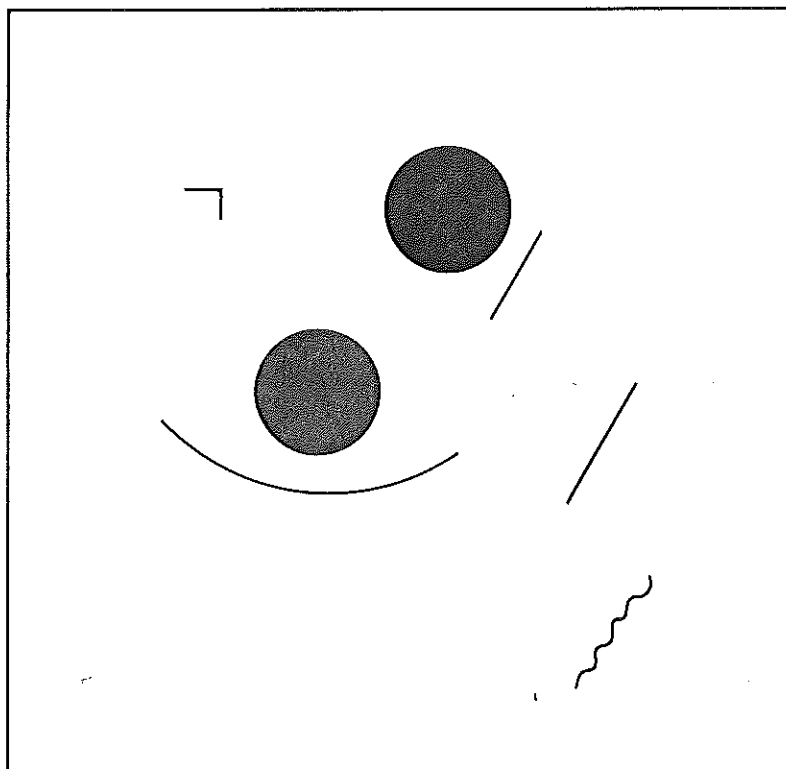


Analysis and Intuition

1987 STA Design Journal



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A Short, Grandiose Theory of Design

Jay Doblin

Why Methodology?

For years, most design problems could be solved by using a combination of design training, experience, and applied intuition. But as the world and its design problems have become more complex, traditional approaches have become less effective.

The notion of design theory may seem woolly-headed and irrelevant, but it has a place: theory can provide a structure for understanding problems and help generate methods for solving them. After many years of being confined to a few oddball schools, design methods are starting to find widespread practical application. Indeed, there are today many classes of design projects (big positioning studies, complex identity programs, massive electronic publishing systems, and systems of products produced in robotic factories among them) that would be irresponsible to attempt without using analytical methods.

The term 'design' is ambiguous and needs clarification. For instance designers commonly refer to "this design I've made," using the term as a noun; and with equal frequency speak of having to "design this thing better," using the term as a verb. To resolve this ambiguity, a distinction can be drawn between design as a state and as a process. The most succinct view of design theory splits these two common uses of the term apart and makes observations about each.

Part 1 of this paper shows how design has evolved from a seamless intuitive process into a more complicated one which can be split into different stages or operations. Part 2 introduces six types of design problems that are fundamentally different from one another. Then Part 3 discusses how design methods and

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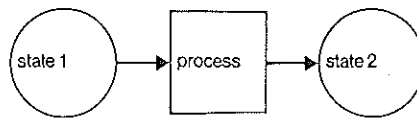
design specialists can be matched to the problems of the day.

The overall goal is ambitious, audacious, and probably offensive to many colleagues in the design fraternity: it is to produce a simple guideline that can be used in solving all different kinds of design problems. In doing so it becomes possible to marry design processes to design problems.

Part 1

Design as a Process

At the most basic level, design can be described as an event that begins with an existing state and through some process produces a more desirable state. This concept can be represented by a simple model, called "SPS":



Of course, this presupposes that someone can recognize the existing state as having some fault that ought to be fixed, can envision a more desirable state, and can achieve it by employing some process. There are two classes of process that can be used to achieve this.

