

The Fog of Design: Five Lessons on the Complexity of Practice

Uday Gajendar, User Experience Pathfinder
Adobe Systems, Inc., San Jose, CA

Introduction

This paper offers five lessons from Silicon Valley to prepare designers for the current and emerging nature of practice. The fundamental premise concerns the dawning realization that design is becoming an integrative discipline, service-driven and experience-oriented—especially as interactive technologies abound. This outlook implies the need for a designer beyond a “maestro of form” who can chart an efficient course through the social, political, and cultural intangibles that constitute the “fog of design” to advance a vision. Failure to accept this expanded view of design will diminish, even marginalize, design’s role in cross-disciplinary endeavors as engineering and marketing solidify their lead. Thus, this paper’s goal is to highlight such complexities so as to initiate dialogue with key members of academy and industry who wish to evolve the education of tomorrow’s designers.

Ultimately, the designer’s goal is to deliver something (a product, service, or experience) that enriches people’s lives somehow. The journey to get there is hard and messy; knowing how to deal with this can empower designers in profound ways, as the insights below demonstrate.

The product design milieu: From complex to wicked

Mainstream media and global design celebrities—Yves Behar, Philippe Starcke, Karim Rashid, Jonathan Ive, to name a few—have successfully elevated the perceived value of design activity by reinventing the mundane: music players, housewares, shoes. These sleek, stylish forms and brands convey an aesthetic hipness that radiates “ease of use”. However, is it easy to *design*?

Such glamorous imagery belies the dark truth many young designers (and even educators) often struggle to accept—design is just one competing element in a complex organizational system serving the primary business function. BodyMedia’s Head of Design Chris Pacione has described business as a “multifaceted and complex organism...students need to recognize what value they offer the organization”.¹ Yet, as design professor Jon Kolko argues, students are not adequately prepared for this “organism” because, “industrial design education has traditionally been defined by craft...there is a reluctance to move beyond ‘form giving’...rendering, model making, or styling”. As an educational ethos, this does not suitably serve young design professionals in today’s practice, whereby design is not necessarily at the center of activity!²

The fact is *design*—even for celebrity examples like the iPod—functions within a complex milieu of forces. There is an interdependent system of business actions via some sponsoring organizations (marketing, engineering, research, etc.), oscillating among dynamic levels of budget, time, and resource availability, given the lifecycle of the company (and market conditions), all of which continuously shape corporate strategy. In addition, there are constituencies in product development, like customers and partners, armed with competing requirements. As Petroski and Moggridge suggest, this complexity is inherent to design practice:

“Designing anything involves satisfying constraints, making choices, containing costs, and accepting compromises.”—Henry Petroski³

¹ Pacione, Chris. Personal interview, conducted via e-mail Wednesday, May 7, 2003.

² Kolko, Jon. “New Techniques in Industrial Design Education.” *Proceedings: 6th International Conference: European Academy of Design*. March 2005.

³ Petroski, Henry. 2003. *Small Things Considered: Why there is no perfect design*. 13-15. New York: Vintage Books.

"The convergences of objects, services, environments, and technologies, indicates that more and more design problems can only be solved by teams from different backgrounds working together."—Bill Moggridge⁴

A casual review of current business literature (e.g. *Harvard Business Review*, *Wall Street Journal*, *BusinessWeek*) reveals several elements pushing this complexity even further:

- Outsourcing development phases, like packaging, branding, and manufacturing
- Buyouts and mergers among competitors in consolidating markets, like telecom/IT, consumer goods, and new media
- Economic volatility resulting from Wall Street expectations causing projects to be canceled or started somewhat capriciously
- The evolution of rival platforms, user standards, industry-wide media formats

Such developments foreshadow the next stage of design problems, which are “ill formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramification on the whole system is thoroughly confusing”—in other words, “wicked”.⁵ Even mundane problems (i.e., re-invent housewares) are becoming wicked as development cycles shrink and resources become tightly constrained amid political disputes. Finally, designers are now asked to solve for novel situations like the following:

- Efficient transportation systems that uphold environmental protocols
- Public housing structures that enable progressive economic policies
- Networked lifestyle devices for disabled or elderly audiences
- Civic voting systems with electronic interactivity

These problems signify what the Next Design Institute declares as the next stage in the evolution of problem solving—global, systemic, and profoundly social, featuring “massive change” for new audiences: elderly, disabled, impoverished, or highly specialized.⁶ The issue of aligning design activities with company imperatives and processes assumes a new level of challenge, with higher bars of achievement for design to officially own and lead innovation amid constant change and complexity. Creating a stylish form simply won’t cut it, in the long run. New kinds of problems are being tackled, and the conditions governing ordinary problems are becoming tighter, making innovation difficult. Form-making and technical skills from the object and designer-centered mindset are insufficient for emerging situations that demand strategic thinking and leadership amid cross-functional teams. So what does all that really mean for design education?

A new source of inspiration

This real-world “fog of design” involves many social, cultural, and political facets, whether for commonplace products re-born as “cool” or entire paradigm shifts. Being able to confront and manage these intangibles will empower a designer towards becoming an effective change agent within an organization. Indeed, with integrated coursework, co-op exchanges, and sponsored projects, there are great opportunities for educators to advance these next design skills:

- Interpretation, analysis, and synthesis of highly specialized domain information
- Rapid conceptual modeling of problems to glean deeper issues
- Systemic thinking of issues, their dependencies and key assumptions
- Advocacy, education, and coordination within global, cross-functional teams

⁴ Wohlfarth, Jenny. 2002. “Making the Grade.” *International Design* (October): 54.

