

THE DESIGN WAY

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**Intentional Change
in an
Unpredictable World**

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FOUNDATIONS AND FUNDAMENTALS OF DESIGN COMPETENCE

**Harold G. Nelson
Erik Stolterman**

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This book is dedicated to:

Anne, Autumn, Erikka, Evelyn
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Genesis is ongoing. As human beings, we continuously create things that help form the basis of the world as we know it. When we create these new things—tools, organizations, processes, symbols and systems—we engage in design. To come up with an idea, and to give form, structure and function to that idea, is at the core of design as a human activity. This book is about that activity.

Design is such a natural human ability that almost everyone is designing most of the time—whether they are conscious of it, or not. Framing our understanding in this way, we will use the concept of design to define, and promote, a new philosophical tradition; a new culture of inquiry and action. That tradition is identified here as *The Design Way*—the first tradition. This designerly approach applies to an infinite variety of design domains; including those fields that are traditionally thought of when we consider design, such as architectural or interior design, industrial design, engineering design, graphic design, urban design, information systems design, software design, fashion design and other forms of physical design. But our definition also allows us to encompass other design areas, such as organizational design, social systems design, educational systems design, work place design and healthcare design. Such a design approach can even be

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applied to significant social institutions such as governments, including the design of democratic constitutions (Sunstein, 2001).

In our struggle to understand an ever more complex reality, we believe the current traditions of inquiry and action prevalent in our society do not give us the support we need—as leaders and designers—to meet the emergent challenges that now confront us. The world is changing rapidly, sometimes with intent, but too often by accident. The world has proven to be unpredictable, despite the best attempts of science and technology to bring predictability and control to worldly affairs. The laws of nature may be fixed, but the complex interactions of everyday events, whether provoked by accident or fate, result in unpredictable outcomes. The one thing that makes this state of affairs tolerable is the inchoate knowledge that change—desired change—can be wrought by human intention. Human intention, made visible and concrete through the instrumentality of design, enables us to create conditions, or artifacts, that facilitate the unfolding of human potential through *designed evolution* in contrast to an evolution based on chance and necessity—a highly unpredictable process.

In our attempts to design the world to be what we would like it to be, we find that the traditions at hand cannot fully support that task. Science, art, spirituality, economics and technology are all important traditions of inquiry. However, they do not embody the unique specifics of the design tradition, with its corresponding philosophy and praxis. Each of the prevailing traditions has developed a depth of knowledge and insight that is impressive, but it is often focused on a narrow aspect of our human experience—one that is necessary but not solely sufficient in the management of human affairs.

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We believe the culture of inquiry and action that infuses design thinking is an essential part of the palette of human traditions. We are not the only ones who think so. Other scholars (Cross, 2001) have investigated the concept of a design *tradition*. Yet, design has remained surprisingly invisible and unrecognized. This book is an attempt to change this by recognizing design as its own tradition and formulating its fundamental core of ideas. *The Design Way* does not present a ready-made recipe on how to engage in design. This is not a book about design praxis, which deserves several books of its own. It is not something exclusive to professional designers. It is a way to approach reality that intentionally embraces its vast richness and complexity.

Our ultimate desire is to encourage and promote a design *culture*. Now, what do we mean by this? For any tradition to flourish, that tradition requires a nurturing environment, a protective container within which its frontiers and prospects are defined and protected. A design tradition requires the enabling presence of a design culture, one that defines conceptual expanses and boundaries, and provides a context for setting particular limits on any design project. Such a design culture acts as a catalyst in the formation of social crucibles essential for sustaining the intensity of design action. It is a protective environment that provides the space and freedom necessary to foster a process that is both powerful and vulnerable at the same time.

