Design Patterns

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Introduction

The world is changing faster than every before, exponentially faster. Technology is the driver, and everything is touched by technology. Individuals, businesses, governments, and societies - all of them are faced with common challenges and opportunities that are new in scope and in kind than those confronted a century ago. The concepts, assumptions, and scientific methods established in the nineteenth century and enhanced and expanded in the twentieth century have reached their productive limits. Alternative ways of thinking about problems and conceptualizing potential solutions for those problems must be explored.

Consider, for a moment, how simple quantitative changes in scale pose unique challenges. As world population continues to increase, the number of individuals in poverty has grown, the challenges of producing and distributing something as basic as food creates a much different problem than 100 years ago. Think about how the sheer volume of electronic communications has affected our ability to cope with the information deluge. Or, a corollary problem, finding a critical bit of information that you know is somewhere out there among the billions of pages on the Internet. Scale matters!

But the real difference is qualitative. We are used to working with a world that is (mostly) predictable; that follows rules; that we can understand in terms of formal solutions (i.e., the Laws of Nature). This is the world of classical physics, seeing the universe as a giant machine or clockworks. We could manage this world, by applying scientific principles, even formulas, in order to solve problems and make changes. Business schools taught "scientific management," new academic disciplines fancied themselves to be sciences (e.g. Computer Science), and Rationalism dominated our culture.

Today we recognize that the world is not a machine, it is, in fact, a living complex adaptive system (CAS). CAS are large in scale ⊠ they are Ultra-Large Scale Systems ⊠ but more importantly they are non-deterministic, self-organizing, and exhibit emergent behaviors. The weather is an example of a CAS, one with which we are all familiar. The variables that determine the weather are vast in number, the interplays among those variables exponential. It is impossible to predict the weather because today's thunderstorm is an emergent behavior, one that could not have been known in advance even if we had perfect knowledge of all of the variables involved.

The understanding and intervention with CAS pose "wicked problems" A wicked problem not only involves large numbers of variables, many of which have unknown values, but also involves a kind of circular feedback where the solution to any given problem has the effect of changing the nature of the problem.

We need a very different way of thinking about this new world. This new way of thinking will require an ability to deal with uncertainty, with ambiguity. It will need to be based on holistic instead of reductionistic principles. It will rely on the ability to blend multiple perspectives. It will be based on emerging techniques of collaboration and communication — ways we are learning to think together.

There is a community of professionals that confront and resolve problems very similar to those we describe as wicked — multiple interacting variables, ambiguity and unknowns, solutions that redefine the original problem, and requiring a holistic viewpoint. They have developed principles, concepts, practices and techniques that serve them well. This is the community of Designers. We include in our understanding of designers the various types of applied arts: industrial, interior, and graphical design.

Other professions often think they 'do' design: architects and engineers apply some of the same techniques and follow some of the same practices as design professionals. In recent years several other professions have adopted the 'design' label for what they do: software designers, business process designers, and user experience designers are examples. There are important, even critical, differences between Design as conceived of, practiced by, and experienced by Designers and design as a focused activity performed by members of other professions.

Designers have developed a different mode of thinking, one involving a very different worldview, grounded in different presuppositions and concepts, and driven by different values. This mode of thinking is so intrinsic and so fundamental to the Design community that, like any other culture, it is largely non-conscious. What the rest of us see as a very different kind of problem is, to them, familiar. Facing this kind of problem they almost instinctively see the path to potential solutions.

But designers are different. They are right-brained artists with esoteric knowledge of line, form, and color who somehow magically distill imagery, layouts, and form-factors from clouds of possibility. Or so the stereotype assures us. And, like all stereotypes, there is some truth in our belief about designers and what they do — design. But if they are really that different from the rest of us, how can we possibly learn what they do and benefit from that learning?

We can learn Design. Those principles, concepts, practices values, and techniques required to be a professional designer can be learned — after all professional designers also had to learn them. While it is definitely true that some people are predisposed to become designers because of innate characteristics and talents, they still have to learn design thinking and design culture.

We are not suggesting that design is the only answer or that everyone must become a professional designer. There is much to be gained by adopting concepts and perspectives that complement traditional modes of thought, traditional analytic practices, and accepted scientific solutions.

The paper you have before you is part of an ongoing effort to capture and communicate the insights and knowledge, common among professional designers. Our goal is to communicate, and translate when necessary, the fundamentals of Design Thinking and demonstrate how we can be better at what we do if we learn and apply those fundamentals.

We are not alone in this effort. Business, biology, ecology, engineering, software, and social sciences also have theorists advocating similar approaches and ideas. In doing so, all these professionals, are discovering some of the same concepts and principles long known to designers. These efforts, we believe, will be supported and enhanced with a basic understanding of Design Thinking.

Background

In *Notes on the Synthesis of Form*, Alexander said: *"The end purpose of design is form"*. Part of our inspiration concerning patterns comes from Alexander and the patterns community.

Years ago most people would say that design was about adding an artistic or aesthetic embellishment to those things we use. Design is about far more than the outcome of a design act or process. Design is about problem solving. Design is about discovering solutions to problems "whose starting point, origin, or process often are uncertain."

An understanding of what design is must begin, not with definition, but with etymology. Kostas Terzidis provides us with an illuminating discussion (emphasis is ours):

> *"Etymologically, the verb "design" is derived from the prefix de and the Latin verb signare, which means to mark, mark out, or sign. The prefix de is used not in the derogatory sense of opposition or reversal, but in the constructive sense of derivation, deduction, or inference.* ***In that context, the word "design" is about the derivation of something that suggests the presence or existence of a fact, condition, or quality.***
>
> *… design is about incompleteness, indefiniteness or imperfection, yet it also is about likelihood, expectation, or anticipation. In its largest sense, design signifies not only the vague, intangible, or ambiguous, but also the strive to capture the elusive."*

Terzidis also makes a number of other points that we need to keep in mind as we proceed.

Many of the points concern the way modern use of terms like design, planning, and innovation are inconsistent with original meanings ⬚ leading to confusion and even mis-use. For example: planning is often confused with design, but they are different in important ways:

> *"Planning is the act of devising a scheme, program, or method worked out beforehand for the accomplishment of an objective. Planning is about realization, organization, and execution.*
>
> *Design is a conceptual activity involving formulating an idea intended to be expressed in a visible form or carried into action. Design is about conceptualization, imagina-*

tion, and interpretation. Design is a vague, ambiguous, and indefinite process of genesis, emergence, or formation of something to be executed, but whose starting point, origin, or process often are uncertain. Design provides the spark of an idea and the formation of a mental image. It is about the primordial stage of capturing, conceiving, and outlining the main features of a plan and, as such, it always precedes the planning stage."

Other points concern time and the contrast in perspective between ancient and modern times:

"Traveling further back into the origin of the Greek word schedon, one may find that it is derived from the word eschein, which is the past tense of the word eho, which in English means to have, hold, or possess. **Translating the etymological context into English, it can be said that design is about something we once had, but have no longer.**

So, according to the Greeks, design is linked indirectly to a loss of possession and a search into an oblivious state of memory. This linguistic connection reveals an antithetical attitude towards design, one that, in the western culture at least, is about stepping into the future, as a search for new entities, processes, and forms, frequently expressed by the terms "novelty" or "innovation". "

"However, unlike innovation, originality is about a point of departure, a source of knowledge, and an archetype. It is a primordial mark at which something comes into existence, an ancestral origin whose genetic material transcends throughout the following generations. Unlike innovation, the importance of originality is to be "first in order", and this quality is not a matter of perception but rather a matter of necessity. While the intention of both processes may be similar, their logical directions are antithetical. If innovation leads towards one direction, then the search for originality leads towards the opposite. Innovation may be seen as a process of adding one more leaf to the tree, while originality can be seen as the process of adding one more root.

In tracing back to the origin, one is forced to travel from the leaves backwards towards the roots. This process involves at least two modes of thought: reduction and reversion. While the notion of reduction can be associated with decrement, lessening, or diminishment, it also can be associated with abstraction, simplification, and idealization. Similarly, reversion is about regress, setback, or recall, yet it can also be about return, reassessment, and reconsideration. The reason for this is that the prefix "re-" is used here not in the negative sense of backward or regress, but rather in the positive sense of again or anew."

In this context, innovation can be seen as adding embellishment or of recombining elements and establishing alternative relationshipd among them, elements that are and always have been. Design is discovering the essence of what is, and always has been, and bringing it into contemporary awareness. This raises a couple of questions:

"As mentioned earlier, the notion of design, according to the Greeks, is associated with the past instead of the future. Such an assumption appears almost antithetical to the predominant notion of design as a process that leads towards the derivation of novelty. How can the past be such significant importance, especially as a recollection of past, lost thoughts? If, according to the Greeks, design is about something that we had but do not have any more, then it is lost somewhere in the past. But then what is its connection to something that is about to become in the future (i.e., a novelty)? Why would they offer such an unexpected and obscure relationship? Is it possible that, according to the Greeks, novelty, in the sense that we understand it today, does not exist per se and anything new is just an illusion?

The answer to this question is metaphysical.

"If we look deeper into pre-Socratic philosophers such as Xenophanes, Parmenides, or Zeno, one of the common agreements between them was **the assumption that nothing comes out of nothing and nothing disappears into nothing (i.e., nothing can just pop up or vanish without a trace). Such an assumption is very important to understand their reluctance to conceive, accept, or understand the concept of novelty in its modern sense. If everything is indestructible, then change is nothing but a transformation from one state to another; the appearance or disappearance of parts is only phenomenal; nothing is added or subtracted. Therefore, if something emergences, appears, or claims to be new, then it must be nothing but an illusion because, if it is not, it would contradict the initial premise of preservation. Such logic, while it may appear to be simplistic or absolute, it is also very powerful because it does not allow thoughts to be affected by sensory phenomena.**

According to this logic, design as a mental process of creation can be seen as bounded by the limits of preservation: any newly conceived thought, process, or form is nothing but a reordering of previous ones. *However, if we consider this possibility, then we are confronted with the problem of origin, a starting point, a root of roots out of which everything spurs, tangles, and multiplies, offering glimpses of what occasionally appears to be "new". Thus, we are led to the conclusion that the origin, like its material counterpart, must be fixed, eternal, and indestructible. And since novelty involves the negation of existence (i.e., something that did not exist before), novelty is impossible. It is only a sensory illusion.*