Direct Design

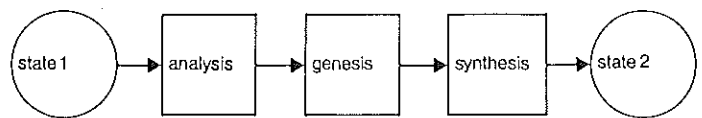
Direct design is the most elementary class of design operation. In terms of the SPS model, only one step occurs in the process stage. Usually, the immediate goal is to replicate a product that already exists. In this case, a hut would be built, a basket woven, or sandals sewn. Typically a craftsman does the handiwork, inspecting progress along the way until the final result is pleasing overall.

Direct design breaks down when projects become complex. When building a cathedral or a ship, the client wants to see some sort of representation of the project in advance. Also, the problem of directing large crews requires more than simple direct observation during production.

Indirect Design

A thousand years ago, mankind began using an enormously more powerful process called indirect design which uses messages, such as drawings and diagrams, to produce solutions. This gives the designer vastly greater flexibility; since he can now easily move a few lines rather than build, tear down, and rebuild physical components. With the design process externalized from the production, a team can work in unison on the messages and the work can be parceled out to specialists and detailers.

For decades design texts have suggested two stages, analysis and synthesis, were at work when the designer was set loose on his mysterious quest. But observations of hundreds of design projects, both large and small, indicate that the design process takes place in three, not two, distinct sequential stages. The SPS model can be expanded to include these operations:



Each of these three stages can be separately described.

Analysis

Analysis is usually defined as breaking something into its constituent parts. In design, analysis is a more specialized concept—to turn reality into messages. Usually, the existing product is "dematerialized" by translating it into sketches, mechanical drawings, or even computer images which the designer can use in a design process.

The core issue of analysis is to assemble, from a virtual infinity of information, whatever is relevant to the project. This information is then detailed and structured so the implications become sharp and clear. Properly done, analysis can be the most expensive and time consuming part of a project. Probably the prime failure of most complex design projects is a tendency to make analysis too casual.

Genesis

In genesis, the messages of analysis are deliberately improved. The essential activity in this operation is generating new information through the application of intelligence. For tiny projects this might be less pretentiously termed a search for insight; for giant complex projects genesis involves simultaneous new discoveries at many levels at once.

Using 'genesis' seems strange in this context because of its biblical associations. Yet even in the biblical sense it means the coming into being or development of anything. In sloppy conventional use of language, the term design is often used to describe this transformation process instead of genesis. This seems a mistake, for design is bigger than genesis. It's the entire process. Genesis is only one of design's three processes: a critical one though, right at the core.

Synthesis

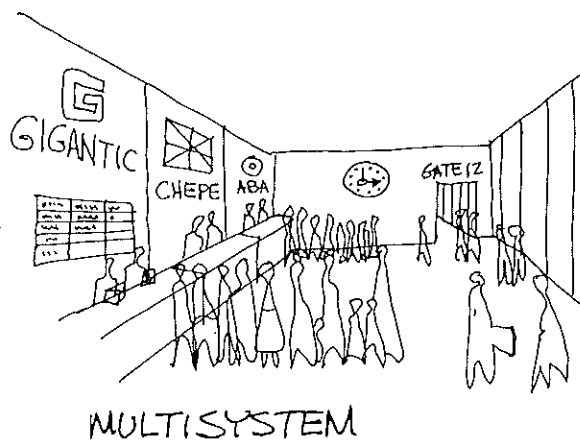
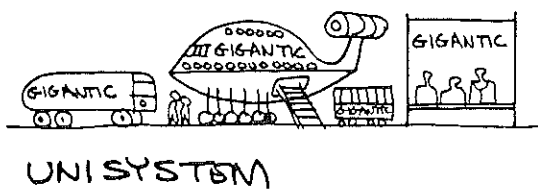
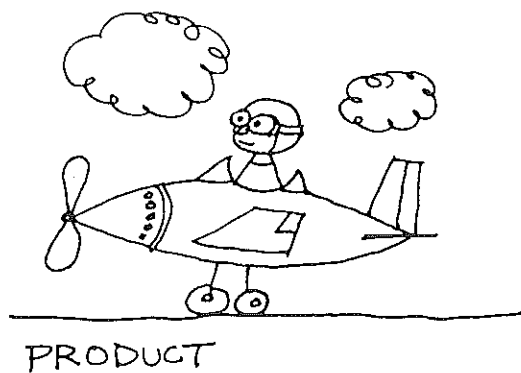
Design firms that produce great comps or models are more likely to communicate their ideas better than those that don't.

