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Between Heaven and Earth

Design Tensions in the Book of Changes

Evan Barba, J.R. Osborn

For some time, we have been using the ancient Chinese *Book of Changes*, or *I Ching*, as a resource for systemic design in both professional and classroom settings. We have found the results of these experiments to be surprising and encouraging, and suggestive of a more complete and formalized methodology. Here, we tie the theoretical underpinnings of this methodology to a few important concepts and texts in the systemic design canon, emphasizing design as intentional change and the dynamic equilibrium, constant transition, and interconnectedness of systems. We then articulate our notion that the sixty-four passages of the *I Ching* correlate to commonly observed stages of iterative design, and the creative process more generally. Finally, we encourage others to explore the *I Ching's* usefulness as a collection of design prompts by providing the backbone of our method — design-centered interpretations of the eight essential trigrams of the *I Ching* and sixty-four designerly names for the hexagrams — as a means of scaffolding interested designers in their own application of the text.

Keywords: intentional change, methodology, *I Ching*, systemic design, design pedagogy

Introduction: Change

There are many definitions of design in usage, and each emphasizes different aspects and values of the design process. One that has some purchase within the systemic design community is found in Nelson and Stolterman's *The Design Way*, where they describe design as *the creation of intentional change* (Nelson & Stolterman, 2012). This is a useful definition because it applies to many fields and subspecialties, from product design to service design, as well as accounting for less formal design activities like crafting and making. It also applies to engineering disciplines and to the sciences more broadly, as in the design of experiments or medical treatments, for example. While this definition does exclude 'accidental' acts of creation that might more properly belong in the domain of expressive art, it bears noting that such a definition may be so overly broad that it might not communicate subtleties or allow for easy differentiation of designed products or design activities. For present purposes though, the definition ties together two important concepts that we can use to begin a productive discussion: **creation** and **change**.

Change and creativity go hand in hand. During the creative process what was there before, either in terms of physical materials or a given non-physical configuration (social or socio-technical for example), is altered in some non-trivial and intentional way. With change so clearly articulated as the object and purpose of design, it stands to reason that other sources that describe the nature and processes of change and transition may yield useful design insights. If the creation of intentional change is what we seek as designers, anything that better helps us

understand that process is helpful. For this reason, we have chosen to investigate the oldest and most widely used text on the nature and process of change, the ***Book of Changes***, or ***I Ching*** (sometimes ***Yijing***) as it is known in its original Chinese.

About the I Ching

The ***I Ching*** is a classic Chinese text that dates back well over 3000 years in its written form, although it assuredly was passed down through oral traditions long before that. It is one of the most studied texts in the world and one of the oldest documents in continuous use; by some accounts, second only to the Bible (Shaughnessy, 1997). Western translations of the text are much more recent, and began appearing in the 1800's. The most commonly referenced, by Wilhelm, was first translated into German in 1923 and re-translated to English by Baynes in 1950 (Wilhelm and Baynes, 1950), but many more have appeared since then. As western understanding of Chinese traditions has grown, so has our understanding (and misunderstanding) of the relevance and content of the ***I Ching***. These translations reflect not only those deeper understandings, but also the influences and expectations of their audiences at the times of translation. For example, Legge's 1899 (Legge, 1963) translation is formally worded and expresses the mystery surrounding Chinese culture in 19th century Europe. More recently, Wing's 1979 (Wing, 1979) translation has the flavor of New Age mysticism found in mainstream American culture during the 1970s, while Pearson's 2011 translation (Pearson, 2011) contains distinctly feminist perspectives. As with any classic, contemporary readers can find new meanings in the text relevant to their time and culture. A natural extension of this idea is that these meanings can also be relevant to different domains, and our attempt to adapt the text into a distinctly design-oriented interpretation is very much in keeping with this tradition.

In what follows, we have adopted this mentality in our interpretation and application of the ***I Ching*** to design practice. By reconciling the different interpretations and meanings attributed to the passages of the ***I Ching*** we have triangulated our own design-centered interpretation — effectively ‘rendering the ideas’ and guidance of the ***I Ching*** in the language and manner of design. We have found insight into the creative process; useful tools for theory, teaching, and practice; and even some insights into the text itself that appear to have eluded previous translators because of their unfamiliarity with design practice and systems thinking.

The System of the Yi

At the most basic level, divination with the ***I Ching*** is a means of generating timely and time-tested advice in difficult situations. That advice is based on the idea that the process of change, although continuous and ongoing, can be segmented into identifiable and understandable stages, essentially different ‘states’ of the system. As Wing (1979) says, ‘*Think of it as clicking the shutter of a camera in order to capture a picture of the moment and examine in detail its meaning*’ (p. 9). Knowing what stage any particular project is in, and taking appropriate action moves the project forward. The ***I Ching*** offers insight into these stages and provides a method for accessing those insights in a timely manner. Whether the ***I Ching*** really offers a window into the universe’s purposes and the designer’s role in affecting those changes is largely irrelevant. What matters at a practical level are really only two things: 1) the 64 hexagrams of the ***I Ching*** correlate to stages of the creative process that have been observed and named; and 2) the designer can operationalize this advice to advance a project.