In English, the word "existence" is derived from the prefix ex (i.e., forth) and the verb sister, which in Latin means to cause to stand up or come to a stop. Thus, etymologically, the meaning of the word "existence" can be associated with the action of appearance or arising. In Greek, the word "existence" is derived from the prefix hypo, meaning "under, below, or beneath", and the noun arche, meaning "beginning, start, or origin". **Thus, similar to design, existence is not only about the distant past, the beginning of things, but also even further because it involves a step beyond, below, or beneath the starting point.** *But how is this possible? How can something lay beyond the beginning? Wouldn't that result in a new beginning which then should be displaced again ad infinitum? Such a train of thoughts may appear paradoxical because it is interpreted as*

a sequential linkage in the context of a beginning and an ending point. As established earlier, in the pre-Socratic spirit, the notion of a beginning (as well as that of an end) must be rejected. **Things exist before their phenomenal starting point and, therefore, the use of the prefix hypo declares the framework, structure, or platform out of which starting points can be observed. Similar to a river, its origin is not the spring itself but rather lies far beyond, beneath, or below its phenomenal emergence.**

The verb "to become" is used in English to denote the action of coming into existence, emerging, or appearing. In language, as opposed to formal logic, existence is a predicate rather than a quantifier, and the passage from copulative to existential can be misleading. The action of coming-to-be or becoming does not necessarily have to be associated with creation, beginning, or emergence, but rather may denote a process of derivation, transformation, or transition from one state to another. Indeed, **transition is the act of becoming, except that its connotation is problematic because, as Evans points out, "… whatever is subject to the transformation must already be complete in all its parts".**

According to Parmenides, …, something that pop ups out of nothing cannot really exist. *Not surprisingly, even today there is no word in the English language or, for that matter, the Greek language that can denote the instant becoming of an object out of nothing. While the verb "become" is the closest word, it implies a moment of time in order for something to originate. The same is true for the terms "emergence", "genesis", "birth", "rise", "derivation", "start", and "beginning", for which time is always involved.* **Similarly, the word "appearance" cannot be equivalent to the word "become", because it involves the subjective interpretation of the existence of an object. Appearance is about the visual interpretation of the existence of something that is coming into sight.** *Surprisingly, the most common word used by people to denote sudden appearance or disappearance is the word "magic", but this also carries an illusionary, unreal, and perhaps deceptive connotation ⊠ a connotation associated with the belief that it is the result of a supernatural event.*

The patterns and discussions that follow presume the philosophical and etymological understanding of design in the preceding paragraphs. We see design not as an act, but as a process and a perspective. The perspective involves understanding of primordial and intrinsic essence and the emergence of that essence as appearance or shape, the quality of which is a combination of its congruence with its essence and affordances to those apprehending it. The process involves resolving forces and thereby solving problems by utilizing concepts, principles, and techniques known to and articulated by professionals in the design community.

The Patterns

As shown in Figure One, we are using a Mandala template (see 350, Show Me pattern) to provide an overview of the patterns, categories and one aspect of relationships among the patterns (e.g. a pattern may appear in more than one place on the Mandala because it is applicable to more than one aspect of design or designing.

The center of the Mandala contains the patterns that address the primordial essence of design and design mind. This essence radiates and is diffused in all of the patterns. Around the core is a circle with the common organizing and driving principles. The next area is divided into focal segments. The outermost circle contains segments that reflect an artificial view of the design process flow ⊠ as if it were linear. This segment shows patterns that are most used when the designer or design team is focused on a specific set of tasks: understanding the problem space, conceiving of a solution, implementing a solution, and evaluating results. Around the sides are icons representing outside forces that affect design, users, budgets, and similar factors.

[Figure One here]

We have elected to use a pattern format and language as the means to communicate what is known about the design process, to make elements of that process accessible to all. Our goal is to evolve the work in this paper to become a full-fledged pattern language.

We are going to make an effort to emulate the Alexandrian form as interpreted by Joshua Kerievsky (PLoP 2010, Reno, NV). Specifically, each pattern will begin with a title and a 'star ranking,' followed by a problem and solution statement. The body of the pattern will include the following sections: Exists in the Context Of; Evidence; Poor Implementations (where appropriate); Stories, a Pattern Description, and Provides Context to.

Alexander used a three star system to indicate the maturity of his patterns; with three stars meaning his team 'nailed it,' two being more work was needed, and one meaning uncertainty about the pattern's expression. We will use a five-star system separated into two groups separated by a hyphen. The first group ⬚ one star indicating "important," two stars indicating "essential" - and group two reflecting our level of confidence in our expression of the pattern. In the second set, one star will indicate something akin to 'draft' status, two indicates that refinement is needed, and three meaning we are pretty confident that we have it right.

Our patterns are presented in several categories and we have elected to use a three digit numbering system for the patterns. Using three digits allows the number to reflect the category and also allow for future expansion as we discover and add new patterns to the language. The categories, associated number range, and pattern names ⬚ both existing and *planned*:

000 ⬚ 99 Essence
Form, Zen Mind, Unfolding.

100-199 Principles
Gestalt, Magical Liminal, Glossolalia, *Time and Timing*, Forever Jung, Russian Dolls.

200-299 Comprehending
Everything An Object, System Metaphor, Behavior, *Personae*, *Affordance*.

300-399 Practices
Design Brief, Prometheus Bound, Story Telling, Show Me, *Prototyping*, *Chunking*.

400-499 Design Teams
It Takes a Village, *Designer Space, Talk To Me*.

500-599 *Techniques*

700-799 Attributes of the Designed
Alignment, Area Alignment, Attractiveness, 80/20 Rule.

900-999 Evaluating Design
Fit, Invisibility, Joy.

Essence

Abstract

These patterns address the essence of Design and of the Designer's mind. Patterns in this category are presuppositional, acting as quasi-definitions and/or unspoken usually non-conscious, assumptions. They are patterns of "Designer's Mind" ⊠ a thoroughly integrated and seamless amalgam of perspective, attitude, values, world-view, and mental state. This means they are patterns of something that is not tangible or directly accessible to any of our normal senses.

The first pattern, FORM, addresses the essence of that which is designed. UNFOLD-ING is focused on the process of designing. And, ZEN MIND is concerned with the mental framework of the designer. The patterns can be difficult to understand. In part because they are so abstract; and, in part because they are unabashedly mystical in nature. Mystical, in part, because of where the patterns were observed.

All patterns are supposed to reflect solutions observed in multiple contexts. Our search for patterns began with observations of different designers and different types (applied arts, architectural, software) of designer. It expanded with the recognition that every-one is a designer and all things are designed albeit not necessarily consciously. For example, when each of us uses the imperfect and incomplete information at our dispos-al to make decisions and take actions that shape our lives, we are designers of our lives.

The way that designers describe their 'mental state' while 'designing' paralleled the way that mystics (in every religious and philosophical tradition known to the authors) describe "enlightenment." Perhaps more accurately, the way that practitioners of arts associated with mystical traditions ⊠ the archer being one with the arrow and target, the samurai with sword, Sesshu with his ink and scroll ⊠ escribe their mental states. The three patterns introduced in this section are patterns of Designer's Mind. They are not patterns of how to achieve Designer's Mind. Just as there are many roads to en-lightenment, the paths to Designer's Mind are myriad. It is not our intent to describe

or define the Path, rather we are offering these patterns as a partial means to limn the Destination.

The three patterns in this initial section are "used" in that someone seeking Designer's Mind will find them helpful in assessing, via introspection, if their Own Mind has characteristics reflective of the patterns we have observed in Designer's Mind.

020 *Form* **

Form is the core coming to the surface.

Victor Hugo

Thumbnail

if (any of these)
- Your representation is more complicated than what is being represented.
- Refactorings are not obvious.
- Elements are not composable.

then (one or more of these)
- Acknowledge immutable essence.
- Strip context from shape to reveal form.
- Respect simplicity.

Problem

You are conceptualizing a model of something you want to design (e.g. a house, a business process, some software), but find it difficult because the model seems so complex, constituent elements are not clear, and you cannot juggle all the dynamic variables at once.

Therefore,

Solution

[picture of solution here]

Recognize that behind the apparent complexity is the simplicity of a Form, an immutable essence that can be discovered by stripping away the context that disguises the Form as a mere Shape. Make the Design consistent with the Form instead of attempting to emulate the Shape.

A concrete example from the world of information: a relational data model (tuples and relations) is far more complicated than the user's model (entities and relationships) of the same information. If you stripped away the context (all the requirements imposed by an automated data-base management system) you might better see a simpler and more direct solution that had greater fidelity to the original model or essence of the information and its inter-relationships.

Discussion

This pattern is grounded in several premises:
1. That everything has an innate essence ⊠ Form
2. Form equals simplicity
3. Form is generative
4. Form, interacting with context (sometimes with the assistance of a conscious designer) gives rise to shape and therefore shape is Form made manifest (accessible with normal human senses).
5. When shape is a true reflection of Form ⊠ here is Beauty (Liveness, QWAN).

These premises, in turn, shape the way that the act or process of design is conceptualized. Individuals in traditional design disciplines (e.g. graphic arts) have a very different concept of what it is that they do than those who have more recently adopted the label of designer (e.g. software, business process, even user experience) for their work.

Designers (traditional) are more likely to see their work in terms of facilitation ⊠ assisting the innate Form to adopt a shape that is most appropriate for a given context ⊠ by adding, modifying, replacing, or deleting some aspect of that context. Form is respected and context is adapted.

Software designers, in contrast, take the context (in the form of absolute requirements and specifications) as a given and seek to find a shape that will best fit the context. Form is irrelevant. This process, not surprisingly, gives rise to 'designed solutions' that are orders of magnitude more complicated than the problems they address. Such solutions are also brittle ⬚ even minor changes in the context (requirements) can have devastating impact on the viability of the initial solution. Despite such obvious problems, "design as shape construction" has been the dominant perspective in software and business engineering (two areas that are actively exploring traditional design and design practices), largely because 'construction' seems to be amenable to formal methods and managed processes.

Design, as a verb, has two contrasting, and perhaps irreconcilable, meanings. Design as facilitating the expression of Form; and Design as the deliberate construction of Shape. An overlap in actual practices and techniques makes it possible to conflate the two design concepts. De-conflation requires understanding of Design Essentials ⬚ including the Form pattern.

It would be unfair and counterproductive if we failed to acknowledge that the notion of Form is entirely absent from conceptualizations of software and business design ⬚ at least implicitly. It can be argued that some computer languages ⬚ notably Simula and Smalltalk ⬚ are more appropriately labeled "design languages" instead of "programming languages." Design languages, because they facilitate the discovery of the innate nature of things in the world and their subsequent expression as machine instructions. Similarly, many of the founders of the Agile movement champion the idea that there is an implicit architecture (Form) that "emerges" naturally from the exploratory, incremental, and iterative process.

Exists in the context of

Form is primordial and therefore the associated pattern is not contextualized by other patterns. Form is an essence and traces of that essence are reflected in some aspect of each of the other patterns in the language. Form, Unfolding, and Zen Mind participate in a mutually established context. In part because they are all primordial concepts, but also by participation in the following relationship: that which is, Form, as it is expressed via Unfolding, and as it is apprehended by a Zen Mind which facilitates the Unfolding with acts of design.

