, construct sub-languages using existing and new patterns, and manage ongoing pattern-based projects. Aldo De Moor and I developed a short list of possible candidates for this language. Our tentative list is included below.

Generating	Configuring (arranging)	Linking
Selecting	Refining	

Using (to generate ideas; for planning; for fostering imagination, group skills, etc.)	Combining	Incentivizing
	Splitting	Problem mapping
	Evaluating	Visualizing
Annotating	Validating	Stakeholder identifying
Discussing	Indexing	
Critiquing	Categorizing	

As with other pattern language approaches a meta-pattern language approach can be seen as a way to help generate knowledge, ideas, insights, and inquiries as well as a way to represent knowledge. Currently we are working to discover how the meta-patterns are actually used with other patterns to help provide insights and advice for future users. It might be the case that the pattern names we identified are actually pattern language categories and one or more patterns belong within that category. Because meta-cognition (Bransford et al 1999) is such an important aspect of individual intelligence, meta-pattern languages, specifically and directly address this issue. When meta-patterns are used fluidly and intentionally in an experimental fashion patterns can be used but, perhaps more importantly, users can also become more adroit with using the patterns *as a language* which, of course, is one of the putative objectives of the pattern language approach.

Seed 6: Remix
An individual or group might want to use a pattern language approach but doesn't really care which pattern language they are drawing patterns from. (And could blame them?) They might want to use one pattern from one pattern language and three from another. They may even want to slice and dice patterns, using the problem statement of one and the solution statements of two others. They may want everything from one pattern except they'd like to use their own introductory image. They may also want to transduce, subclass, or make links across pattern language borders. Computers could make this easier — but it's far from where we are now. And reassembling may be more difficult than tearing apart!

As part of an open-ended exploration, I wrote a simple "shuffle" program to randomly select patterns from three pattern languages (A Pattern Language, Group Works, and Liberating Voices) as a very simple remixing experiment (one set of results in Figure 6). The question that this approach surfaces is whether random selections from disparate pattern languages might be useful for groups of people who were working on shared projects or problems. Any expectation of a positive result relies on concept of *forced connection* (Liu & Schönwetter 2004), a technique for encouraging creativity that appears to be validated quite often in the workshops that I convene. From the first attempted I noticed one evocative grouping consisting of Retreat and Reflection, Seasoned Timing, and Connection to the Earth. I also note that the Group Works pattern language contains a Purpose pattern whereas the Liberating Voices pattern language contains a Shared Purpose pattern. Arguably, he least relevant of the randomly selected patterns is Floor Surface from APL, but on reflection, this too can probably be integrated / adapted to the others; if Floor Surface is seen as the interface for "grounding" for the group's activities.

Voices of the Unheard (LV)	Floor Surface (APL)	Go Meta (GW)
Retreat and Reflection (LV)	Purpose (GW)	Seeing the Forest, Seeing the Trees
Seasoned Timing (GW)	Spirit (GW)	(GW)
Connection to the Earth (APL)	Big Tent for Social Change (LV)	
Online Deliberation	Power Research (LV)	

Seasoned Timing	Connection to the Earth	Retreat and Reflection

Figure 6 — Random Patterns Can Yield Unexpected—but Natural and Fertile—Possibilities

Additionally, while people generally select the patterns they use, the set that they start with could include randomization as we often do with our workshops. And games, of course, nearly always employ randomization of some sort; players slough off the cards they don't need and develop coherent approaches towards the goals with the ones they retain.

Seed 7: Process Mapping
This seed builds on the idea of the diagram used in A Pattern Language "which shows the solution in the form of a diagram, with labels to show its main components" (Alexander et al. 1977). If this could be done in a more rigorous manner the patterns could be more useful – they could be more falsifiable and more amenable to testing; they could also be more useful for "real-life" problem domains where we hope to employ them. This aspect could also be used in our quest for validation criteria. If, for example, pattern language developers agreed on a graphic modeling approach and, probably, some agreed-upon vocabulary, it might be possible to see to a greater degree how the patterns *worked* but, also, how they could work together, in a somewhat more rigorous manner. Based on this approach it might also be quite a bit easier to locate other patterns from a collection of independently developed pattern languages, that would help a given person or group in their assembly of a pattern language that was tailor-made for their specific needs. My students and I hoped to uncover deep connections among the anti-patterns we developed but have not yet tackled the project of deeply interlinking the entire pattern language via process mapping. It seems, for example, using the anti-patterns (Figure 7) that Violence, Environmental Degradation, and Consumerism all spring from Civic Ignorance but also Civic Ignorance can be exacerbated from applications of the other three. Helene Finidori's paper (2014) on PLAST, a pattern language for systemic transformation, presents many insights that are especially relevant to this seed.

Civic Ignorance

Civic ignorance describes how well a group or person ignores the civic ideas, problems, or solutions of those surrounding them. The need to solve problems intelligently and taking account of all solutions is cast away in favor of the quick, the easy, and the brutal. Maybe the problem will just go away? Critics of this should be marginalized, ignored or otherwise disabled or destroyed.