What is presented in this book is a *composition* of what we believe a broad and deep understanding of design—and designing as a tradition of inquiry and action—should include. This composition is, in itself, a design. It is not an attempt to present a true or accurate description of an idealized design culture. Nor, is it an attempt to answer all questions that might emerge concerning what a design culture might,

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or ought to, be. It is our understanding of design, as its own tradition and not merely a variant of science, or art, or technology, or spirituality. It is an effort to build a deeper understanding of design, based on ideas we believe must be present in the development and implementation of a design culture—the necessary ingredients for the release of design’s full potential and promise for generative human agency.

The Design Way is an introduction to many ideas that deserve a book of their own. We feel that it is important, however, to present them here as a whole, as part of our composition. We are not proposing a particular theory, or a set of theorems, or axioms. Instead, we have chosen to use *foundations*, *fundamentals* and *metaphysics* as the unifying elements of the book. The foundations are equivalent to the first principles or causes of other traditions such as science. The fundamentals are identified as those core concepts of the design approach that can be learned and improved on through practice. The metaphysical issues arise as a consequence of the interaction of the foundations and fundamentals of the design tradition, with one another and with the larger domains of human existence.

This structure of foundations, fundamentals and metaphysics best reflects the level of our intention in making a case for a design culture. Over the years, we have found that there are emergent patterns informing the composition of our ideas as a whole. We find that it is possible to make a composition from this tripartite relationship; one that reflects, in different ways, what we see as the core of a design approach—a design way.

The idea of a design culture is one that promotes an understanding of design as transcendent of particular contexts, specific disciplines, or

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single concepts. For instance, it is commonly believed that design is simply a form of creativity. Creativity is thought of as the activity that gives design its special qualities. But, even though creativity is seminal to design—design is larger and more comprehensive. Design is inclusive not only of creative thinking but includes innovative activity as well. Innovation differs from creativity in that innovation is action oriented. It is achieved through the manifestation and integration of creative concepts into the real world. Design is also a compound of rational, ideal and pragmatic inquiry. Design is constituted of reflective thinking, productive action and responsible follow through. Therefore, a single concept, such as creativity, does not capture the full richness of the design tradition.

A design culture needs to be broad in its scope and deep in its meaning and utility. Thinking about design in this way, we hope to define a firm platform from which designers, in any field, can bring this new appreciation for the potential of design into action. With this in mind, we will often use the term ‘design’ to stand for this broader meaning of a design culture.

The process of design is always the most effective and efficient means of getting organizations and individuals to new places. Design is therefore about leadership—and leadership is therefore an essential element of any design culture. Leadership today demands action and the ability to act, based on an overwhelming amount of insufficient information within restrictive limits of resources and time. These demands cannot be met solely from within the traditions of science, art, or pragmatic technology. These demands require leaders to imagine and implement adequate responses that are sustainable—in all their implications. This is a task that calls for judgment—not problem

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solving. It calls for *good* compositions—not *true* solutions. We argue that *The Design Way* is not only for designers, but for leaders as well. We believe that leaders and designers are often one and the same, and that it is important for leaders to recognize their challenge as that of a designer—to find direction and destination via the design tradition.

The Design Way is based on the notion of *reflections* and *substance*. We hope that the book, as a composition, will evoke an understanding of *what design is all about*. Each chapter is an attempt to reflect that substance. Each reflection reveals only one image, which is not enough by itself. It is hoped that, by moving among different reflections, recognition and understanding of the substance itself (i.e., what design is all about) will emerge. This means we encourage readers to choose to read the reflections (or chapters) that seem most interesting or suitable to them. Even if the book is designed as a composition with an overarching structure, it is possible to read the chapters independently. For example, many readers have found it more beneficial to read the *Systems* chapter after reading most of the other chapters because of its dissimilar tone and more methodological approach to content.

Our hope is that each reflection or image of design will intrigue the reader to delve further, eventually creating a more comprehensive understanding of the substance of design. This is also true of the individual graphics found throughout the text. The graphics are meant to not merely illustrate the text, as the text is not meant to just explain the graphics. The graphics in many cases are meant to momentarily arrest the progress of the *acquiring eye* in order to give the *reflective eye* time and space to provoke questions and elicit understandings that are

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relevant to the reader's *own* experiences and understanding. In this way our ideas can start to become the reader's ideas.