Evidence

The idea of an essence in every thing we see in the world around us is fundamental to all but the most objectivist of philosophies. The notion of a soul (with religious connotations) or a self (more secular) as the essence of a human being is almost universal. Animism and pantheism suggest that all living things have the equivalent of a soul ⬚ a bit of anime. A metaphysical thread running through the Vedas and Buddhism suggests that all matter, down to individual quanta, is infused with some proportional

amount of "intelligence".

More than material objects and living things have an essence as well. Relationships among things also have an essence. In this case what is meant by essence is really more a sense of "true nature" along with the sense that something is correct or appropriate when its expression conforms to its true nature. Behaviors and patterns of behavior also have an essence and are held to be appropriate or proper when the overt behaviors are consistent with an ideal or essential nature. The British, for example might compliment someone's behavior with the expression, "good form." This example illustrates the use of the term, "form," to essence or true nature and we see that the expression of form can be seen as positive (good) or negative (bad).

A far more extensive example is found in Japanese culture and the concept of Kata. Kata is usually translated as "form". There is an umbrella term, shikata, that appends the prefix shi - the root meaning of which is a combination of "support" and "serve" in the sense of an inferior supporting and serving a superior ⌧ to form, thus yielding a "way of doing things," with special emphasis on the form and order of the process. Process has two connotations: the way that form comes to be expressed, which will relate to the Unfolding pattern that follows; and, the idea of conformance between the essential form and the expression of that form in terms of behavior. Boyé Lafayette De Mente discusses kata extensively:

> "Some of the more common uses of kata include yomi kata "way of reading", tabekata "way of eating", kangae kata "way of thinking", and iki kata "way of living". … There are dozens of other kata. In fact, there is hardly an area of Japanese thought or behavior that is not directly influenced by one or more kata.
>
> When used in the Japanese context the shikata concept includes more than just the mechanical process of doing something. It also incorporates the physical and spiritual laws of the cosmos. It refers to the way things are supposed to be done, both the form and the order, as a means of expressing and maintaining harmony in society and the universe.
>
> The absence of shikata is virtually unthinkable to the Japanese, for that refers to an unreal world, without order or form.
>
> Early in their history the Japanese developed the belief that form had a reality of its own, and that it often took precedence over substance. They also believed that anything could be accomplished if the right kata was mentally and physically practiced long enough. … "Japan has no genuine philosophy as such, only form," says Kazumo Matsumura, assistant professor of Japanese mythology at the Oyasato institute at Tenri University in Nara.
>
> To the Japanese there was an inner order (the individual heart) and a natural order (the cosmos), and these two were linked together by form ⌧ by kata. It was kata that linked the individual and society. If one did not follow the correct form, he was out of harmony with both his fellow man and nature. The challenge facing the Japanese was to know their own honshin, "true" or "right heart", then learn and follow the kata that would keep them in sync with society and the cosmos.
>
> Zen priests have been teaching the Japanese since the 13th century that mental training is just important, if not more so, than physical training in the achiev-

ing of harmony and the mastery of any skill. ... The ultimate goal in traditional Japanese education among the samurai and professional classes was for the pupil to become one with the object of his training. The goal of the swordsman was to merge his consciousness with his sword; the painter with his brush; the potter with his clay; the garden designer with the materials of the garden. Once this was achieved, as the theory goes, the doing of a thing perfectly was as easy as thinking it."

[Boyé Lafayette De Mente 2003]

The discussion of kata (form) in Japanese culture helps understand FORM itself while providing additional information about the mutual context established by FORM, UNFOLDING, and ZEN MIND.

Form is essence, is intrinsic to a thing, and is not, usually, directly perceived. Only when form is made manifest, as shape, relation, behavior, etc., is it sensed, observed, appreciated, or evaluated. It is very common to use the same term, form, to mean the essence and the sensible manifestation of that essence. Similarly, it is very common to use terms like 'shape,' 'appearance,' and even 'structure' as synonyms for form and thereby increasing the confusion between form (appearance) and FORM (essence). This is one of the three major ways in which FORM can be poorly implemented.

Poor Implementations

Conflation of form (appearance) and FORM (essence) is one way that the FORM pattern might be mis-implemented. Alexander, in Nature of Order, provides an example of this with his focus on strictly geometrical properties. Geometry may or may not apply to FORM (essence) regardless of how applicable it might be to form (appearance) in the three-dimensional world of physical buildings and artifacts.

Poor implementations might also arise from the use of a process that Alexander described as "Self-conscious" design in Notes on the Synthesis of Form. The self-conscious process is what comes into existence when a practice becomes a profession. In Alexander's case, when the practice of building became the profession of architecture. Design is reduced to conformance to abstract principles and concepts and loses its sense of 'fitness' and QWAN.

The self-conscious process replaced the natural interaction of builder and built with a set of abstract concepts and rules. The abstractions could be permuted in various ways to create "schools of thought" and architecture was deemed to be "good or bad" by virtue of its conformance to the abstract school of thought ⊠ not conformance to the essential FORM of that which was being built.

As Design has become a profession, it too has established abstract concepts and rules that may or may not have anything to do with FORM and processes used to facilitate the expression of FORM. ZEN MIND directly addresses the issue of unself-conscious design processes ⊠ n fact is a necessary foundation for them.

Stories

[possible story in Greek theatre ⊠ mask / form / personae / audio amplifier as well ⊠ mask was the translator of FORM expressed as personae]

Pattern Description

This pattern asserts that there is an essential FORM in all things and that this FORM may or may not be directly accessible to our senses. It further asserts that there is a relationship between FORM and form (shape or other sense accessible characteristic). Finally it suggests that there is a process, discussed in UNFOLDING, to facilitate the expression of FORM and that this process is dependent on a designer possessing a ZEN MIND.

Provides context to

Along with other Zero-level patterns, FORM establishes the foundation from which are derived all the other patterns in the language. FORM along informs the essence of the patterns (whose focus increases in specificity): RUSSIAN DOLLS and GESTALT; BEHAVIOR, EVERYTHING IS AN OBJECT, AFFORDANCE and PERSONAE; STORY TELLING and SHOW ME; ATTRACTIVENESS, FIT, and JOY.

040 *Unfolding* **
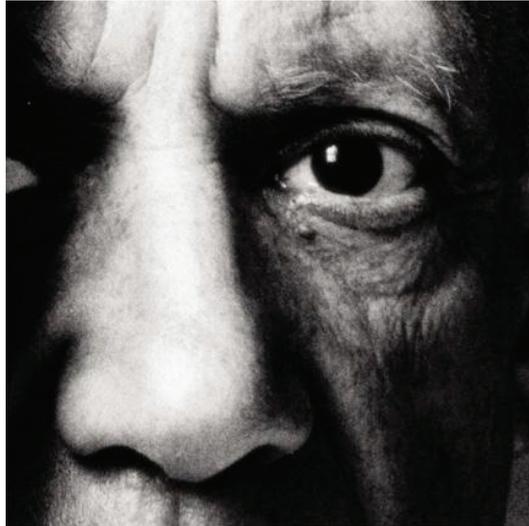
Become who you are.
Pablo Picasso

Thumbnail

if (any of these)
- ■ Your design is obviously the product of an ego.
- ■ The difficulty in moving from one version to the next increases exponentially.
- ■ Construction is dependent on an elaborate falsework.

then (one or more of these)
- ■ Recognize the power of the "non-selfconscious" process.
- ■ Assure essence preserving transformations.
- ■ Utilize continuous 'baby steps' incremental development.

Problem

It is difficult to discern and lay out an explicit path that leads from essence (Form) to expression (Shape). The information necessary to identify all the critical decisions and actions required is incomplete, at best. There is little if any assurance that the final result will be 'Essential,' that it will be anything more than a simple satisfaction of overt requirements.

Therefore,

Solution
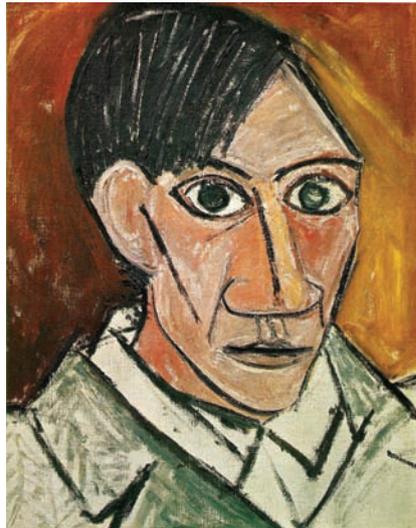
Allow the essence, the FORM, to express itself via a process of UNFOLDING.

Begin with the assurance that you have understood the essence, the FORM, of a thing. Make small transformations, each focused on producing a new SHAPE while preserving FORM. Stop when the resulting SHAPE satisfies your professional sensibilities and the client's expectations.

An example (rather elaborate): given a human person, design a virtual (digital representation) person.

First ,I observe humans and notice that, (being of the Humanist persuasion), each one is unique. The essence of that uniqueness is complicated, if not complex, but the part of that essence is a means to differentiate one human from another in an exact manner. Examples would include DNA, iris patterns, and even fingerprints. None of these is absolute, but all are 'good enough.' So I decide that my virtual person should have an ID ⊠ a digital value that assures uniqueness. [I have been told that any of the naturally occurring differentiators ⊠ DNA, fingerprints, etc ⊠ can be digitized and could serve as my virtual person ID.]

A very important part of differentiating among humans is what it is that they can do.

More specifically, what they can do for me in this situation. So I make a list of these things, call them 'behaviors,' and note the means I can use, (e.g. orders, requests) to elicit the behaviors when desired, and call them messages. I add 'methods,' blank for the moment, and a draft message protocol to my virtual person.

Thinking about how a real person does what they do leads me to consider two things: what might they need to know in order to do that; and, do they need help from someone or something else? So I make a list of all the things that a person would need to know (including the kind of collaborators and how to ask them for help). I notice that real people do not necessarily "contain" everything they need to know, sometimes they obtain that knowledge as part of a 'request for service,' sometimes by asking someone else, and sometimes simply by figuring it out on the fly using other things they know or can know. I then add instance variables to my virtual person to store those things that a real person would 'memorize,' modify my message protocol to include arguments for knowledge that should be part of a message, and note those things that I will need to actually calculate.

Noticing that individuals have characteristics or traits and these are a part of what distinguishes them from other humans. But I also notice that the importance of these characteristics (attributes) vary dramatically over time and as a function of who is noticing those traits. I also notice that humans are often unaware of even the most innate of characteristics. From these observations I conclude the necessity for keeping track of attributes, but that the work involved in doing so should be delegated to some other thing ⌧ because that work is not part of the essence of being a human. Therefore I create a "description object" and store it in an instance variable of my virtual person instead of giving my virtual person a long list of named attributes, each in its own variable.