Synthesis doesn't materially improve a product as genesis does but if skillfully done, it can contribute enormously to the product's value. Beethoven's Ninth Symphony is a wholly different experience when performed by a high school band then by the Chicago Symphony Orchestra; this is synthesis at work.

Part 2

Design as a State

Besides being a process, design is also a state. Objects or things have certain physical qualities that can be isolated, considered in relationship to each other, and then used in developing a systematic approach to design. Observation and reflection suggest that two concepts are needed to understand different types of design problems: product properties and project complexity. Each will be expressed as a scale.



Performance and Appearance Ratio

Products can be conceived as having two polar properties: performance and appearance. The primary purpose of every product is to perform some task: wash dishes, produce light, transport people, print words on paper, transmit voice communications, visually entertain. Appearance, the way a product looks, is added to the product's mechanism by design and is often manipulated to attract the consumer.

A continuum exists between pure performance and pure appearance. Some products, such as crowbars or paper clips, are clearly performance products. Others, such as Christmas ornaments, medals, and trophies, as well as fantastic products like Versailles, King Tut's burial artifacts, or a Cellini salt cellar, are purely appearance products. Still others, like automobiles, cups, and chairs, are combinations of both. The essential point is most products (and messages) can be conceived as primarily performance or appearance oriented.

Unfortunately, the threshold separating performance products from appearance products can be fugitive, and is sometimes confused when the designer has one goal, the user another. For example, a Porsche or Hasselblad, primarily intended to work as performance products, are mostly appearance products if the Porsche is driven to work on city streets or the Hasselblad used to take snapshots of the kids. Used this way, their purpose is to enhance the user's status, rather than perform at the level they were designed for. For present purposes, we intend these terms to apply to the designer's intended properties of items, not the *effective* properties, which are a function of how they are used.

Three Levels of Complexity

Besides looking at the relative performance and appearance properties in any design, an important conclusion can be drawn about complexity. The complexity of a design is usually related to the number of parts involved. The design of a car, for example, is much more complex than the design of a spoon. Design can be broken down into three levels of complexity: products, unisystems, and multisystems.

Products, the simplest kind of design, are tangible objects, which can be touched, photographed, and comprehended. Objects such as cars, chairs, and

spoons and messages such as brochures, signs, or ads are all included.

Unisystems are comprised of sets of coordinated products and the people who operate them. They are more complex in design, perform more complex operations, and are not as readily discernible as products alone. A kitchen, an airline, a factory, and a corporation are all types of unisystems.

Multisystems are comprised of sets of competing unisystems. The retailing field or the office equipment market are types of multisystems. At this end of the continuum, Sears goes against JCPenney, K-Mart, department stores, and hardware stores. Another example is the office equipment market in which IBM, Xerox, Digital, Wang, Apple, and Canon are all pitted against each other.

A Matrix of Design: The Six Types

appearance products	appearance unisystems	appearance multisystems
performance products	performance unisystems	performance multisystems

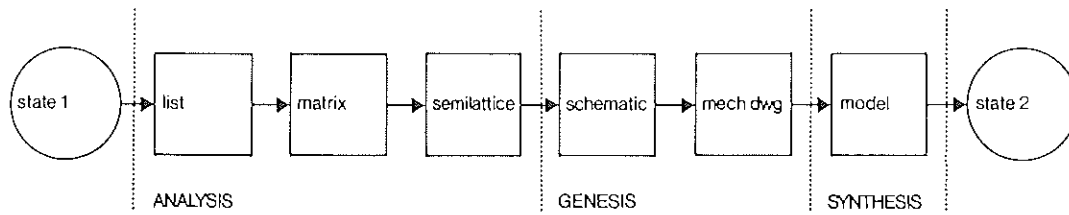
Cross the twin properties of performance and appearance with the three levels of design complexity, and six distinct types of design are produced. Knowledge of these six design types can be crucial in helping designers recognize what type of design problem is being addressed and prescribing an approach or method suited to solve the problem. The six types can be succinctly described:

