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Design Thinking: Driving Innovation

Charles L. Owen

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Design Thinking. What It Is, Why It Is Different. Where It Has New Value.

Abstract

Innovation, a critical factor in business competition, is a more complex concept than many realize. Far more than principles, rules and procedures, it is a process most effective when imbued with attitudes and ways of thinking that have evolved over generations within the community of those who routinely practice creative invention and synthesis. Significant among these are ways of thinking from the design fields appropriately referred to as "design thinking".

Introduction

The word "innovation" is approaching the status of buzzword, which is unfortunate because the concepts it covers—those that drive it—are both significant and elusive. We can ill afford to let them slip out of consciousness simply because the term that indexes them falls out of fashion. While it is still viable, then, a few words about some of the more important of these innovation concepts. The ones I personally find most useful are gathered under *design thinking*, a way of thinking that parallels other ways of thinking—like science thinking—but offers a way of approaching issues, problems and opportunities almost uniquely suited to innovation.

Creativity, of course, is of major importance to design thinking—as it is to science thinking and thinking in any field. But as is true for every field, characteristics other than creativity are also important, and these are the elusive ones because they tend to be less widely shared. Among others, I would nominate the following from the field of design as significant and invaluable to innovation:

Characteristics of Design Thinking

Conditioned Inventiveness.

Creative thinking for designers is directed toward inventing—as opposed to discovering for the scientist. Designers tend to be more interested in the "what" questions than the "whys" of interest to science. Design creativity complements scientific creativity. However, design creativity must cover more than just invention. Design brings to invention a concern that what is produced not only be inventive, but be so within the frameworks of human-centered and environment-centered measures governing the designer's efforts.

Human-centered Focus.

Science and, to a lesser extent, technology generally, have few built-in governors. As in the arts, exploration proceeds where discoveries direct. Design, on the other hand, is client-directed. Design thinking must continually consider how what is being created will respond to the client's needs.

Environment-centered Concern.

In recent years, design thinking has acquired a second omnipresent, meta-level client: the environment. Present-day thinking puts environmental interests at a level with human interests as primary constraints on the design process. Sustainable design is one very noticeable result. The ultimate value of human- and environment-centeredness is the promise that the best interests of humankind and environment will be considered in any project.

Ability To Visualize.
Designers do much of their work visually. Designers can visualize ideas in a range of media, bringing a unifying view to concepts otherwise imagined uniquely by everyone in a discussion. Designers can reveal the whole elephant that the blind men only partially and imperfectly conceive.

Tempered Optimism.
It is difficult to work—and especially to work creatively—in a pessimistic, critical mood. Designers are taught to recognize this and to establish optimistic and proactive ways of working. Pronounced mood swings are not unusual among creative individuals, but designers learn to control these to level out both lows and highs in the interests of professionalism—designers must be able to turn on enthusiasm on demand.

Bias for Adaptivity.
In recent years, the emergence of adaptive processes in manufacturing and information technologies has greatly reinforced a practice historically followed by progressive designers: the design of adaptive products able to fit their users' needs uniquely. Design thinking today has accepted that concept, approaching problems with the view that, where possible, solutions *should* be adaptive—in production to fit the needs of users uniquely, throughout their use to fit users' evolving needs.

Predisposition toward Multifunctionality.
Solutions to problems need not be monofunctional. Designers routinely look for multiple dividends from solutions to problems. This would seem to be an obvious way to proceed, but it is not. In a recent issue of *Popular Science* magazine, the cover story was six new technologies to stop global warming. The story reported proposals made by the science community at a special invited meeting with White House officials. All six science proposals were serious proposals for macro-engineering projects. Five of the six proposed single-valued means for relieving global warming—at considerable cost, and with no additional benefits. The sixth, as an extension of a technology already used for increasing natural gas production, had that benefit, but no other. In contrast, the three macro-engineering projects proposed in the Institute of Design's prize winning Project Phoenix (also reported in *Popular Science* 14 years earlier) all had major economic benefits in addition to their global warming benefits. Design thinking keeps the big picture (and its opportunities) in mind while focusing on specifics.