Other observations (individuals do different things in different contexts and as a result of participating in different relationships) would lead to giving the virtual person "roles" and "personae." They would also support implementations of the virtual person that would preserve autonomy and self-direction.

Each step of the design process is an increment of unfolding ⌧ the Shape of the virtual person (the target of design) reflects a revelation of the Form of the human person. Fidelity between Form and Shape is preserved. And because essence is preserved, my virtual person will be as composable, flexible, and adaptable as its human counterpart.

Discussion

This pattern involves the core difference between the way a traditional designer attempts to solve a problem (come up with a design) and the way a traditional software developer attempts to solve a problem (engineer and construct a program). It strikes at the difference between a metaphorical approach and a literal one. It asserts that the 'designer' is informed by the 'natural' and the biological while the 'programmer' is informed by the 'artificial' and the machine.

page 23

The pattern is synthesized from several observational threads. One of the most obvious is the evolution of ideas about form and growth in the work of Alexander, beginning with his understanding of the 'organic' non-selfconscious way of building in his first book to the explicit discussion of unfolding (and its biological examples) in his (probably) final work. Richard Gabriel's ideas about the "Designed as Designer" help understand how a thing can reveal itself, its Form, to those charged as "the designer" and thereby participate in its 'design.'

Exists in the context of

Unfolding is a process pattern based on observations of nature, specifically living things and how they come to manifest different forms. Form, Unfolding, and Zen Mind participate in a mutually established context. In part because they are all primordial concepts, but also by participation in the following relationship: that which is, Form, as it is expressed via Unfolding, and as it is apprehended by a Zen Mind which facilitates the Unfolding with acts of design.

Evidence

Chaucer tells us, "an ook cometh of a litel spyr," putting into words a phenomenon we see around us every day ⬜ the emergence of something like the mighty oak tree from a mere sapling, and before that a tiny seed, an acorn.

Modern biology tells us that all living things arise from a process of self-directed division and differentiation driven by our DNA ⬜ but guided by the environmentally driven setting of complex switches that allow and inhibit the expression of different genes along the DNA strand. Biology says that the essence of any life-form is sufficient to assure expression of that essence. Nuances and details, the kind of thing that allows for individual variation among a class of life-forms, are enabled by connection to the environment. Different environments have the effect of shaping different outcomes.

Alexander discusses, at great length, how his understanding of biology and the emergence of shape (lower case form as discussed in the Form pattern) led him to include Unfolding as a basic property of the nature of order (or perhaps more accurately, the order of nature). Alexander highlights two important aspects of unfolding: first, that unfolding is indeed a process, a sequence of stages between Form and form; and second, that at each step of the sequence the essence, the Form, is preserved.

Both of these aspects are important as design also involves a sequence and the goal of design is to assure conformance between the essence and the expression ⬜ to assure that whatever transformations might be involved in the process, preserve the original essence. What Alexander called structure-preserving, we will call essence-preserving transformations.

Evidence and an illustration of essence-preserving transformations are readily seen in

mathematics. An equation that is too difficult to solve can be transformed into another expression (by adding, subtracting, dividing, or multiplying two sides of an equation by the same factor for example) and the new expression is easier to solve. The allowable transformations assure that the structure, essence, even "Truth" of the original equation is preserved at each step of the 're-expression process.'

Unfolding is dependent on an interaction between essence, the Form, of a thing and the environment where that essence is expressed. The essence drives the expression, but the environment constrains the expression giving rise to 'shape' that may or may not appear to the observer to be consistent with the Form. It often seems as if we must rely on trust or belief that unfolding is indeed Form, or essence, preserving.

Humans 'unfold' their lives, striving to establish and maintain fidelity between the "inner order" and the "natural order." But this cannot be done by a formula, there is no exact and correct way to insure results. But we can discover and follow patterns of behavior ⬚ kata ⬚ that assure synchronization, that lead to the best possible results, even if they do not provide guarantees.

Fortunately there are 'masters' ⬚ those that grasp the essentials of kata, of Form, of patterns and who can provide guidance, mentoring, or coaching to assist others in their individual unfoldings.

Poor Implementations

If a seed is planted too deep in the soil it may begin the process of expressing itself but fail to carry it out because the environment is totally hostile. It is more common, however to see some environmental factor result in malformation ⬚ an expression that is tenuously related to essence.

The cause of poor implementation usually arises from the interaction between the essence and the environment. It is possible for a gene, an example of essence, to contain an error that leads to malformation, but it is more likely for the switch that controls that particular gene's ability to express itself (a switch set by the environment) to be the cause.

A self-conscious process can also be the cause of a poor implementation (see ZEN MIND for further discussion). Consider the difference between topiary and bonsai. In the former a self-conscious process forces a plant to assume a shape, a form, quite contrary to its innate and essential FORM. In Bonsai, the gardener attempts to discern the FORM within and to alter only those "switches" that might have been triggered in a natural environment ⬚ leading to a form that is congruent with FORM albeit on a very different scale.

Simple errors in understanding a Form might also be the cause of a poor implementation. This kind of error can best be seen by thinking backward, from expression to see what kind of understanding of essence was at play. The "big box superstore" for

example is a place where humans can obtain that which is necessary to live ⊠ from food to clothing to medicine to tools. One might suppose that the essence behind such stores was the same essence that leads to the establishment of village markets. Indeed the designers (architects) of big-box stores probably think that is exactly what they are doing ⊠ but they fail because they did not see the real essence of the marketplace ⊠ the messy, chaotic, dynamic, and overwhelming social nature of the village.

Stories

[...]

Pattern Description

Unfolding is a process of self-expression guided by environment stimulated triggers or switches. Unfolding is grounded in Form; it is Form that is self-expressing. Unfolding involves a sequence of stages, each of which involves a transformation and an intermediary expression of Form that conforms to the original essence. This pattern suggests that the role of a designer in the unfolding process is to assume responsibility for guiding the unfolding by taking actions and making decisions that emulate the kind of environment switching that allows and assures conformance between form and Form.

Provides context to

Along with other Zero-level patterns, Unfolding establishes the foundation from which are derived all the other patterns in the language. Unfolding along informs the essence of the patterns (whose focus increases in specificity): Russian Dolls; System Metaphor; and Fit.

060 *Zen Mind* **

Thumbnail

if (any of these)
- You are lost in a plethora of trees.
- You know the "Devil is in the details," but would prefer not to go to Hell.
- You fear failure.

then (all of these)
- Apprehend the Gestalt.
- Master Non-Attachment.
- Stop thinking!

Problem

It is difficult to think of designing as anything other than a verb - one that mandates the designer ' do something' That which is to be done is framed in the form of hundreds if not thousands of discrete "requirements." You are incapable of grasping all of those details simultaneously ⊠ a kind of conceptual Hell. Your work is burdensome in direct proportion to your conviction that the project will ultimately fail (at least in part).

Therefore,

Solution

Nurture a ZEN MIND, one that embodies omniscience, one that is dependent on the ability to listen and observe; one that allows action consistent and congruent with the situation instead of that which is "right" or "wrong."

Examples: being "in the zone," experiencing, "flow," or the enlightened one that acknowledges, "when I am hungry, I eat, when thirsty drink, when sleepy, sleep."

Discussion

We are all aware of the limitations of our conscious mind. Miller's "magic number seven, plus or minus two" is a one of the most cited discussions of such limitations. Fred Brooks, in 'No Silver Bullet,' speaks to the difficulty of establishing and maintaining a conscious mental model of a computer program.

Less familiar are the capabilities of our non-conscious mind: the ability to process millions of simultaneous sensory inputs, to recognize and respond to thousands of highly dynamic variables (internal and external), vivid and detailed memory, and even lucid dreaming.

One of the precepts of Zen (indeed most mystical traditions) is the need to "still" the conscious mind and experience the Awareness of the non-conscious. This precept is the foundation for the last injunction in the pattern thumbnail, above.

Mystics are not the only ones that recognize the value in transcending the limitations of the conscious mind. The "Centipedes Dilemma" (getting stuck on the question of which foot moves first, instead of just walking) is an example from common folklore. Athletes and coaches frequently admonish novices to 'stop thinking and just feel or just do it.' (Nike's slogan is itself such an admonition.) The Dreyfus brothers talked of the

evolution of Chess masters, from making moves to recognizing patterned situations, to transcending ("compiling") conscious thought. Alexander noted that a pattern language is but a Gate, and that you could not truly practice the Timeless Way until you had passed through the Gate.

A discussion of the means or mechanisms by which one establishes Zen Mind are beyond the scope of this discussion. The title of the pattern does allude to one such approach. We will also mention another because it reflects a major difference between how one is expected to become a designer and how one is expected to become a software developer (as one example). Designers are expected to design ⧠ frequently, constantly, in diverse contexts, using diverse media, and always subject to feedback and criticism. Richard Gabriel noticed this difference when comparing his education as a poet and his education as a computer scientist. Mastery of poetry required writing a poem a day, at minimum, but computer science required writing a few dozen, toy programs, over a span of up to eight years. Practice may not assure perfection, but it certainly lays a solid foundation for the development of Zen Mind.

Some ways that Zen Mind offers pragmatic benefits to a designer include:

■ Gestalt thinking ⧠ seeing the forest instead of a plethora of trees. A gestalt creates a simultaneous awareness of components and relationships among components. It provides the context that allows correct interpretation and implementation of individual details ⧠ you can focus on the detail without losing sight of how that detail conforms to the whole.

■ As problems become more complicated, or even complex, and the number of issues and specific 'requirements' multiply beyond all reason ⧠ you can delegate the handling of those details to the part of your mind/brain that is equipped to deal with them. What is hell for the conscious is child's play for the non-conscious. (You do need to operationalize the non-conscious, but that is what practice accomplishes.)

■ You open up the possibility of 'doing the right thing,' instead of striving 'to do what is right.' The former is grounded in the "omniscience" associated with flow or being in the zone. This is not the omniscience of memorizing Wikipedia, but the omniscience that comes from non-conscious awareness of all the factors that matter in the here and now and the, equally non-conscious, response to that awareness. Doing what is right implies conformance to some arbitrary set of criteria or rules ⧠ what Alexander decried as the "self-conscious process."

■ A corollary of doing what is right, is the absence of YOU ⧠ it is not your ego that is responsible for the doing ⧠ it is the situation and all of the factors operative in that situation that are expressing themselves ⧠ you are merely the instrument. Your are not responsible, it is not YOUR doing. Form is unfolding and coming to the surface as Shape. You need not experience the agony of Arjuna (in the Bhagavad-Gita) or the fears of failure.