1. Product Performance Design

Engineering is the design function conventionally used to deliver product performance. Good engineers like Thomas Edison, Henry Ford, and Dr. Edward Land have applied their skills to make products that perform well. Another observation: product performance is quantitative, so it's relatively easy for a consumer to choose the mechanism that best satisfies his requirements.

2. Product Appearance Design

Appearance design or styling is most recognizable when done by famous product appearance designers such as Dieter Rams, Raymond Loewy, Harley Earl, Charles Eames, Massimo Vignelli and Marcello Nizzoli. Sometimes appearance evolves into conventions called styles (such as purism, streamline, Deco, or new-wave), which other designers can then imitate. Because issues of appearance are not easily quantified, it is often useful to represent product appearance on maps. Maps show how appearance of one item compares in a relative sense to other items in a set.



3. Performance Unisystems Design

Performance unisystems range in size from small to large—from compact kitchens to NASA space missions. An airline, typical of performance unisystems, is a collection of products. The important concept in unisystems design is that it's the *relationships and interactions* between the items involved that are important.

Since World War II, unisystems of any size have required methodology, usually computer assisted. PERT, one widely known method, is helpful for keeping track of many project parts at once. Another, which comes closer to the essence of genesis has been developed by Christopher Alexander; it can decompose any system into a list of requirements that are deliberately structured into related sets and can then be designed. Alexander's hierarchical decomposition has become a standard for addressing performance unisystems.

4. Appearance Unisystems Design

Appearance unisystems are usually environments that can range in size from a restaurant to a world's fair. Their primary purpose is to deliver a satisfying experience. If they don't, they fail. Because of the investment in and the complexity of large appearance unisystems, they're usually designed by impresarios with an holistic approach. Projects begin with an overall vision of what the consumer's experience should be, then the details of the experience are painstakingly worked out.

Some well-known appearance unisystem designs are South Street Seaport in New York and Disneyland.