We also hope, that through reading it, *The Design Way* will sway others to participate in the creation of a design culture as a consequence of the influences of a revitalized and reconstituted tradition of design. This means the book is not just for designers, or those who hope to become designers, but for everyone. Each person, in his or her own way, can become responsible for the creation of a design culture. With such a design culture in place, designers will find themselves being encouraged to safely pursue their design intentions in an open and supportive environment.

In our attempts to present a broad understanding of design, we have been pragmatic in our relation to other sources. We have drawn from many intellectual traditions, and we have used philosophers and design thinkers in ways not always obvious from a standard perspective. When we make a reference to a specific philosopher, or thinker, this does not imply that we endorse the entirety of his or her work.

To make the design tradition visibly distinct from other intellectual traditions, we sometimes portray those traditions in ways that may not do them full justice. To make these traditions visible, we might use an idealized and sometimes simplified understanding of their essential nature. This may seem offensive to some readers, who are led to believe our purpose is to diminish the richness of the other traditions in order to make the design tradition appear more valuable. This is not our intention, however, but merely an artifact of our pedagogical approach.

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When it comes to our own ideas, we have tried to be congruent with the design tradition. It is the composition of our thoughts—as a whole—that carries the primary message. This means that when we discuss specific concepts, such as judgment, composition, contracting, communication, or character, we do this from within the design tradition. We do not try to provide universal definitions of these concepts that would apply across other traditions of inquiry and action. They are defined through use in pragmatic design ways, with the specific purpose of revealing our grasp of design as a whole.

I. THE FIRST TRADITION

Humans did not discover fire—they designed it. The wheel was not something our ancestors merely stumbled over in a stroke of good luck; it, too, was designed. The habit of labeling significant human achievements as ‘discoveries’, rather than ‘designs’, discloses a critical bias in our Western tradition. Absent from the conflicting descriptions of Leonardo da Vinci, as either scientist or artist, is the missing insight into his essential nature as a designer. His practical, purpose-driven and integrative approach to the world—an archetypal designer’s approach—is primarily what made him so distinct in his own time, as well as our own. Through his imaginative genius, augmentations to the real world were made manifest. This has been the contribution of all designers throughout human history. Outside of nature, they are the prime creators of our experienced reality.

Carefully designed artifacts accompany the remains of our earliest ancestors. Designed implements have been found which predate the earliest human fossil remains discovered so far. In fact, it is evidence of design ability, and activity, which allows an archeologist to distinguish between a species that is not quite human and one that is. So, it appears that it is our very ability to design which determines our humanness.

Design is the ability to imagine *that-which-does-not-yet-exist*, to make it appear in concrete form as a new, purposeful addition to the real world. *Design is the first tradition* among the many traditions of inquiry and action developed over time, including art, religion, science and technology. We design our cosmologies, our homes, our businesses and our lives, as well as our material artifacts. As such, design touches nearly every aspect of our experienced world. It is an important capacity, not only for those who wish to be designers, but also for those who are served in the design relationship as well. Things that really count, and are highly valued, come from design, when not directly from nature.

Possessing the ability to engage so powerfully in the world is the essence of human potential. But, it is also true that humans are fallible. Design activities can do and have done

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great service for humanity. But design has done great harm as well. We cannot know for certain, that what we design is what ought to be designed. We cannot know what the unintended consequences of a design will be, and we cannot know, ahead of time, the full, systemic effects of a design implementation. We can be god-like in the co-creation of the world, yet we cannot be god-like in our guarantee that the design will be only what we intended it to be, for the reasons we intended, and with a full understanding of the necessity of the design in the first place. We will always be startled by the appearance of unintended consequences and other unpleasant surprises.