As instructors, we are often called upon to give students advice on varied projects, sometimes with little time to dive deeply into observed problems and offer appropriate solutions. At times, our assessments and suggestions are spot-on and the student can take our advice at face value and use it effectively. Other times this is less exact. We all have limited experience to draw on, with no access to students’ inner processes, intentions, or motivations, and can only help scaffold their insight by providing our opinions. In our experience though, any advice is helpful, and even inappropriate, incomplete, or misunderstood advice can get a student unstuck. In this sense it matters little whether the ***I Ching*** is mystically capable of revealing the correct course of action for a project, what matters is that it can be used productively. In our experience, this is indeed the case. If nothing else, the ***I Ching*** offers a novel method to introduce a new variable that ‘shakes up’ a stagnant project.

Some will no doubt find it blasphemous for educators to suggest that their advice, trained over thousands of hours of experience, is no better than a randomly selected passage from a cryptic 3000 year old text; but this misses the point. It’s more accurate to say that what students — and, frankly, even seasoned professionals — need at many times during the creative process is something to push them forward. Having a clear sense of where one

is in the creative cycle and what actions to prioritize can make a world of difference when one is conflicted and confused about where to put their next effort. What the *I Ching* provides in these cases is simply a prompt for rumination, interpretation, and action that can change the mindset of the designer, give them a new perspective on the project, and help them decide for themselves what the best next step might be.

Applying the Lessons of the I Ching

The hexagrams are six-line wholes, that are assembled from two parts called ‘trigrams’ (three lines each), one upper and one lower. Within a trigram, each of the three lines can be either solid or broken, making the original distinction — upon which the trigrams and the entire system of the Yi are built — a binary one. Traditionally, each of the trigrams is assigned a certain character based on its relation to natural forces and elements: Heaven, Earth, Wind/Wood, Water, Fire, Lake, Mountain and Thunder. In keeping with Heaven and Earth cosmology described above, the nature of each hexagram is defined by the tension between its upper and lower trigrams. As Wing (1979) states:

The coming together of the two trigrams within the hexagrams represents the coming together of heaven (upper) and earth (lower), while their interaction and dynamism represent the cosmic forces as they affect human affairs. (p. 15)

Mapping this general statement into the realm of design by replacing the phrase, ‘cosmic forces as they affect human affairs,’ with ‘tensions to be resolved in the design’, reveals the nature and usefulness of our method. We reinterpreted the traditional characteristics of the eight trigrams into a collection of ideas more accessible to designers, and we provide those below alongside more design-focused interpretations of all 64 hexagrams (Table 1 and Table 2). Although space prevents us from providing a complete reinterpretations of the hexagrams, it is perhaps more useful for the interested designer to derive their own interpretations by contemplating the tensions between the upper and lower trigrams in relation to the design term we provide for the hexagram. We encourage interested readers to examine the text of the *I Ching* themselves (particularly the guidelines for divination) and to use our reinterpretations as a guide to advancing their own projects and understanding of systemic design.

In our use of the *I Ching* we have relied heavily on the “coin method” of divination, in which three coins are tossed six times to construct a hexagram that the reader can then look up in the text to contemplate in regard to their own situation. The more traditional yarrow stick method yields similar results but is more cumbersome. However, if one’s purpose is to simply generate a random number from 1-64, any reliable method can work. Simply using a search engine or other program is effective and efficient. Rolling an 8-sided die can also get a random number between 1 and 64 (9d8 -8) or simulate the same probability of outcomes as the coin toss method (more complicated). We encourage the interested reader to examine these methods in more detail. Instructions can be found in the introductions to most of the translations we reference and on the many web pages dedicated to the *I Ching*. We also encourage more playful approaches. A particular favourite is to ask a student what number is currently the most significant in their project, then using it to seed a random number generator or in modulo arithmetic (mod64) to obtain a result. Simply using the text intentionally, by identifying and referencing the passage relevant to the stage you believe you are in, is another possibility. Again, the point here is less about using the *I Ching* ‘correctly’ than it is about using it ‘productively.’

Conclusion

We have explained the logic behind our adoption of the *I Ching* as an aid to systemic design through its philosophical connection to both design and systems, and we have outlined our argument for how the hexagrams of the *I Ching* can be mapped upon 64 common stages of a creative cycle. The commentary surrounding each hexagram characterizes that single step in the creative process and suggests mindsets and actions that can move the cycle forward. These will be readily recognized by the experienced designer, and can be intuitively felt by the novice. Not every cycle contains every step, and some projects may force us to revisit a few steps repeatedly. For sure, experience alone can often help us determine where we are and where to go next, but even the most experienced designer can be humbled by new challenges, divergent possibilities, and surprise results. It never hurts to have a guide when navigating through complex and foreign terrain. Even familiar territory can prove treacherous when our assumptions and confidence fail us. In these cases, and especially at inflection points when decisions with lasting consequences are made, we need the wisdom of time-tested advice. This is what the *I Ching* provides. It can function as a guidebook to the creative process that contains, not only the collected



wisdom and experience of those who have seen the patterns before, but also as a means of accessing that knowledge and resolving creative tensions in both theory and method.