Exists in the context of

Zen Mind focuses on the mental state of the designer, one that promotes unfiltered discernment of Form and effective participation in the Unfolding process. All three patterns establish a mutual context. In part because they are all primordial concepts, but also by participation in the following relationship: that which is, Form, as it is expressed via Unfolding, and as it is apprehended by a Zen Mind which facilitates the Unfolding with acts of design.

Evidence

A state of being where the whole of oneself is as one with the whole of one's surroundings is surprisingly common, albeit too often fleeting. Athletes call such a state of mind as being "in the zone". A surfer might speak of "being one with the wave." Most professionals have experienced moments when the "work just flows." All of these can be seen as episodes of Zen Mind.

The state of mind, really the state of being, that we are naming Zen Mind is found in every culture and is almost always associated with "mystical" traditions. The specific association with Zen comes, perhaps, from the pervasiveness of the idea in Japanese culture. As Lafayette De Mente points out:

> *"The ultimate goal in traditional Japanese education among the samurai and professional classes was for the pupil to become one with the object of his training. The goal of the swordsman was to merge his consciousness with his sword; the painter with his brush; the potter with his clay; the garden designer with the materials of the garden. Once this was achieved, as the theory goes, the doing of a thing perfectly was as easy as thinking it."*

[Boyé Lafayette De Mente 2003]

Poor Implementations

Nonexistent ⊠ you have it or you don't. Perhaps "getting stuck in the magic," ala Milarepa, might be a poor implementation. Perhaps a tendency to literalism could be a poor implementation ⊠ he two monks and the geisha for example.

Stories

Stories about Zen Mind, or an aspect of it, are abundant. Some favorites include the story of the Zen Butcher (originally the Taoist Butcher) and Sesshu's comment at the end of his Long Scroll.

> *"Having reached the venerable age of 67, the court butcher decided to retire. He had cut meat for the court for more than fifty years, using the same knife without*

the need to sharpen it. The Emperor decided to recognize this remarkable feat during the festivities he asked the butcher to explain why the butcher's knife never needed sharpening. The butcher thought for just a moment before telling the Emperor, "I simply cut where the meat wasn't."

The following illustrations are from Sesshu's Long Scroll ⬚ a landscape watercolor that measured 14 inches (~40 centimeters) by 50 feet (~15 meters). Sesshu was a Zen Master as well as a skilled painter, one who was truly one with his brush ⬚ as the caption at the end of the scroll attests.

Part of Sesshu's Long Scroll

Stories similar to that of the Zen butcher are seen in other traditions. The sculptor, for example, that simply *"removed all the marble from the block that was not part of the horse"*.

Pattern Description

This is a pattern about a state of mind or being. When one is in that state of being, one is highly sensitive to surroundings, is able to listen, and to see clearly the reality behind the illusion. Ego is removed, and the designer acts on the basis of need and correctness, in conformance with the FORM rather than on the basis of willful desire. The designer becomes the instrument of the designed, engaging in a dialog and assisting the self-expression of FORM. The pattern is mystical in nature mostly because it is associated with such traditions. ZEN MIND is not at all mystical or alien, given that so many of us have experienced ephemeral moments of Zen Mind in our lives.

Provides context to

In some sense this pattern provides context, in the form of a foundation or a prerequisite, for all of the other patterns in the language.

Abstract

[There will be a short introduction here explaining the grouping of the 100 level patterns and some background info.]

120 *Magically Liminal***

[archetypal picture here]

Thumbnail

if
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Context

The preliminaries are complete. The design/development team has its Design Brief and a clear understanding of the constraints of the solution space. A design has yet to emerge. This is the space where 'design happens.'

Problem

How to deal with the "Anguish of the Void" ⊠ the necessary but problematic place where creativity has its roots.

Succinctly stated, this is the problem of the "Blank Page." Every author, every designer, every programmer; has experienced this problem: a void that must be filled. A void characterized as a space, "where nothing IS and anything might BE." A void that cannot be filled with random elements, but only with elements, and an organization of those elements, with the potential to "make sense." The requirement to, eventually, make sense means that the thoughts and the activities in which the designer engage required "guidance" but that guidance cannot predetermine or predestine the eventual outcome, the eventual design. Both the void and the virtual space where the designer thinks and acts to fill that void are inside the mind of a human designer. We can therefore speak only "about" that virtual space, we cannot define it or describe it.

Therefore,

Solution

Support and promote a liminal state and allow the creator to experience that state, to become liminal.

Forces

The problem of the 'Blank Page,' the virtual space where "nothing IS and anything CAN BE," and the lack of direct access to the Designer's mind are joined with a set of implicit forces arising from the liminal state:

> It is magical, in the sense that the rules and laws that govern everyday reality are suspended and everything is, literally, possible.
> It is characterized by its dynamism and the circularity of that dynamism.
> The recognition of any element, the juxtaposition of any elements, the emergence of any kind of 'proto-design' all have the effect of subtly changing the problem that led to the tentative design.
> It is a place with its own internal logic, and that which makes sense when liminal can appear to be impossible or ludicrous outside the liminal state.
> It is a place where everything, including the designer's sense of self, is in flux.

It is a place of ego-less omniscience and non-attached action. The same place that mystics label 'satori.'

It is a bewildering space, a space where it is quite possible to lose oneself and one's purpose. Safe passage through the space requires a guide, but the guide cannot direct, cannot lead along a specific path, can not predetermine the end-point of the journey. We cannot build what we cannot conceive (design), so some resolution is essential and we find that resolution in the archetypal ⬚ which has left the subconscious and become manifest in our awareness ⬚ and in the use of metaphor. As the philosopher, W.V. Quine, once said:

"Along the philosophical fringes of science we may find reasons to question basic conceptual structures and to grope for ways to refashion them. Old idioms are bound to fail us here, and only metaphor can begin to limn the new order."

Pattern Description

This pattern focuses on the state of liminality ⬚ a space that cannot be described or defined. In fact the pattern suggests the need to support such a space and to allow designers to experience it. The pattern description therefore shifts away from the liminal space and towards a description of other instances of people experiencing the liminal.

Perhaps the best description comes from Arnold von Gennep and is analysis of Rites of Passage. The rites studied by von Gennep involve humans changing their status and their role in a society: e.g. child to adult or secular to sacred. Rites of passage have three phases ⬚ separation (from what was); the Magical Liminal (Clifford Geertz called this, "the betwixt and between), and incorporation (the new is made manifest and tangible).

Human rites are 'guided' by other humans, those who have already experienced the Passage and are experienced in the incorporated state. In the context of this pattern, metaphor and application of Forever Jung provide the necessary guidance.

130 *Forever Jung****

[archetypal picture here]

Thumbnail

if
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then
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Context

Your focus is on those aspects of a design that are directly concerned with human interaction. You want to incorporate elements and relationships in your design that have facilitate interaction with humans and that communicate simply but profoundly with humans. Most of these design elements will be visual and auditory, with some being tactile and ergonomic or kinesthetic. (The use of smell and taste elements in design is still largely unexplored territory except for "designer foods and recipes or designer scents/perfumes.)

Problem

Can we find elements of Beauty, Good Design, or QWAN that can be used to facilitate design thinking?

A design must be compelling to human beings for it to be considered "good" design. Finding those elements and arrangements that make a design compelling still involves significant amounts of trial and error. That is why designers work with multiple concepts during the design process. How can the process of selecting design elements be enhanced - the time spent in trial and error be reduced but not eliminated?

Therefore,

Solution

Incorporate elements in your design that are known to be "archetypal" and those colors, symbols, shapes, and other sensory signals that you believe evoke and provoke the desired reactions.

Carl Jung has explored psychology to find universal symbolism, Joseph Campbell has explored myth to expose universal stories and relationships, and Christopher Alexander has explored Nature to find universal properties, each with the intent of finding 'archetypes' universally shared fundamentals that might explain the affective power of design and design elements. Their discoveries include elements like the Fibonacci number series that define the shape of a nautilus shell, or the hexagons of a honeycomb that are both highly recurrent and surprisingly powerful.

Recurrent examples of the organization of elements, grounded in our physiology and culture can be found. One example, putting the most important information in the upper left quadrant of a visual field; reflecting that fact that people read horizontally, left-to-right, then vertically unless, of course, you are one of the billions of people that read vertically then horizontally right-to-left.

Designers are very much aware of this pattern; as evidenced by the numerous books on the design shelf of any bookstore that are essentially simple compendiums of shapes and symbols.

Forces

The number of design elements is very large. In the words of Shakespeare:

There are more things in heaven and earth, Horatio,
Than are dreamt of in your philosophy.

The possible arrangement of those elements yields a combinatorial explosion. Only certain elements, in certain arrangements have been empirically demonstrated as effective. The time and cost associated with trial and error is significant and does not guarantee an optimal outcome. It is very possible that a trial and error approach will lead to the selection of a design that is nothing more than "the best of the worst."

We are very aware that small sensory triggers can evoke feelings of appreciation or repulsion in human beings. In some cases the evoked reaction is universal ⬛ all humans respond or react in the same way ⬛ and in other cases the effect varies according to circumstance, time, place, and by culture.

Although any given problem in its unique context can be unique in its solution, the vast majority of problems and solutions have commonalities, patterns. It is far more cost effective to adopt and adapt a proven solution than it is to recreate a solution from whole cloth. At the same time we know that it is impossible to completely document a solution: both because the tacit knowledge implicit in the solution is never in the documentation; and, because the "coherence" of any given design is an emergent property and cannot be documented.

Pattern Description

One description of this pattern is a book of symbols, of which there are many, that is used as a reference work to look up particular symbols, images, sounds or other sensory stimuli. A second description of this pattern is really a call for further work ⬛ the creation of better indices (given a desire to evoke this response, consider this set of symbols) and, in fact, for a true Design Patterns library.

Discussion

Software, today, is generally engineered, (engineering is a subset of or specialized kind of design), and engineers do employ archetypal organizations, or architectures in their designs. This kind of design is evident at the systems, applications, program structure, and data structure levels. Unfortunately, engineers are familiar with a very small subset of archetypal elements and organization ⬛ those that are most reflective of machines, not humans or biological organizations. The result is a huge "impedance mismatch" between the software and the systems in which it is deployed. This also accounts for the lack of usability that is so apparent in most software.

As attention turns away from the machine (the computer) and those aspects of software that are amenable to engineering; and towards the system in which software is

deployed and to the human beings that are integral elements of that system: the role of design will increase and the products of design will be dramatically different than those in evidence today.

140 *Glossolalia****

[archetypal picture here]

Thumbnail

if
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then
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Context

The liminal state, where everything is possible, except, things that are not.

Problem

How can we recognize and overcome the influence and bias, the limitations, inherent in language?