Systemic Vision.
Design thinking is holistic. In the last forty years, roughly since the computer began to influence design thinking, designers have moved to considering problems more broadly. Modern design treats problems as *system* problems with opportunities for systemic solutions involving mixes of hardware, software, procedures, policies, organizational concepts and whatever else is necessary to create a holistic solution.

View of the Generalist.
Common wisdom today holds that the trend of expertise is to greater and greater specialization and, therefore, success will come more readily to those who choose to specialize early and plan their training accordingly. Design thinking, to the contrary, is highly generalist in preparation and execution. In a world of specialists, there is real need for those who can reach across disciplines to communicate and who can bring diverse experts together in coordinated effort. For inventive creativity, the wider the reach of the knowledge base, the more likely the creative inspiration. A designer is a specialist in the process of design, but a generalist in as wide a range of content as possible.

Ability To Use Language as a Tool.
Language is usually thought of as means for communication. For design thinking, it is also a tool. Visual language is used diagrammatically to abstract concepts, reveal and explain patterns, and simplify complex phenomena to their fundamental essences. Mathematical language is used to explore "what if" questions where feasibility may be established by approximation—by calculations not exact, but close enough to support an idea or change a line of reasoning. Verbal language is used in description where explanation goes hand in hand with the creative process, forcing invention where detail is lacking and expressing relationships not obvious visually.

Affinity for Teamwork.
Because designers work for clients, it is natural that good interpersonal skills become part of the professional set of tools they develop. An additional impetus toward teamwork has been a movement in the professions over the last forty years toward team-based design, spurred by developments in industry. Design thinking today is highly influenced by this, and designers routinely work closely with other designers and experts from other fields. On multi-discipline teams, designers are a highly valuable asset because of their characteristic abilities to generalize, communicate across disciplines, work systematically with qualitative information, and visualize concepts.

Facility for Avoiding the Necessity of Choice.
The job of the decision maker is to choose among alternative proposals, usually the products of different problem-solving approaches. Design thinking takes the view that making that choice is a last resort. Before moving to choice-making, the designer looks for ways to "have your cake and eat it too"—a seeming paradox (exactly what you cannot do, as pointed out in the old English proverb). The optimistic, adaptive designer, however, searches the competing alternatives for their essential characteristics and finds ways to reformulate them in a new configuration. When this process is successful, the result is a solution that avoids the decision and combines the best of both possible choices.

Self-governing Practicality.
Design is a field in which inventiveness is prized. In very few fields is there the freedom to dream expected in design. The best design thinkers understand this and learn to govern flights of fantasy with a latent sense of the practical. The flight is to the outer reaches of what can be conceived; the tether is to ways that the conceivable might be realized. This is embedded in a style of thinking that explores freely in the foreground, while maintaining in the background a realistic appraisal of costs that can be met and functionality that can be effected.

Ability To Work Systematically with Qualitative Information.
As design research has matured and design methodology progressed, design processes with component methods and tools have been developed and refined. As one such process, *Structured Planning* contains a tool-kit of methods for a complete range of planning tasks covering ways to find information, gain insights from it, organize it optimally for conceptualization, evaluate results and communicate a plan to the public and follow-on teams in the development process. Methods such as this are qualitative information handling techniques applicable to many kinds of conceptual problems where complex system solutions are necessary or desirable. They are usable by anyone working on a planning team, enabling systematic aspects of design thinking to be accessible to all.

Into Play

These special characteristics of design thinking are not normally discussed in a university catalog. Indeed, they are seldom taught explicitly. Rather, they are acquired almost unconsciously as tacit knowledge in school projects or on the job.

Where they come into play most effectively is in conjunction with other kinds of thinking brought to the innovation process by those with different values and training—from the physical sciences, arts, political and social sciences, engineering, business, etc. Design thinking can be introduced as a service of design or planning consultancies. But it can be made a more immediate part of the process if introduced by design professionals actually members of the team; and, most effective of all, it can be systemic if team members are able individually to learn and practice its values.

In short, the innovation process can be improved significantly with design thinking. It can be used *by* a team as an alternative way of thinking. It can be used *for* a team by a team member trained as a design professional. And it can be used *away from* a team in specialized support projects conducted by design professionals to explore in detail issues and opportunities uncovered in the innovation process.