An archetypal designer is represented in the Greek pantheon of gods in the persona of Hephaistos—the lame god. Hephaistos’ counterparts appear in African and Middle Eastern mythology as well. Depending on the particular story you read, the reasons for Hephaistos’ lameness vary. However, as a consequence of his condition, he was required to create tools and devices (artifacts, if you will) which enabled him to overcome his handicap, setting him apart from the other, more perfect gods. His great creativity and craftsmanship attracted the attention of the other gods, who contracted for his services in the creation of jewelry, homes, armor and other godly necessities.

Hephaistos had the full potential of the other gods, but did not have their full capacity. This lack of capacity required him to bring things into existence in order to overcome his imperfection. With the aid of his own creations, he became the archetypal designer in order to fulfill his potential. In the process, he began to improve the experienced realities of the other, uncompromised deities. Human designers share Hephaistos’ challenge. We must design, because we are not perfect. Yet, even though we lack this capacity for perfection, we share the potential of our creator gods to do great good, or immense harm, as we have continually demonstrated to others and ourselves since the dawn of civilization.

As shown in the figures below, the question of why we design does not lend itself to a simple answer (see Fig. I-1). Like Hephaistos, we have to design because we want to survive, but humans also seem to have a will for continuous improvement and development. Different psychological theories also tell us that we have other purposes; for instance, we want to make a difference in the world. At the highest level, it might be that we want to participate in *the* creation. In effect, we want to make the world *our* world.

We also display varying levels of motivation (see Fig. I-2). At the most basic level, we as human beings are compelled to design—it is our calling as agents of free will, who through design intelligence, can

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- Survive
- IMPROVE
- DEVELOP
- THRIVE
- EVOLVE
- SERVE OTHERS
- MAKE SOMETHING OF LASTING QUALITY
- CREATE SOMETHING OF REAL CONSEQUENCE
- PARTICIPATE IN THE NEVER-ENDING GENESIS

Fig. I-1 Purpose of Designing

act with *design will*. As humans with design will, we are impelled to create new meaning, new forms and new realities. The source of our free will and the compelling nature of our design remain a mystery of human nature. Joseph Campbell's (1968) description of the 'hero's quest', a common theme in most mythologies, begins with the 'call' for a hero or heroine to step out of his/her normal and comfortable life into a dangerous but necessary quest for life enhancing wisdom. The call can be ignored, but not without consequences. The call, when answered, initiates a process leading to a life-affirming boon for society—motivated by the desire to be in service to others. But, that is not our only motivator, we also have the desire to be in more control of as much of our lives as possible.

On a more abstract level, we are drawn to design because we may feel a lack of wholeness—we do not find the world in a condition that is satisfying or fulfilling for us. And, ultimately, we are motivated to design because it is an accessible means to enlightenment, to bring order, and to give meaning to our lives. It is a way for us, as it was for Hephaistos, to become what we are capable of being, but do not have the full capacity to be, without our creations to aid us (what Sigmund Freud called being "prosthetic gods").

- TO CONTROL
- FROM NECESSITY
- BRING ORDER
- GIVE MEANING

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- CALLING—DESIGN WILL
- FOR ENLIGHTENMENT / WISDOM
- LACK OF WHOLENESS
- TO BE OF SERVICE

Fig. I-2 Motivation for Designing

Design, as a unique way of thinking and acting, does not have a long, well-developed scholarly history. Other intellectual traditions, such as science and art, have enjoyed thousands of years of considered thought. But, in the Western tradition at the time of Socrates, Plato and Aristotle, design, as a focus of philosophic reflection, was divided. The word philosophy is a compound word composed of two Greek root terms: *philo* and *sophia*. Philo is love and sophia is wisdom; thus the term philosophy means the love of wisdom. During the pre-Socratic period in Greece, the defined understanding of wisdom or sophia, was the *knowing hand*. Sophia was an integration of thinking and action, as well as reflection and production.