Like culture, discussed in Thick Description, language influences and biases thought - in part by providing the vocabulary and therefore the concepts that are available to think with. This is a modest form of the Sapir-Whorf hypothesis: your thinking is limited by the language you speak. For example, how do you conceive of something that has no name and no words to describe it?

Translation illustrates this problem. The way we think about something is very dependent on the words used. One humorous example: the U.S. deodorant manufacturer that chose an octopus to symbolize the power of its product ⊠ "strong enough for an octopus with eight arms." Unfortunately, in Japan octopi have eight 'legs.' The purpose of the product was hopelessly muddled and it failed to gain a market.

Therefore,

Solution

Develop an awareness of how languages vary and how those variations affect thinking. Actively seek to be multi-lingual, to develop the ability to "speak in many tongues."

Forces

Language constrains thought. Most of us learn one natural language before we learn others and that first language can constrain our understanding of subsequent languages, until we "learn to think" in a second or third language. All of us learn a natural language before we are introduced to the specialized vocabularies, the argot and vernacular of specialized cultures or disciplines.

Pattern Description

At first glance this pattern might be taken as a suggestion that all design and all design thinking be done in English; simply because that language contains more words, and is constantly and indiscriminately adopting and coining new ones every day.

But that is not the case. This pattern suggests that there is great value in designers and design teams that are multi-lingual. It is almost certainly true that different languages, especially those from diverse language families, bring different values and different concepts that are useful in design thinking. Ernst Fenollosa authored a short essay demonstrating the power of idiographic Chinese for writing poetry that would be difficult to expess in a symbolic language like English.

Multi-lingualism should not be limited to natural languages. Designers need to be familiar with the specialized domain argot of their sponsors just as designers seek to be conversant with the specialized languages of their clients.

150 *Russian Dolls****

[archetypal picture here]

Thumbnail

if
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- ■

then
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- ■
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Context

The project is in progress and the design is evolving. Attention, necessarily, shifts from the general to the specific and then back again, visiting many points in-between. Each shift in focus generates work results that must be 'validated' ⊠ onfirmation that you are still working within the parameters set forth in Design Brief.

Problem

How can you maintain consistency among each iteration of your work product when the simple act of changing focus might take you on a very different path towards, or away from, your goal?

Without some kind of touchstone, it is very possible for the project to proceed more or less randomly and thereby generate an outcome that has very little congruency with the idea in hand at the beginning. When a concept passes from the general (architecture) to more specific (contractor blueprints) to very specific (plumber soldering sequences of pipe) provide and example of how a shift in level of detail can introduce inconsistencies.

Therefore,

Solution

Create a "seed" that encapsulates the whole of the design and evolve the design in layers around that seed ⊠m uch as the innermost doll in a nested set of Russian Dolls encapsulates the whole while each larger layer simply adds detail. This solution is closely associated with, and relies upon, Guiding Metaphor.

Forces

The primary force addressed by this pattern is seen in a common aphorism, "you cannot see the forest for the trees." If our focus is on detail (the trees) we can miss the general. Conversely if our focus is on the general (the forest) it can be hard to see that there are a multitude of tree species participating in a complex web of relationships with other trees and other denizens of the forest. It is easy to lose vision of the whole when our focus is on the detail and we can fail to recognize the existence and effect of detail on the whole.

Russian Dolls resolves these difficulties in two ways: first by suggesting a method ⊠ additive layers of increasing detail; and second, when it is necessary to jump several levels, to address very precise details, the overall context, the whole, remains in your "peripheral vision."

Pattern Description

RUSSIAN DOLLS establishes a relationship among a set of nested levels and suggests that the innermost level be seen as a kind of "seed" with the outer levels incrementally adding detail and specificity. This pattern parallels Alexander's concept of unfolding as discussed in his book *The Nature of Order*. Wholeness is preserved at each stage of development, just as the form of the flower is contained within the seed.

In a RUSSIAN DOLL, the innermost doll will have mere suggestions (simple lines and dots and solid colors) of a face. As each doll in the nested set gets larger, there is more room to add detail and nuance, until the topmost doll will show eyebrows, eyelashes, corneas, and pupils in place of the simple dot of color on the innermost doll.

Abstract

[There will be a short introduction here explaining the grouping of the 200 level patterns and some background info.]

210 *Everything is an Object* ***

[archetypal picture here]

Thumbnail

if
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then
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Context

You are in liminal space ⊠ reation, design, is happening; Sʏsᴛᴇᴍ Mᴇᴛᴀᴘʜᴏʀ and Fᴏʀᴇᴠᴇʀ Jᴜɴɢ are providing guidance.

Problem

What kind of abstraction or metaphor can you use to decompose a complex system into understandable and coherent elements.

You are thinking about a design, but what is a design and what are you thinking with? Design involved the creation of a system (selecting a set of elements and establishing relationships among them), modifying a system (adding / deleting elements ⊠ altering relationships), or modifying an element (adding, deleting, altering one or more characteristics). But what are system 'elements?' How many different kinds of elements are there? At first glance, the world seems made up of billions of different kinds of things. Is it possible to think with that large a vocabulary?

Therefore,

Solution

Find a single abstraction/metaphor ⊠ an Object - that can simplify the design thinking process.

The metaphor/abstraction of an object is an excellent candidate. Amplify this abstraction with the assertion that everything is an object. This means that relationships are objects and so are systems. Objects are differentiated from each other on the basis of their intrinsic behaviors, not on the basis of their characteristics. Objects constitute the "nouns" in the design vocabulary, while archetypes and metaphors suggest characteristics of objects and systems, plus patterns of relationships.

Forces

The pattern deals with two pairs of forces. First, simplicity versus complexity. (In this instance complexity is used as a synonym for complicatedness, which is much harder to pronounce; and not in the more modern sense of non-deterministic, adaptive, and emergent.) Both Object and System are abstractions that apply at any level of scale and across any kind of problem domain. They simplify without distorting.

Second the scope and complexity of the world and the relatively limited ability of a human mind to deal with that degree of complexity. This mandates an ability to decompose large complex things into smaller complex things that are more tractable to thinking.

Pattern Description

The Object is a tool for decomposition and decomposition is a tool for reducing the scale of what we have to think about. The System is a similar decomposition tool. The main difference between them is that the Object allows for a wider range of variation in the kind of objects while Systems are "systems all the way down."

Objects offer a powerful way to decompose the world into discrete things, while retaining the ability to put them together again. As Plato, circa 400 BC said:

> *"[First,] perceiving and bringing together under one Idea the scattered particulars, so that one makes clear … the particular thing which he wishes [to do] … [Second,] the separation of the Idea into classes, by dividing it where the **natural joints** are, and not trying to break any part, after the manner of a bad carver … I love these processes of division and bringing together … and if I think any other man is able to see things that can naturally be collected into one and divided into many, him will I follow as if he were a god."*

An object is any thing identified by the things it can do. Differentiation among objects are also based on who can do what. Objects have access to all the knowledge and resources necessary for them to do what it is that they do. Example: an Airplane is differentiated from a Truck because it can fly. The Airplane must know about its position and its capacity because others might ask the Airplane about those. The Airplane also must have access to other objects, like a Control Tower, in order to obtain directions and commands.

As was the case in some of the earlier pattern descriptions, this is less of a description than it is a call for future work, developing an Object pattern language.

Discussion

A lot has been written about objects in the world of software, and yet the concept is still not understood, or worse, is still misunderstood. Much of this is because the discussion of objects derives from imperfect implementations of the concept in programming languages. This pattern attempts to refocus the understanding of objects as a tool to empower decomposition and design ⊠ long before any attempt is made to write program code in any language.

Provides Context to

Everything is an Object, Guiding Metaphor, and Story Telling are closely related patterns. Objects are "characters," metaphor provides the "scene" or context, and story is the actual narrative.

220 *Guiding Metaphor* ***

[archetypal picture here]

Thumbnail

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Context

The project is in progress and the design is evolving. There are a number of people working on the project, each with their own expertise, perspective, and expectations. Communication among the team involves "translation" as each person tries to understand what the others are saying in their own terms.

Problem

How can you maintain a common perspective, a common conceptual construct, over time and among a diverse group of individuals or teams?

Much like the circle game where one person whispers a phrase into her neighbor's ear, who whispers it to his neighbor and so forth around the circle. What the final person repeats to the originator is seldom recognizable.

Therefore,

Solution

Make use of metaphor, specifically a "guide" metaphor (which might also be called a 'design metaphor' or a 'system metaphor') to provide a loose fitting common context that preserves wholeness and integrity throughout the project.

The GUIDING METAPHOR shares purpose and intent with the innermost seed doll in a set of RUSSIAN DOLLS.

Forces

This pattern addresses one, quite powerful, force ⊠ the tendency towards divergence arising from a sequence of interpretations and reinterpretations, as evidenced in the familiar circle game described in the problem statement. There is a corollary pair of opposing forces involved: the need to move expeditiously towards our final goal while still allowing sufficient latitude for side-trips and local explorations that can provide insights that enhance the final outcome.

Pattern Description

Guiding Metaphor is grounded in the theory of metaphor discussed by MacCormac in his book, On Metaphor. A metaphor begins as a poetic correlation between a familiar thing and an unfamiliar thing. Our knowledge of the familiar thing suggests secondary or corollary metaphors, creating a rich web of understanding. Metaphors also "evolve" as a result of whether the secondary metaphors are confirmed ⊠ strengthen the original metaphor. If the result is confirmation the metaphor becomes a lexical term

and is no longer metaphor at all. If the result is weakening, the metaphor is discarded as unproductive.

Guiding Metaphor is not really a single metaphor, but a family of related and suggestive metaphors that can be applied at different levels of detail. For example, Kent Beck suggested the use of a "System Metaphor" to serve as a global reference point for a project. That metaphor then suggested metaphors for more detailed parts of the system, like class names and even method and variable names.

Provides Context to

EVERYTHING IS AN OBJECT, GUIDING METAPHOR, and STORY TELLING are closely related patterns. Objects are "characters," metaphor provides the "scene" or context, and story is the actual narrative.

Abstract

[There will be a short introduction here explaining the grouping of the 300 level patterns and some background info.]

310 *Design Brief****

[archetypal picture here]

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Context

Every project begins with some kind of articulation of what the project is about: what is wanted; an idea, a feeling, a wish, or a need. Project outcomes might be tangible artifacts, or processes, organizational structures, or even intangible ideas.

Problem

Design is directed towards the creation of an outcome. That requires information about what is wanted and needed. Unfortunately, the customer does not know exactly and precisely what they want. Often the customers and users do not possess complete and unambiguous information. And what information they do have may not be expressed in a manner that is interpretable and useful for the designer. The required information frequently comes from multiple sources, each with a unique perspective.