Table 1. The Eight Trigrams, their Chinese names, and traditional translations alongside our design-focused names and reinterpretations.

Concept	
	Typical interpretations of Heaven, or pure yin, ascribe attributes such as creativity, strength, action, drive, etc. The doubling of this trigram into the hexagram we call "Inspiration" begins the creative cycle, and so the line trigram encompasses that idea in a slightly more subdued way. When this trigram appears, we interpret it simply as a reference to the concept in its most idealized and solution-neutral form. That enthusiasm you have when the lightbulb goes off in your head and you feel motivated to pursue a new idea is the heart of ch'i'en.
Ch'i'en Heaven	
Material	
	Beneath heaven is the earth represented by this trigram of three broken lines symbolizing pure yang. The doubled K'un is the second hexagram of the I Ching, and for us represents the inert tools and materials waiting to be formed by concept and action. As the counterpart to yin, it typically connotes characteristics of receptivity and inaction. We have found that it also represents the needs of end users or clients, those who encounter our creations in the wild or for whom they are designed.
K'un Earth	
Work	
	The connotations of this trigram commonly identify movement and wakefulness, as if a clap of thunder has woken you from a more sedate frame of mind. We find it useful to think of this trigram as representing work in all its forms. Sometimes you need a clap of thunder to rouse you from your complacency to get to work, and sometimes you just need to put your nose to the grindstone. Either way, this trigram is a reminder that your effort and attention are needed.
Ch'êng Thunder	
Structure/Process	
	The idea connoted by this trigram is often penetration or gentle, slow, and imperceptible progress. The growth of a tree or the blowing of the wind are both invisible on short time scales but we can see the results of these incremental processes in the changing shape of the tree and the patterns on the landscape. Thus, for our purposes we think of this trigram as representing patterns and the unobservable forces that create them.
Sun Wood/Wind	
Features/Details	
	Clinging is a traditional concept here, the way a flame clings to a log. Brightness, brilliance, and dependence appear frequently as concepts as well. We interpret this as 'features' or 'details', as we know how one can cling to these in our creations as well as how they are very dependent on context and attach themselves to designs. They are also commonly the eye-catching or defining aspects of a design that set it apart from others, they can be bright, shiny, and brilliant in every sense of the word, but also dependent on the rest of the design and cannot hold on their own.
Li Fire	
Formlessness	
	Typically the most negatively interpreted trigram, K'an often connotes danger through a ceaseless descent. We recognize this danger in terms of creative designs as 'formlessness' and this has many implications. Form is critical to any final design and lacking it will lead to disaster. However, water also
K'an	

Water takes the shape of its container and therefore attention to context and constraints when interpreting this trigram matters quite a bit. Going deeper and sinking are also important connotations. Not all are negative however, the formlessness of flowing water is a positive connotation that might well be a hallmark of well-designed interaction.

Joy/Delight



Most occurrences of this trigram have it representing joy or joyousness. The concept behind this is that lakes are where people go to swim, bathe, relax and rejuvenate. The delight of users is an important part of design, as is the emergence of such delight through play. And so, for us, we use notions of playful discovery and surprise as the guiding forces in our interpretation of this trigram.

Tui
Lake

Convention



Connotations here are of stopping, stillness, permanence, and continuity. These are all important aspects of a creative process and in play whenever this trigram appears. We tend to interpret this as 'convention' or 'tradition'. The mountain is the long-standing body of work that a new iteration builds upon. Sometimes progress necessitates breaking with this tradition and sometimes it is a return to it — through study, reproduction, or reference — that reveals the way forward.

Ken
Mountain

Table 2. The 64 hexagrams of the I Ching and our design terms for each.

 1 Inspiration	 17 Finding a Rhythm	 33 Reflect	 49 Metamorphosis
 2 Adoption	 18 Branching Out	 34 Strength	 50 Incubate
 3 Getting Started	 19 Flourishing	 35 Proceed	 51 Get to Work
 4 Exuberance	 20 Listening	 36 Recover	 52 Pause
 5 Waiting	 21 Sink Your Teeth In	 37 Teamwork	 53 Slow and Steady
 6 Tension	 22 Adornment	 38 Divergence	 54 Duty-Bound
 7 Leading	 23 Shedding	 39 Hardship	 55 Apex
 8 Organize	 24 Revisit	 40 Relief	 56 Explore
 9 Stocking Up	 25 Sincerity	 41 Dial it Down	 57 Second Wind
 10 Step Lightly	 26 Continuity	 42 Turn it Up	 58 Coupled
 11 Progress	 27 Restraint	 43 Resolve	 59 Dispersing
 12 Impasse	 28 Critical Mass	 44 Influence	 60 Constraints
 13 Fellowship	 29 Bogged Down	 45 Convergence	 61 Inherent Value
 14 Abundance	 30 Clarity	 46 Scaling Up	 62 Slight Advantage
 15 Moderation	 31 Second Opinion	 47 Exhaustion	 63 Loose Ends
 16 Mobilize	 32 Keep it Up	 48 Replenishment	 64 Never-Ending

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