However, during the time of the above-mentioned philosophers, sophia was divided. In the philosophic writings of Aristotle, wisdom (sophia), became primarily the concern for first principles and causes—thus cleaving it from practical wisdom and productive action. Sophia was further divided into knowledge of ideals and the capacity for practical actions.

Sophia was not only divided into separate parts, but the resulting components were placed at the extremes of a hierarchy. In Plato's Republic, those who *thought* about things were elevated to the pinnacle of society, while those who *made* things were positioned at the bottom of the social hierarchy. This hierarchy can be seen even in today's world. Polarities between people, such as white collar and blue-collar workers, management and labor, thinkers and doers, continue to play out this division in sophia. The split widens further in the polarization of ideas, like rigor versus relevance, feeling versus intellect, thinking versus doing, or abstract versus concrete.

Design's historical roots were further frayed when Aristotle's four causes—material cause (substance), instrumental cause (means), formal cause (forms), final cause (ends)—used to describe and explain the world, were reduced in the middle ages to just two causes: material cause and instrumental cause (i.e., pure science and applied science). The original understanding of design in the pre-Socratic era not only included Aristotle's full complement

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of causes, but required the addition of other causes that had their focus on making and production—in distinction to just description and explanation.

These historical polarizations and separations have influenced the way in which we today can understand, or justify taking any collective action. Without the tradition of design in place, in its pre-Socratic form, we have had to look to other traditions for insight into the nature and management of change.

The dominant trigger for initiating change in human affairs is, today, primarily based on the existence of a clear and immediate understanding of a particular problem or set of problems. Political action, professional performance, economic decisions, social planning and business choices are almost entirely justified on the grounds that life is a set of problems requiring practical, efficient and effective solutions. Much of formal education or training is based on preparing students to better identify and solve problems creatively, quickly, fairly, rationally and prudently. This essentially reactive mode, applied to every realm of life, is reinforced and supported by well-developed procedures for problem solving. Horst Rittel (1972) has identified such procedures as *tame problem solving procedures* (see Fig. I-3).

1. UNDERSTAND PROBLEM
2. GATHER INFORMATION
3. ANALYZE INFORMATION
4. GENERATE SOLUTIONS
5. ASSESS THE SOLUTIONS
6. IMPLEMENT
7. TEST
8. MODIFY

Fig. I-3 Solving Tame Problems (Rittel, 1972)

Tame problems are appropriate for simple or trivial concerns, but more important or significant issues are better characterized, according to Rittel, as *wicked problems* (as shown in Fig. I-4). The characteristics of wicked problems do not lend themselves to simple procedures, or even easy characterizations. If taken seriously, the wicked nature of these problems can lead to paralysis. This paralysis is most often skirted by the assumption that most wicked problems can be recast as tame problems. This, of course, exacerbates the original wicked problem and creates an even greater mess.

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- CANNOT BE EXHAUSTIVELY FORMULATED
- EVERY FORMULATION IS A STATEMENT OF A SOLUTION
- NO STOPPING RULE
- NO TRUE OR FALSE
- NO EXHAUSTIVE LIST OF OPERATIONS
- MANY EXPLANATIONS FOR THE SAME PROBLEM
- EVERY PROBLEM IS A SYMPTOM OF ANOTHER PROBLEM
- NO IMMEDIATE OR ULTIMATE TEST
- ONE-SHOT SOLUTIONS
- EVERY PROBLEM IS ESSENTIALLY UNIQUE
- PROBLEM SOLVER HAS NO RIGHT TO BE WRONG

Fig. I-4 Characteristics of Wicked Problems (Rittel, 1972)

The characteristics of a wicked problem listed above are not descriptive of a process for determining solutions to such problems, but are merely explanative of the nature of wicked problems. These characteristics are the result of the limits and paradoxes of reason when applied to real-world situations in human affairs that are unique, contingent, unpredictable and complex. (For a full description of these characteristics of wicked problems, please see Rittel's complete article.)