Violence

Much can be achieved through dominance and submission by using violence. If the subject cannot be subdued psychologically through fear, then injury can be inflicted. If injury is not enough, then the subject can ultimately be eliminated by murder. This is ultimately the underlying threat of violence.

Environmental Degradation

The natural environment; including but not limited to soil, water, air, flora, and fauna, has a natural balance. Through pollution, over usage, and lack of stewardship, the balance is broken causing the natural networks that sustain life on this planet to suffer.

Consumerism

Quality of life is ultimately measured by on the acquisition and display of material goods. At the heart of consumerism is the thought that the "good life" can be purchased. Consumerism also contains a set of standards through which people can be judged based on material wealth.

Figure 7 — First Four Anti-patterns: Civic Ignorance, Violence, Environmental Degradation, and Consumerism

Seed 8: Characterizing Pattern Languages

While there are generally strong "family resemblances" between the myriad pattern languages that have been developed, they are far from identical in the forms they assume, let alone in the their objectives or, even, their definition of a pattern. A reference model that was basically a superset of current pattern language characteristics cold help address the problem of incommensurable pattern languages. This would include standard metadata such as the title and author, but also metadata that was specific to pattern languages, number within the pattern language, name of the pattern language, status, license, which fields were used — such as introductory graphic, diagram, problem, context, solution and the like — and whether it was a translation or a card based on a pattern. It would also include information on how to access the pattern or pattern language thus forming a sort of digital card catalog of patterns. One of the primary uses of this would be to provide online for support for pattern language work. Ideally there would be application program interfaces (APIs) that would enable digital integration of patterns in new ways (e.g. see the Remix seed above) or online workshops. would enable digital integration of patterns in new ways (e.g. see the Remix seed above) or online workshops.

Демистификация и Раз-очарование	Память и ответственность
Наши политические, экономические, и технологические системы стали таинственными, в то время как реальные тайны больше не несут глубокого значения и связи между людьми и миром природы. Демистификация и Раз-очарование необходимы, чтобы сообщать перспективу, которая приглашает, поощряет и поддерживает свободные взгляды в человеческом сообществе.	Хотя зло прошлого продолжает преследовать нас в настоящем моменте, общество часто неспособно или не желает иметь дело с исторической несправедливостью. Функция Памяти и Ответственности - способствовать исцелению, изучать историю, чтобы избежать будущих проблем. Основное намерение – не искать виноватых или наказывать, но поощрять людей рассуждать вместе и бороться за согласие.

Figure 8 — Liberating Voices cards Memory and Responsibility and Demystification & Re-enchantment translated into Russian (Translator: Sergei Stafeev)

Seed 9: Public Problem Domains

To help focus our efforts and to advance to the next stage of our collective learning process, it is probably necessary to identify certain problem domains that would be amenable to collaborative pattern language work. This approach could provide important impetus for consideration of many of the seeds in this paper. And it could also encourage the development of the new ones. Some of these problem domains could include sustainability, anti-corruption, anti-poverty, climate change mediation and adaptation. Those fit the bill for important, distributed, complex problems. And a long-term community commitment to developing one or more pattern languages, promoting their use, and continuously evaluating and revising them, would be significant. One possible approach would be to issue a Call for Patterns as we did for the 2002 Directions and Implications of Advanced Computing conference sponsored by Computer Professionals for Social Responsibility (http://cpsr.org/prevsite/conferences/diac02/index.html/). We used "Patterns for Participation, Action, and Change" as the conference title and over one hundred pattern submissions were made on our online site. These are still online (http://www.publicsphereproject.org/patterns_pool) and formed the basis of the Liberating Voices book.

Seed 10: Community Development

We need to build our community, share our ideas, and better coordinate our efforts. Clearly the recent steps to explicitly open up a pattern language community that is transdisciplinary are significant. We also need to integrate people from various pattern language communities and extend this community to include the people who would like to empower their work, work better with allies, etc. but who may have never heard of pattern languages. This group can not only use the patterns languages that are developed but work on the development of new ones. They can also assist the development and theory community who desperately need ideas, data, and feedback from the real world.