Therefore,

Solution

Write a DESIGN BRIEF ⊠ an illustrated narrative or description of what it is that the sponsors want, in their words, to the best of their ability to articulate what they know at the inception of the project. A design brief is a starting point for an exploration ⊠ like the most primitive of maps that gave only the most general information about the journey to come.

Forces

A DESIGN BRIEF resolves two binary forces: 1) striking a balance between ambiguity and precision; and 2) a balance between too little information and too much information. Certain parts of the brief must be ambiguous so that the designer has latitude to explore possibilities but other parts, like inviolate constraints, budget, or technology mandates, must be stated as precisely as possible. Enough information must be present in the brief to limn the space where a designer will most likely find a design. Too much information merely inhibits the designer, creates a smaller space to be explored and creates the risk of wasting time on considerations that will prove to be irrelevant or immaterial.

The large number of unknowns - many of which are un-knowable - present at the beginning of any project is another force. For example, the sponsors may not know what they really want because they do not know what is possible. A design brief exposes the unknowns and the ambiguities that a designer uses as input to the creative, imaginative, and exploratory process of design.

Pattern Description

A design brief shares many of the aspects of a story. It usually take a narrative form. A brief identifies a set of 'things' and any known interactions (extant or desired) among them and identifies a goal or state to be achieved as a result of those interactions. This is analogous to a story with a cast of characters, a plot, a script (a sequence of interactions among the characters), a set, and props.

A design brief is a record of the initial conversations between a client and a design team.

Discussion

DESIGN BRIEF has a parallel in software development, specifically Agile software development, and even more specifically, the User Story and System Metaphor of Extreme Programming (XP). XP recognized the fallacy of "complete and unambiguous requirements and specifications" demanded by the prevailing practice of Software Engineering. An alternative to the voluminous and detailed 'requirements document' was required, an alternative that would provide a solid starting point while allowing for evolution of the software solution as those involved in the project ⊠ sponsors and developers ⊠ expanded and clarified their understanding of the problem and its solution.

XP suggested that the best starting point for a software project would consist of a useful System Metaphor (a bridge between that is known and that which has yet to be understood), some User Stories, and some ephemeral illustrations on a whiteboard. This is directly analogous to the content of a designer's brief. It has the same purpose ⊠ to delineate a starting point for productive exploration.

Agile software developers are familiar with the use of this pattern. System Metaphors and User Stories were present at the beginning of Agile and their power needs to be rediscovered and exploited.

320 *Story Telling* ***

[archetypal picture here]

Thumbnail

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Context

A Design Brief is in hand and the project is underway. Both the problem space and the solution space are being explored. Potential solutions, designs, are being formulated and evaluated. Numerous people, filling varied but complementary roles, are involved in the project, and all of them bring their own perspectives and contributions to the proceedings. A shared vision of project and its final outcome is emerging.

Problem

How to grasp the implicit essence within a large volume of information in a way that can be conveyed to others.

Therefore,

Solution

Exploit the power of story telling.

Storytelling, since time began, has been the mainstay of mankind when it comes to making collective sense of life, teaching, entertaining, and acculturating newcomers. Stories are the backbone of human cognition. Stories allow us to coalesce a complex set of facts or intuitions into a coherent whole. Stories are effective, powerful, easily remembered, high bandwidth tools of problem solving, entertainment, and information transfer, whose force resides in their primarily evocative nature. Even the simplest story, operating like a vacation snapshot, will bring to mind a dense association of other stories, circumstances, and knowledge. That's why we like them, tell them, and remember them.

Forces

Each new piece of information has the potential to change the meaning of all the other information at hand. Conversely, each new piece of information potentially requires reevaluation and reinterpretation in the context of everything else that is known or believed. Occasionally, a development thread will hit a dead end and it will be necessary to return to that thread's starting point and explore in an alternative direction.

The volume of information exceeds human capacity to juggle disparate and discrete information elements. Information flow and semantic meaning are in constant flux. The system and the process of design shares the characteristics of any complex adaptive system. Order (a viable design) must emerge from apparent Chaos.

Pattern Description

A story is any narrative depiction of the interactions among a group of characters and their environment as the whole moves from one state of affairs to another. Stories can be told at many levels and from various viewpoints. Stories can be nested, intertwined, and set in opposition. Stories are shaped by their context and provide a context that shapes other stories.

Discussion

Design is about turning ideas into expressions, and this requires an understanding of a broad range of information about the world and how potential designs will work in that world - a theory, if you will. In the world of software, Peter Naur spoke of software development as theory construction. A theory was an understanding of "an affair of the world and how the software would handle and support it." The construction of a theory is an iterative process of story telling, prototyping, and assessment. Theory exists only in the heads (minds) of those who participated in its development. At any given time most of the Theory is non-conscious, but each story has the potential of evoking, recalling to mind, vast segments of the Theory.

User Stories, properly understood, provide the mechanism for conducting and recording the on-going conversation among all members of a project team. Each User Story ⬚ recorded as a simple natural language narrative on an index card ⬚ is a "reminder of conversations past and an invitation to conversations future." (Kent Beck, inventor of Extreme Programming) Simple stories provide the mechanism enabling all parties to convey, disambiguate, and achieve a consensus understanding, a Theory, of the problem, the emerging design (software in some cases), and the means for implementing and effecting the design.

User Stories support a dynamic cycle of: think (about the problem); articulate (a proposed solution); express (the solution); analyze (computer behavior / feedback) the outcomes; revise and amend your thinking; and repeat until the clients, designers, and development team agree that the best possible work has been delivered.

Pattern Description

Everything is an Object, Guiding Metaphor, and Story Telling are closely related patterns. Objects are "characters," metaphor provides the "scene" or context, and story is the actual narrative.

350 *Prometheus Bound* ***

[archetypal picture here]

Thumbnail

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Context

The liminal state where everything is possible, except, things that are not.

Problem

How can you identify and use constraints?

No designer has absolute freedom. Some designs cannot be implemented due to technological or scientific limitations. Others are bound by the amount of money or time available from the client. Still others may falter because of the available skills of the development team. Explicit constraints are usually provided to the developer / designer, but some constraints have more validity than others. Some constraints should be observed and others challenged.

Conversely, absolute freedom is also a constraint - as discussed in the Magically Liminal as the problem of the "blank page". Constraints allow the designer to focus, to make their work more productive by "limiting the space" in which an optimal design might be found.

Therefore,

Solution

Expose, analyze and leverage all the constraints that affect a design project.

Forces

Not all constraints are overt, some constraints are more apparent than real, and some are based on a lack of knowledge about what is really possible ⧠ particularly in those circumstances where a 'disruptive' design not only solves a problem but simultaneously eliminates constraints by redefining the context in which the solution is deployed.

Pattern Description

1) Elicit all relevant constraints. Ask the customer / owner to enumerate the constraints they want to put on the project ⧠ usually time, budget, technology and method.
2) Use the It Takes a Village pattern to elicit tacit constraints.
3) Challenge the assumptions and presuppositions behind each enumerated constraint. The purpose here is to find out the "real" issues behind any stated constraint so that you can challenge or address them immediately instead of being surprised. Also you will be able to prioritize constraints and find out which ones you can 'fudge' a bit and those that you absolutely cannot ignore or violate. Finally you will be able to identify how a constraint is part of its context and determine how it might change in the future.who

she hopes to understand. She participates in the life of the people, working in the fields, dancing in ritual performances, preparing and consuming food ⬚ everything. She is not a mere observer. In the software world, this means going and 'living' with your customer and actually doing their work, experiencing what they experience.

The value of doing applying this pattern comes from your increased awareness of a web of constraints that will ultimately determine the success or failure of your project. These constraints take the form of cultural values; behavioral norms and sanctions for violating those norms; power, gender, and familial relations; and, worldviews.

330 *Show Me****

[archetypal picture here]

Thumbnail

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Context

You are telling stories and your story library is growing and solidifying. The number of stories at hand is steadily expanding and the scope of storytelling is both widening and deepening.

Problem

Some stories are so convoluted or so ambiguous you cannot understand what is being said. Some stories depict things or situations sufficiently removed from ordinary experience that meaning of the story eludes comprehension. The sheer volume of stories accumulating makes it difficult or impossible to keep track of all the versions of related stories and all of the associations and interactions among the stories.

Therefore,

Solution

Depict the story, or some of its elements, in a way that allows senses, other than the analytical brain, to apprehend and experience them. Create a visual (or other sense-based) abstraction of the complex interplay among stories. Create a prototype of a design solution that allows for the collection of sensory data (tactile, visual, auditory, kinesthetic) that would be impossible to abstract from simple text.

Research suggests that human beings developed the ability to visualize and to artistically (graphically, musically, and tactile shaping) depict concepts and ideas before they developed language (even verbal language) and symbolic writing. Human cognition relies on the integration of both sets of specializations ⊠ language and analytics / visualization and spatial relationships ⊠ that are typically attributed to the two halves, right and left, of the human brain. Comprehension is always improved when both sides of the brain, both our primordial drawing and more recent linguistic abilities, are integrated and coordinated.

Stories can be illustrated using a totem or other tangible artifact, a diagram, a sequence of sounds or visual images, or a complicated three-dimensional model. In all cases, the illustration serves as a kind of shorthand token capable of recalling the entire story to our conscious awareness.

Prototypes provide a way for the design to "participate" in the discussion. When the designer look at a visual prototype, even a sketch, a void in the imagination (the ability to extract meaning from words alone) is filled. The prototype "speaks" to the designer and things are seen that would otherwise be missed. Other types of prototypes speak to other senses (quoted remarks from the point of view of the prototype): "do I fit comfortably in your hand?" "Am I too heavy to carry around?" "I am discordant." "I am sensuous." All of these are personifications of the kind of feedback offered by a

prototype.

"A picture is worth a thousand words." Although this maxim is not always true, it is certainly possible to create a visual representation that has greater "information density" than words and phrases. Such pictures also provide compact indices into a body of complexly interlinked and highly modularized information.

Forces

Show Me addresses and attempts to resolve two primary forces. First is finding the most succinct, yet information rich, manner in which to depict a concept or an idea. Sometimes this is clearly a picture (or the heard, felt, tasted, smelled equivalent) but at other times it can be a highly evocative phrase, as in poetry. The second force is economic ⬚ the ratio of time and cost associated with creating an in process artifact compared to the cost of realizing the actual design or project outcome.

Pattern Description

There is significant irony in the attempt to use words to describe a pattern that transcends text and language. The best that can be done is to enumerate some of the forms in which the Show Me pattern is expressed. Two categories to organize these myriad forms suggest themselves: the Sketch and the Prototype. Both of these categories could be developed into patterns in their own right.