By treating a wicked problem as a tame problem, energy and resources are misdirected, resulting in solutions that are not only ineffective, but can actually create more difficulty; because the approach used is an intervention that is, by necessity, inappropriately conceptualized. Most of our significant everyday encounters with a problematic reality have the characteristics of wicked problems. Very few everyday situations of any importance can be appropriately and unerringly described as tame problems. For instance, there is never only one best solution to such problems. There are only solutions that are good or bad. There is no one correct approach or methodology for solving these problems, and it is not possible to formulate one comprehensive and accurate description of a problematic situation from the beginning. Tame and wicked problems are not governed by the same logic. The strategies developed to deal with tame problems are not just different in degree, but different in kind from those required for dealing with the complexity, ambiguity and epistemological uniqueness of wicked problems.

The focus on *problems*, whether wicked or tame, as the primary justifiable trigger for taking action in human affairs has limited our ability to frame change as an outcome of intention and purpose. It means that wise action, or wisdom, is starved of its potential (Nelson, 1994). Wisdom—specifically what we call design wisdom—is a much richer concept than problem solving, because it shifts one’s thoughts from focusing only on avoiding undesirable states, to focusing on intentional actions that lead to states of reality which are desirable and appropriate.

As only the intellectual or reflective components of the pre-Socratic concept of wisdom (i.e., the wisdom of reason) remain present in Western thought, wisdom is most often treated as simply the summation of data, translated into information, which is then transformed into knowledge. On the rare occasions when wisdom is discussed in practical settings, the challenge is how to make and maintain the linkages between the rational components of wisdom, while accommodating the challenges of unique particular design situations.

The wisdom of the *knowing hand*, that of making, producing and acting, must be connected to the wisdom of reason. But, wisdom—in the realm of design—requires that we take a step back. Design wisdom requires the reconstitution of *sophia*. Design wisdom is an integration of reason with observation, reflection, imagination, action and production.

Another demand that design wisdom makes upon us is to reintroduce the *analog* into a world long dominated by the *digital* and the *analytic*. The digital and analytic perspectives have heavily influenced Western traditions of thought for centuries. For instance, the division of the day into hours, minutes and seconds that are indifferent to the particular qualities of any one day is an example of the digital. The division of land into grids indifferent to terrain or social habitation is another example of the digital. The division of sound or light waves into electronic pulses is another form of digital translation. The digital approach divides information into packets that are stable and congruent but detached from the qualities of the substance or event itself.

The division of all reality into disciplines of science is an example of the analytic. The analytic is an approach that divides things into constituent parts or categories of similarity. The division of human service into areas of professional expertise is another example of the analytic. This has allowed us to make significant advances in technology and related scientific endeavors. Unfortunately, concurrent with this, the analog has become conspicuous in its absence in contemporary technical societies. This absence is a natural consequence of

societies divided and separated by specialization, by taxonomies and categorizations, by social hierarchies and by administrative conveniences.

Individuals struggle to comprehend their experience of life as an analog reality—an integrated, complex whole, without clear, distinct and separate taxonomies or categories. The digital and analytic approach to making sense of this undifferentiated experience helps to facilitate intentional change by reducing the overwhelming complexity of any particular situation and by providing instrumental distinctions that can become elements in new design compositions. Design wisdom has the ability to shift from an analog experience of life, to a digital or analytic perspective of the world and *back again*. This is done by means of a 000 that begins initially with a complex, undifferentiated situation, which then transitions through a process of discernment and distinction and ultimately terminates with the integration of innovative designs into a desired seamless reality for those being served directly or affected incidentally. Therefore, one of the most vital aspects of design is that the outcome of any necessary digital and analytic intervention must be transformed back into the analog. This is to assure that, with each new design addition, life continues to be experienced as a whole.