Figure 9 (from Schuler 2008) depicts various relationships (represented as arrows) between pattern languages, relevant communities (various types of "users") and the "real world" which includes the physical, human (social), and knowledge- (or information-) based worlds. An inspection of the various areas (nodes) and the relationships between them should be useful in helping us to think about the goals and tasks associated with each in our efforts to make pattern language use more effective in bringing the results that we'd like to see. Although the focus of the figure is broader, we can use it to describe aspects most relevant to pattern language developers for whom this article is primarily directed. According the figure, the main job of the developers could be seen as developing pattern languages based on some particular view of the "real" and potentially real world which is reflected in the pattern language domain.
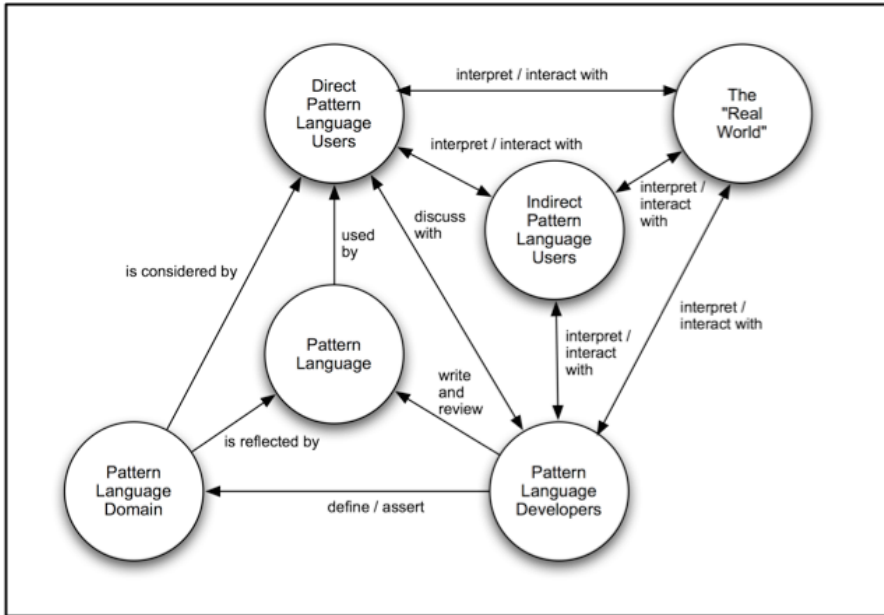

Figure 9 — Ecosystem of Pattern Language Entities and Roles (From Schuler, 2008)

This ecosystem of pattern language relationships reminds us that language "goodness" must include usefulness. Pattern languages, at least for our purposes here are not intended as purely aesthetic objects to be admired. Part of our job will be to make the pattern languages as useful as possible. This means that they should, first, be able to be readily discovered by potential users — probably on the Internet. Whenever possible we should license our patterns (or cards based on the patterns) as creative commons, which would allow people to duplicate and remix them. We've done this with the Liberating Voices cards but, presumably, without outreach people won't know how to use them — or whether they exist at all. Secondly, it must be clear how to use them. This means that the patterns themselves must have suggestions for using them within the text. It probably also means that there are useful resources available that describe uses for them. This would include suggestions as to appropriate methodology, "kits" for conducting design workshops, case studies, and a community that is standing by in order to assist them with all phases of pattern language development and use.

We believe that dedicated communities — online, offline, and hybrid — will be necessary for the development of the civic intelligence that we need for the future. While the technology to support groups and discussion related to pattern language development, evaluation, and use is required, the desire to push on and the ability to collaborate will depend on the people and the character of the communities we create. This can take several forms; Helmut Leitner (email correspondence), for example, has suggested a "pattern card working group" with three roles: "(1) collect best practices how to use pattern cards in workshops and similar events; (2) find ways to produce pattern card decks at low costs to ease their use and circulation. And maybe, in the end, (3) find a publisher that specializes on pattern language books and materials."

Seed 11: Research and Theory
This concept is listed last, but not because it is less important. The theory of pattern languages (and, probably, the superset that Christopher Alexander calls the Nature of Order (Alexander 2003)) is a critical aspect of this and many others including Mehaffy and Salingaros (Mehaffy & Salingaros 2012; Salingaros 2000), and many others. I've focused more on other elements in this prolegomenon because I believe there is an urgent need to address the critical problems before us and pattern languages could play a vital role in addressing them. Theory development and theory deployment (via the patterns) are vitally intertwined; both will gain if the people working in each area conscientiously learn from each other.

To my mind I envision three important areas that are open to theory development. The first is the theory of patterns and pattern languages themselves, as distinct forms. This explores aspects of pattern languages such as generativity: *How might we evaluate these features? Why might pattern languages be more suited than other approaches? How should patterns and pattern languages be validated?* The second is that of pattern languages in use. This focuses on the wide range of how people use pattern languages: *Can pattern languages help integrate disparate communities? How do we evaluate the effectiveness of pattern language use? What forms (e.g. pattern cards or pattern work best for what groups? Why does using multiple patterns seem to be successful at suggesting new possibilities? What can we as pattern language advocates do to accelerate and inform the use of pattern languages. What elements of the pattern language are most important (e.g. the diagram?)* The third aspect focuses on pattern language domains: *What type of domain is most suitable? Are there ways of portraying or representing the domain that will make it more suitable for pattern language treatment.* These questions are only a beginning. There are undoubtedly lots more that we can and will ask ourselves.

Next Steps

Pattern languages instill fierce devotion in many people — including myself. We are impressed with their range, relevance, beauty, and elegance. Although the idea has gained some purchase in the fields of architecture and digital technology pattern languages are far from providing the compelling, important, and ubiquitous roles that many of us believe they are well-suited for.

We are now seeing a transdisciplinary movement to establish pattern languages as a useful addition to humankind's problem-solving toolbox. For this to happen we will need the various parties to understand the seeds discussed in this article more thoroughly and to understand the dynamics of use by actively fielding different projects and collaborating with diverse communities. We are advocates for the pattern language approach. How we do this moving forward will help determine who else might share our passion in the years ahead and how can we collectively channel that passion?

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