PLAST (PATTERN LANGUAGES FOR SYSTEMIC TRANSFORMATION):

A FOURTH GENERATION PATTERN LANGUAGE

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ABSTRACT

This paper proposes the development of a new generation of pattern languages, aimed at gaining insight on intricate wicked problems and the hidden phenomena of the systems we construct, and the whole system that emerges as a consequence. This generation of pattern languages is set to enable the collective interpretation of emergent phenomena, acting as an epistemological thread between observed patterns and the system, between patterns and solutions, and between domain-related pattern, thus generating coherence from disparate efforts.

The Pattern Languages for Systemic Transformation (PLAST) concept proposed is a peer-to-peer open source project aimed at innovating in the area of collective problem solving, to be developed as a collaboration between scientists, communities of design and communities of practice.

INTERPRETING WICKED PROBLEMS

"Below the surface, in nature, layers and layers of biological processes are running on many different times and spatial scales. They combine to create the patterns we see everyday, producing emergent phenomena. Global patterns come about, that cannot be understood only at the local interactions level." (Downing 2013)

Social processes, i.e. human processes augmented by technology, work in similar ways.

Solving wicked sustainability and societal problems requires us to understand emergent phenomena and systemic dynamics by collectively identifying and interpreting the tracks they leave in the system. And to succeed in this enterprise we must be able to understand each other.

A FOURTH GENERATION OF PATTERN LANGUAGES

Pattern Languages first appeared in architecture under the impulse of Christopher Alexander, to capture and reproduce the 'quality' or the 'essence of life' sought for physical structures. They were then adopted in software programming through Pattern Languages of Programs, and found their way into other areas of design and learning, bringing pattern mining, sense making, awareness raising, and collaboration to many other domains of application. In particular they developed in the field of social change and sustainable innovation (Schuler 2014, Leitner 2014). Pattern research estimates a total number of about 30000 pattern languages and half a million patterns in a variety of domains such as movie costume design, organizational design, fire

fighting, scrum, and music composition, several hundreds of which only have yet been gathered in common repositories (Leitner 2014).

In *Pattern Languages As Media For The Creative Society* presented in the proceedings of Coins13, Takashi Iba phases the development of Pattern Languages since the end of the 1970s in three generations distinguished in terms of their object of design, act of design and purpose.
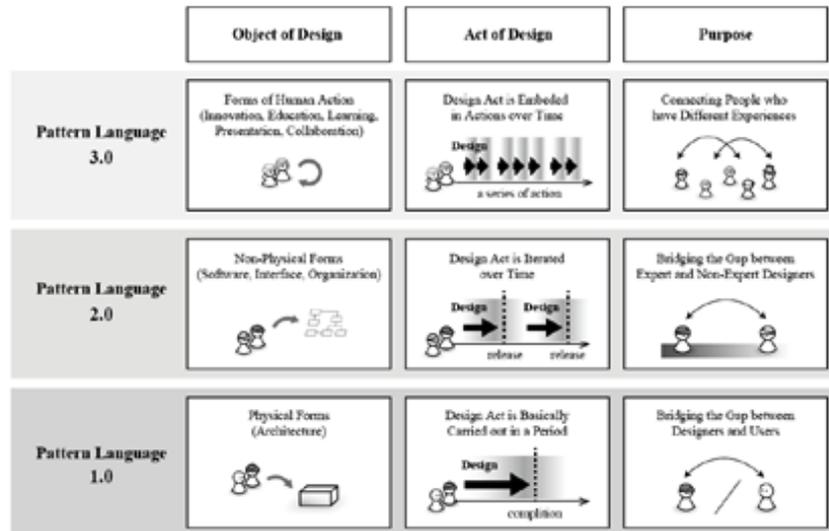

Figure 3: Comparison among Generations of Pattern Languages

The objects of design of the first generation, Pattern Language 1.0, are mainly material forms, with a design act carried out in a finite period of time, over the completion of a building or other physical structure, its purpose is to bridge the gap of understanding between designers and users. Objects of the second generation, Pattern Language 2.0 are non-material, intangible forms or structures, such as organizations, learning programs, software or interfaces, with a design act iterated over time, and a purpose to bridge the gaps of understanding between expert and non expert designers. Pattern Language 3.0 designs human interaction forms such as innovation oriented collaboration, co-creation and peer learning, in an act continually embedded in action over time, with the purpose of bridging gaps between people of different backgrounds and experiences.

These pattern languages, developed vertically in domain related contexts, or horizontally at functional levels, 'describe' patterns in more or less fine grain, from elementary component (ingredient) to whole solution (recipe).

The Pattern Languages for Systemic Transformation (PLAST) concept proposed includes a 'root' or 'meta' language made of granular visual elements that grammatise dynamics independently from any context, function and language domain. It enables the description and interpretation (encoding & decoding) of emergent processes and systemic dynamics as fractal groupings of elementary components representative of the system that produce certain recurring effects (patterns) over time, adding a time dimension to the spatial one.

PLAST serves as a connector between patterns in the various domains where they emerge at various levels and scales. It acts as a link between observed patterns and proposed solutions, as an interface between pattern languages, and through this channel as a bridge between languages and domains of experience. It can be used as a system for comparing solutions and models across disciplines and domains, for indexing and retrieving solutions, and for vetting and adjusting solutions in relation to desired effects.

This is different from any existing form of pattern language. It has dynamics and systemic effects as object of design, continuous emergent feedback over time as act, and bridging the gaps between people and the

outcomes of their social behaviors on the system as purpose. A Pattern Language 4.0 in Iba's classification?

THE WAY FORWARD

We see this project moving forward with the modeling of a PLAST visual language (vocabulary, grammar, syntax) via a collaboration between communities of practice (change agents and practioners, educators and designers on the field) and scholars in various disciplines (complexity & network theory, systems dynamics & systems thinking, mathematics, algorithmic design, economics, linguistics, graphic design...), maintaining the integrity of the PLAST on an on- going basis.

The first sets of syntax components and sequences that may be sourced both from theory and from experience, will describe known dynamics such as systems archetypes, the dynamics of scarcity and abundance, or a few new organization models such as new forms of cooperatives or open networks, and how they manifest and operate in the real world. The approach will also explore the heuristics that can be associated.

The language itself will be used as an ontology for indexing and connecting the various elements together, and for the mapping of the web of pattern languages and the domains of social change.

The project as a whole will be operationalized technologically into a digital platform, comprising a social component and repository of various layers of patterns and pattern languages by domains of application or function (PatternPedia), with design tools that support synchrone and asynchrone co design (graphic as well as text/code), forking and merging, and moving things around, combining, sequencing, such as currently enabled by Github or Ward Cunningham's Small Federated Wiki.

Other envisioned technological applications include standards for indexation of solutions databases, qualification or tagging of projects and models, indexation of algorithms' 'intent' (DACs DAOs), as systemic interoperability standard, or language for the hermeneutic web.

It will be operationalized off-line through the constitution of an open source network of communities of theory and practice, and its dynamisation through the creation of design and facilitation methodologies, tools and artifacts, conferences, workshops, and hackatons that will support both the design of the pattern language and shared discovery and mutual recognition across communities of practice and experience.

The process of mining and finding patterns, of breaking them down into smaller segments, of probing their sustainability and trueness to purpose, of assembling them into sequences of aggregate patterns and of probing again, is part of a peer-to-peer learning process that will enhance systemic awareness and literacy.

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