One more component of design wisdom concerns the nature of *change*. Change is an oft-evoked concept in politics, planning, management and other forms of intervention, but it is often not clearly articulated. In the tradition of scientific thinking, change is a consequence of either *chance* or *necessity*. Probability theory and statistical analysis are examples of our approach to change, as a result of chance. In human affairs, chance is often experienced as luck, or fate, whereas scientific principles, or laws, and rules of behavior are examples of how we react when necessity (or certainty) is the cause of change.

Design wisdom—as a first tradition—provides an escape from this limited state of affairs. Change, as a consequence of *design cause* or *intention*, is an approach available to us, as a third option (Nelson, 1987). In order to develop a tradition of design thinking, this concept of *intention* needs to be added as an agent of change to the ones already existing. The concept of change needs to be deepened as well in this context. Change—in relationship to design wisdom—has multiple levels of meaning, significance and consequence, as shown in Fig. I-5.

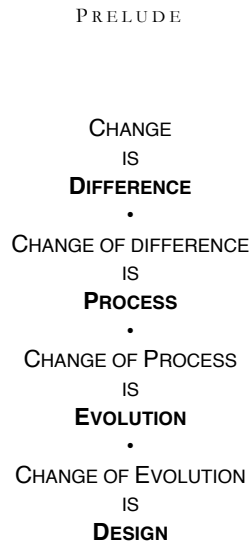


Fig. I-5 Hierarchy of Change

The challenge to cultures, or societies, on how to deal with change at these multiple levels was formulated by Arnold J. Toynbee (1948), and presented in mythic terms in the work of Joseph Campbell (1968)(see Fig. I-6). According to Toynbee’s findings, based on his research into the behavior of past civilizations, social systems historically evoke four types of responses when confronted by change. The only cultures that successfully move through major challenges, or crises, are those that engage in change in a manner that is consistent with design wisdom and leads to transformational change.

Of course, cultures, civilizations, nations and other forms of large-scale social systems can escape major change over extended periods of time. But, when the pressures for change build internally, or externally, accidentally or intentionally, successful survival and improvement seem to come only as consequences of an approach that can radically transform the existing order of things as per Toynbee’s model. Such an approach can be characterized as a design approach.

- A. “RETURN” TO THE GOOD OLD DAYS
- B. “HANG-ON-TO” THE PRESENT
- C. “REACH” FOR A UTOPIA
- D. RADICALLY “TRANSFORM” THE EXISTING

Fig. I-6 Toynbee’s Social Change Strategies

Change is a vital part of our experience of life. We often feel pushed into design because of the perceived pace of change in contemporary human affairs. We are pushed again by the explosion of information we are challenged to gather, understand and utilize. We are pushed still further by the immense increase in Western technologic development, with its fallout of incomprehensible numbers of distinct tools, machines, products and all manner of designed artifacts. Thus, we are confronted with more varieties of *what can be done*, than with *what we know we want done*.

But, it is also true, that we are pulled into design because it allows us to initiate intentional action out of strength, hope, passion, desire and love. It is action that generates more energy than it consumes. It is innovative inquiry that creates more resources—of greater variety and potential—than are used. Design action is distinct from problem action, which is initiated out of need, fear, weakness, hate, pain and other reactive motivations.

A desire for change is often assumed to imply a need for comprehensive analysis, and rational decision-making, leading to a clear choice for action. The reality is that analysis often leads to ever-greater numbers of paths, which then require more analysis. The consequence is that decisions cannot, and are not, made rationally—at least not in the rational tradition of scientific comprehensiveness. The real world is much too complex to be understood comprehensively.