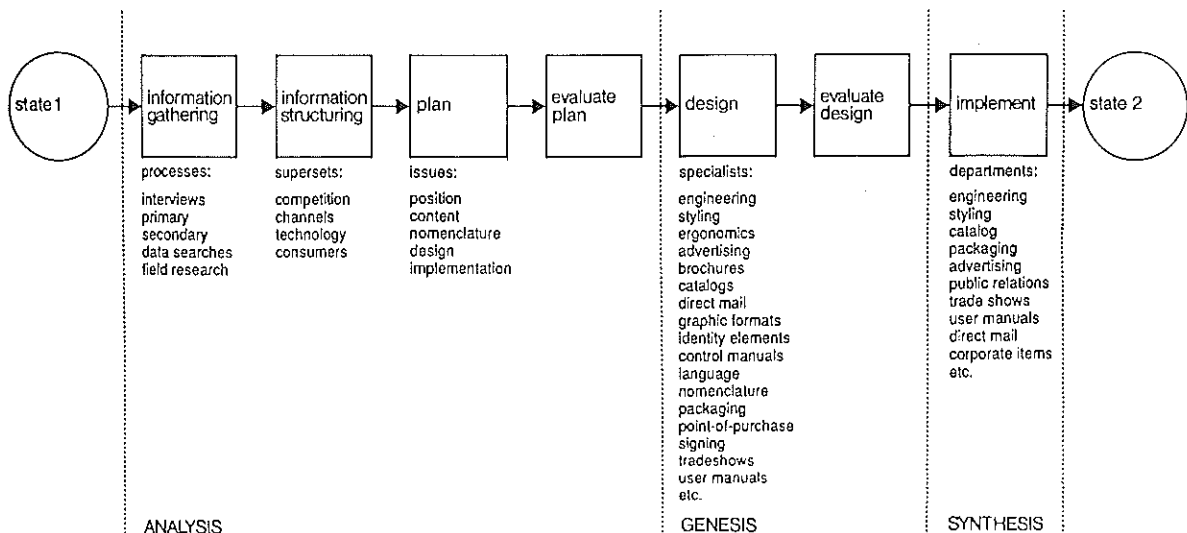
5. Performance Multisystems and

6. Appearance Multisystems Design

Since design approaches for these two types of multisystems are similar, they can be discussed together. The essence of multisystems is competition, and, curiously, performance and appearance multisystems can be represented by similar maps.

At first glance, maps that represent multisystems seem similar to the product appearance maps discussed earlier. There is an essential difference. The entities plotted on multisystem maps are competing unisystems (such as companies) rather than products. It's this difference that makes multisystems enormously more complex.

Because the unisystems contained in multisystems are competing against each other, it's necessary to develop a long-range corporate concept or position before anything can be designed. Also, in most cases, these unisystems require design coherence between hundreds of intrinsics (the products that consumers buy and use) and extrinsics (catalogs, brochures, signing, nomenclature, advertising, packaging, shows, corporate materials, stores) that support the distribution and promotion of the intrinsics.



Part 3

Building a Prescription

Matching the Right Designer to the Problem

Just as there are six distinguishable types of design, there are six different kinds of designers. It is a rare designer who is competent in more than one design type. The capability and experience required in one arena may actually obstruct a designer's competence in another.

Designers and clients must recognize these six design types or run the risk of failure. The practice of medicine has changed dramatically, from a single family practitioner to a plethora of specialists. It is clear to everyone today that not all doctors are equipped to treat all ills; by contrast, designers still frequently purport to treat all design problems. This will surely change as the field matures.

Matching the Right Method to the Problem

Over the last thirty years, the complexity of design problems has increased dramatically. In the 1950s, intuitive design coped with the problems of product and message design. In the sixties, methods developed in science and the military were adapted to solve problems of unisystems design such as service stations, retail stores, and industrial installations. In the seventies, it became clear that designing multisystems required more sophisticated planning and design methods.

The big design offices of the past that claimed to be one-stop design shops providing architecture, packaging, marketing research, direct mail, products, manuals, trade shows, advertising, etc., are no longer capable of doing today's complex multisystem programs. They may be strong in one or two areas but are weak in many others. Typically now, a team of specialists working together under an intricate plan is required in order to be effective.

To avoid dealing with complexity, most designers drive tasks downscale by simplifying them. For example, stylists may avoid technical complexity by accepting a mechanism as is and merely "icing" it with symbols

and form. Consumers get stuck with the results: from flamboyant chairs too uncomfortable to bear for more than a few minutes, to wild clocks difficult to read. Even worse, kitchens or offices become misfit unisystems because designers develop each product individually, giving no thought to their integration into true systems.

Another common approach to simplification is to drive a multisystem program back to unisystem methods. For example, corporate designers, mistaking neatness for substance, may style all products and messages in a rigid, uniform format, identified with a rubber-stamped mark. This misguided focus on visual order fails to deal with the core issue: to compete effectively.

For a complex multisystem, a methodology is needed that addresses many issues and problems. Until a decade ago, programs of this scale were done by designers using some paper and the "golden gut intuitive technique." If the designer was exceptionally talented and unpressured, he or she may have been able to focus on one or two requirements. If the client is very lucky, the requirements considered might even be important ones. More commonly the client gets a slick, conventional recommendation that achieves only rough parity with competitors.

Other fields have grown up and surely design will too. We will experience a time when designers forego their adolescent reliance on purely intuitive practices. Innocence, a lovely quality in a child, will be replaced by algorithm, an equally admiral quality in a professional. How can you be sure? For most clients today, the stakes are too high, the risk of failure is too great, to entrust their complex programs to flashy hip-shooters. The best design consultants and most senior design managers are already moving fast in this direction.