A sketch can be as basic as the drawing you make when you are discussing a new idea over lunch and you grab a paper napkin and sketch out some elements of the idea under discussion. The idea is to capture a few key visual elements and relationships that will later evoke the more detailed conversation about the idea. Sketches are not intended to capture and represent the entire idea. A sketch could be a single visual artifact or symbol; or, it might be a group of labeled images and links.

Similarly, prototyping is an essential design skill. The prototype is constructed of basic materials as quickly and inexpensively as possible. The prototype embodies a potential design solution, one that allows meaningful interactions.

Sketch and Prototype might be separable into two distinct patterns. If that was the case then one might be titled: Whiteboards, Napkins, and Drawing Tablets and would address the 'art of the sketch.' The other would be called: Foam Core, Exacto Knives, and Duct Tape and would address the art of the prototype.

In addition to sketching and prototyping various elements of design, Show Me supports the use of a visualization as an aid for comprehending a large and complex system. The need to do this arises from the fact that the concept and practice of design has extended beyond artifacts, posters and logos to the business enterprise as a whole. An example of applying Show Me in this way is the "Wheel of Life" Mandala, a Thangka

painting, above Dave's desk. Figure two is a highly simplified view of such a Thangka.

[Figure W heel of Life Mandala]

In a space measuring roughly 60 by 90 centimeters, an entire cosmology, theory of the Universe, is captured with individuals symbols evoking stories about things, and spatial relationships recalling to mind stories about how and why things happen.

Discussion

The history of software development is replete with applications of the Show Me pattern. Graphical modeling in forms ranging from "Program Structure Charts," "Data Flow Diagrams," and "Entity-Relation Models" to the multiple models defined in UML are but a few examples.

Agile advocates extended the pattern with its advocacy of ephemeral and informal diagrams on the wall-to-wall whiteboards that characterize an Agile team environment. Big Visible Charts and other Information Radiators extend the Show Me pattern.   Agile also extended the notion of prototype to include tests and program code, code that metaphorically provided olfactory sensory feedback in the form of "smells." All code written during an Agile project is considered prototype code until the day the project ends.

Despite the fact that software development has always relied on visual representation, there is a critical point of divergence between the way that designers think of Show Me artifacts and the way that traditional software engineering conceives of those same artifacts. Software engineering believes that diagrams and similar models **represent** that which they model. Designers have no such delusion, recognizing that models only **evoke**, or recall to mind, knowledge and understanding about that which they model. At the extreme, software engineering believes that the UML graphical model IS the program it represents; and, that the only difference between program code and a UML model is syntax. One can be formally transformed into the other without the addition or deletion of meaning or any form of re-interpretation.

330 Thick Description***

[archetypal picture here]

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Context

The liminal state where everything is possible, except, things that are not.

Problem

How can designers explore "all that is possible" when language (see Glossolalia) and culture have the effect of focusing our attention only on that which is familiar?

Design is supposed to be as free to consider any and all possible solutions to a problem as is possible. That is why Keep it Brief mandates that a brief contain enough information (mostly focused on absolute constraints) but not too much. Too much information inhibits design. But, not all of the information that might inhibit design options is overt and derived from the environment or from clients and/or end-users or even other members of the team.

Everyone is a product of their culture, and culture both exposes and hides aspects of the world around us. For example: If I were stranded in the Australian Outback, I would starve and die of thirst because my cultural background would prevent me from seeing the bounteous sources of food and drink that are obvious to the Aboriginal. Culture biases our thinking in many ways and those biases can constrain design in undesirable ways (e.g. xenophobia).

Culture is invisible and it is very difficult for any individual to perceive his or her own culture. How then can we remove this source of undesirable design constraint?

Therefore,

Solution

Embrace cultural sensitivity and self awareness with the anthropological concept of to "making the familiar strange and the strange familiar."

Forces

One force addressed by this pattern is indirect ⊠ the tendency of any living system to seek and maintain an equilibrium. If a system experiences disruption of such magnitude that it cannot return to is equilibrium point it will attempt to stabilize at a new equilibrium. Failing that, the system will essentially self-destruct. Culture is a living system that effectively acts to channel the thoughts and behaviors of individual members of that culture in ways that maintain equilibrium. This makes it very hard for a designer, for one example, to have an "original thought." But design is all about innovation, originality, and creativity ⊠ he antithesis of what the cultural system "wants."

A second force comes from the fact that one's culture is effectively invisible. It operates below the threshold of conscious thought. Even when challenged with a question, like why do you do things that way? We seldom have an answer much beyond, "because that is the way things are."

Pattern Description

"Thick Description," is a term coined by Clifford Geertz to explain what is possible when it comes to communicating a culture to someone not a member of that culture. Geertz believed that it was impossible to precisely describe all of the rules, relationships, and parts of a complex system like a culture. The best you could hope for was a description of what could be observed interspersed with annotations, explanations, variations, and illustrative anecdotes.

A thick description is the outcome of a process of participant-observation. In the case of anthropology, the ethnographer spends extended periods of time living with those who she hopes to understand. She participates in the life of the people, working in the fields, dancing in ritual performances, preparing and consuming food ⬚ everything. She is not a mere observer. In the software world, this means going and 'living' with your customer and actually doing their work, experiencing what they experience.

The value of doing applying this pattern comes from your increased awareness of a web of constraints that will ultimately determine the success or failure of your project. These constraints take the form of cultural values; behavioral norms and sanctions for violating those norms; power, gender, and familial relations; and, worldviews.

Abstract

[There will be a short introduction here explaining the grouping of the 400 level patterns and some background info.]

420 *It takes a Village* ***

[archetypal picture here]

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Context

The Universe is a System ⊠ complicated and diverse set of components interacting in a dynamic, complex, fashion. For convenience, we partition the Universe into segments; a culture, a business enterprise, a problem domain. Each of these segments remains a system ⊠ collection of parts and their dynamic interactions. General Systems Theory tells us many things about systems, but one of the most important principles is the fact that every system element is connected to every other element and changes in one thing has the potential to change everything.

Problem

The breadth of knowledge required to resolve complex problems exceeds that associated with a single discipline or specialty.

Design, by definition, involves the introduction of change into a system ⊠ changing the nature of an element of the system, replacing an element with another, or changing one or more relationships among system elements. The consequences of the change are unpredictable and have the potential to destroy the system (move it so far from its natural equilibrium that is cannot restore that state nor find an alternative equilibrium point. Lauriston Sharp, in "Steel Axes for a Stone Age People," documented how the simple introduction of a steel axe to replace stone axes, disrupted an entire culture and led to its ultimate demise.

Even though a design effort may be tightly focused and limited in scope, the General Systems principle of "all affects all" guarantees that there will be unanticipated consequences. Thinking about design therefore mandates thinking about a multitude of factors ⊠ factors far beyond those typically introduced in design school.

We tend to think of the designer as an individual. And it is certainly true that an individual can assume primary responsibility for a design and that, in some circumstances, a design can be the product of a single mind. Most design projects, however, are the work of a team of individuals working collaboratively. How can we assure the right mix of individuals with the right mix of perspectives that will assure adequate exploration and accommodation of the multitude of factors that influence a design introduced into an existing system?

Therefore,

Solution

Assemble a team of contributors with multiple viewpoints and expertise, les penseurs, each of whom is a "T-shaped individual." A t-shaped individual is one with breadth of knowledge and experience ⊠ the arm of the T, with depth in one specific area, the vertical post of the T.

Forces

First, this pattern attempts to resolve two closely related pairs of forces. One: the need for generalists, modern polymaths, when our educational and employment environments are determined to produce narrow specialists. Two: a culture that celebrates the Lone Wolf, the rugged individualist, and Ayn Rand's Atlas coupled with a system that mandates individual action; at a time when we need to produce "collaboration ready" team members.

A corollary force involves the ability to communicate and the need to communicate across specialties opposed to the ability to communicate within a specialty. Here again the need for cross-disciplinary understanding and communication is thwarted by the tendency of every specialty to invent is own private language, accessible only to initiates in that discipline.

There is a third, less obvious force, that arises from the need to design both a solution and an implementation of that solution. When the focus is on understanding the problem and the system in which a solution will be embedded, there is greater need for a diverse team. When the focus shifts to a specific implementation of the solution the problem becomes far more consistent with the abilities of a single designer.

Pattern Description

This pattern suggests the need for a team with multiple perspectives, a team capable of addressing the multitude of facets presented by any design problem. It suggests the general nature of individual members of the team ⬛ that the be 'T-shaped." It also suggests, or at least implies, that one of the advantages of being T-shaped is the increased likelihood of an ability to communicate across disciplinary specializations.

What the pattern does not provide is a template for team membership. Different problems suggest the need for different perspectives, there is no absolute ideal membership list for all design problems. There is a need, however, to conceive of roles, and names for those roles that break down existing specializations. There is also a need to explore alternative roles, alternative specializations for the T-shaped individual. Tom Kelly, in The Ten Faces of Innovation, suggests some of these alternate roles and their definition. A sampling:

> Anthropologist ⬛ someone skilled in participant observation that can elicit all of the tacit forces at play in a domain and a problem.
> Experimenter ⬛ someone who tinkers with potential solutions.
> Cross-Pollinator ⬛ some with a breadth of knowledge that can bring ideas from diverse fields to bear on the problem, someone who can suggest fruitful metaphors.
> Experience Architect ⬛ someone who can see how all the pieces of a solution fit together to create the 'world' in which the customer will live and work.

Storyteller ⊠ someone who can take the most complicated conversation and reduce it to a simple, repeatable, and recallable story ⊠ who can recall and relate the most appropriate story for any given moment.

Each of the roles could be the foundation for a pattern in their own right.

Discussion

This pattern focuses on team composition but it points to another set of related patterns that are concerned with interactions among team members and the environment within which those interactions take place. It is likely, that some of both kinds of patterns already exist. We are familiar with one such pattern, One Room Schoolhouse ⊠ used to describe the open collaborative environment, familiar to Agile advocates, used in an educational / apprenticeship setting. (This pattern was presented at the Educator's Forum, OOPSLA 2003 by West, Rostal, et. al.)

Agile software development has practices that reflect Les Penseurs and One Room Schoolhouse. The practices of Whole Team and On-site Customer, in Extreme Programming, both reflect the need for a wide range of inputs and roles in collaborative development. However, even XP fails to recognize, at least overtly, the full range of potential participants, mostly because XP comes out of the software development world where design is not considered a central issue. The open, noisy, dynamic, collaborative workspace of Agile is also well known.

Conclusion

This is a first small step towards developing a robust design thinking pattern language. This paper contains but a representative sampling of the kind of patterns that are possible. In many instances we have pointed out how elements of the patterns described here could become patterns in their own right. In some cases we noted that potential for an entire complementary pattern language.

Omitted in this paper, but an integral part of any future work, is the various kinds of relationships among the patterns ⊠ relationships that will turn an ad hoc collection into a language.

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