Design—as an alternative to this rational approach—utilizes a process of *composition*, which pulls a variety of elements into relationship with one another, forming a functional assembly that can serve the purposes, and intentions, of diverse populations of human beings. For example, any human activity system is an example of this, including transportation systems, governance systems, economics systems, health systems and education systems. Whenever such systems are created or modified as designs, a compositional approach is used. We also utilize the same process when we create new material goods and services. In addition, the composition process creates emergent qualities that become apparent when these designs are viewed as wholes. These emergent qualities transcend a design's functional qualities, often serving deeper, more significant, needs and desires.

So, to summarize a bit, the design tradition's thread of continuity frayed, and finally broke, over the centuries, as the Western world poured its focus and resources on the development of science and technology. Yet, to be able to successfully deal with change in

the 21st Century, it is now critical that we pick up those frayed design threads, and weave them into new patterns, integrating their wisdom into a more holistic fabric of life.

How do we go about this? We believe that for a design tradition to flourish, we will need to create a design culture. That is, a culture which embraces a social, economic, political and personal environment into which designing, and designers, are not only invited, but welcomed. It is equally important to populate this culture with competent designers who have the education, experience and desire to practice design from a broader perspective than the traditional practices of material design.

Why is there—at this point in time—such a need for a design culture? And, is it possible to present some essential qualities of such a culture in a book? We believe that it is, and this book is just such an attempt. Of course, an entire culture can never be created by merely writing a book, but we hope to initiate a reflective dialogue on what a design culture might look like—at least in the beginning stages of its development, joining with others with similar interests, such as Bela H. Banathy (1996).

It's our thought that the first step in establishing a design culture is to conceptualize design as a unique way of looking at the human condition. To that end, we need to develop and use design wisdom as a frame of reference grounded in its own unique tradition. It is, in effect, our first tradition, as was discussed at the beginning of the book. The remainder of this book deals with considering the character and consequences of this idea more fully.

In every particular design, there are specific dimensions of art, technology and science, but in the totality of that design, in its inclusiveness of generalized aspects of the experienced world, it has a commonality with all applications of design. Herbert Simon (1969), speaking from an engineering background, made a seminal contribution to the development of a broader understanding of design by introducing the concept of the science of the artificial—design. The continuation and expansion of this idea, in more recent work, is collected in Margolin and Buchanan (1995), and in Buchanan and Margolin (1995).

That design thinkers hail from a variety of backgrounds should not come as a surprise. Designers from any design field, formally defined or not, can relate to other designers because they all are striving towards the same goal; they are hoping to add to, or change, the real world. They do this through their creativity, and innovation, in both particular, and universal, ways.

A culture is never a natural occurrence. A culture is always created by design. Cultures are a living tension between tradition and innovation, between stability and change. This type of social structure and process (i.e., culture), can always be changed, developed, deepened,

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misunderstood, or misinterpreted. As we work to develop a conscious design tradition, we must remember that any change in cultural tradition can easily be blocked by habits we do not see, or understand. A culture often consists of ideas, guidelines and a ‘common sense’ understanding that we take for granted, often without questioning their origin or benefit. This means that there is a need for both open and critical minds in the creation of a design culture.

Even when we focus on the cultural similarities among different kinds of designers, we do so based on a recognition and acceptance of their differences. It is important to acknowledge that every formally recognized professional designer has a specific *field of design expertise*—a range of specific crafts, skills and knowledge, such as: industrial design, architecture, information design, software design, urban design, organizational design, educational design, instructional design, etc. It is even more important to emphasize that every informally recognized designer has a similar field of expertise. It goes without saying that every designer needs knowledge and skills, concerning materials, tools, methods, languages, traditions, styles, etc., in his or her specific field.

This book is not about those focused skills. Instead it is about the cultural tradition within which the designer acts. We argue that, to be a thoughtful and responsible designer, any general understanding of what design is ultimately about has to be challenged and critically analyzed, by you—the individual designer, client, stakeholder—or anyone else affected by design. In addition, any understanding of design should be the result of reflective practice, intellectual apperception and intentional choice. This book is meant to be a resource in the creation of such an individual understanding of design.