⁵ Buchanan, Richard. 1995. “Wicked Problems in Design Thinking.” In *The Idea of Design*, ed. Victor Margolin and Richard Buchanan, 14. MIT Press.

⁶ Next Design Leadership Institute. <<http://www.nextd.org/01/index.html>>. Accessed 5/10/05.

Such skills, bound by a broad user experience ideology exploring the human dimensions to a problem, will enhance a designer's professional contribution, with thorough user-centered methods. Dubberly's curriculum proposal, as an example, articulates a valuable direction for design schools to consider.⁷

In addition it may be useful for the IDSA community to reflect upon conditions in Silicon Valley, that feature interaction and user-centered design of software systems at places as diverse as Oracle and Adobe. In each case, design is positioned in a certain way to deliver services for the broader business function:

- Centralized enforcement agency for consistency of interface standards
- Embedded designers within a product engineering team, focused on technical specs
- Centrally managed but business-unit funded designers that work consensually with product teams to achieve user experience cohesion

In any of these characterizations of design practice, there are rich design problems when creating and improving software applications, spanning user interface, information architecture, interaction design, and human factors. Such areas of impact correlate well to aspects of designing physical products and social services. So, while the outcomes may differ (ephemeral software versus tangible object), the methods and issues closely resonate as the following lessons will illustrate.

Five lessons from interaction design practice

Cumulatively these lessons encompass the ideals of educating the next design professionals, prepared to navigate and resolve the chaotic complexity of practice.

Lesson 1: *Designers should be like ecologists, conscious of the integrated system of invisible consequences.* Every product offering needs to be viewed as part of a system of platforms, hierarchies, and families. This includes the brand, features, and related offerings in the company portfolio—even those outside one's immediate design responsibility.

Legendary designer Charles Eames presented a simple yet brilliant sketch that illustrated the zone of an optimal solution, addressing the ideal fusion of competing requirements, much like a Venn diagram with a "sweet spot" of intersections.⁸ Ecological thinking goes a step further, recognizing the deep social and technical connections supporting a design's value, implying a comment by architect Eliel Saarinen: "Always design a thing by considering it in its next larger context - a chair in a room, a room in a house, a house in an environment, an environment in a city plan."⁹

Accordingly, the ecology metaphor relates to corporate design by suggesting a "dense network of relationship in a local setting" centered around design activities informed by a "dynamic blend of people, practices, values, and technologies," like wildlife species in a rainforest.¹⁰ In other words, design lives within a continually active system of dependent capabilities, from engineering, to sales, to quality assurance, to marketing, to customer service, all fitted within some overarching process(es) to ensure the creation and delivery of products to customers. Consequently, there needs to be a balance between a) one's design task which is the "locality of habit" or practice and b) the surroundings of diverse, interdependent "species" whose needs and risks are interrelated by a common purpose of survival and competition for resources—stakeholders, regulatory boards, and executive review teams, among others.¹¹ These unique dependencies surface as budgets, schedules, deliverables, and feature requirements. Each of these species play vital roles

⁷ Dubberly, Hugh. 2001. "AIGA Briefing Paper on a Curriculum for Experience Design." In *The Education of an E-Designer*, ed. Steven Heller, 164–167. New York: Allworth Press.

⁸ Mok, Clement. 1996. *Designing Business: Multiple Media, Multiple Disciplines*, 19. San Jose: Adobe Press.

⁹ First attributed to Saarinen in *Time* magazine, July 2, 1956.

¹⁰ Nardi, Bonnie. 1999. *Information Ecologies: Using Technology with Heart*. Cambridge: MIT Press.

¹¹ *Ibid.*

within the product development process and cannot be ignored without some consequence for the business function—or the product itself. This is the nature of the ecological balance of goals and activities within product development a designer should appreciate.

There is also a product-centric ecology in that the targeted product exists as part of a portfolio of offerings, based upon a platform, associated with brand families, and built with modular components shared among other products in the inventory—particularly if it is a global company with assorted business units. Thus, the designer's decision-making should be informed by a “global generalist” outlook, which is a systemic perspective on design issues: how does changing X impact Y? What level of change? What severity of impact? Who else is involved across the company?¹² Becoming comfortable with integrative thinking, and sensing problems from multiple dimensions will guide a designer in selecting the proper battles, and gauge the proper level of priority for a design activity amid tightening constraints.

Lesson 2: *Asking the right questions driven by a set of conceptual frameworks can be more important than domain expertise itself. Knowing the domain is central towards making sensible design decisions. Designers regularly confront varieties of constraints and goals; thus, knowing how to interpret the domain sufficiently can help resolve conflicts.*

Asking exploratory questions rooted in the human-centered view will help the time-pressured designer ascertain what is necessary and sufficient to solve a problem. The alarming speed and quantity of electronic communications has stressed the designer's attention span. Thus, developing a capacity for critical questioning has become a survival skill to keep the designer focused on what is necessary to solve a given problem. Other advantages include improved relations with remote team members, and identified knowledge gaps. More importantly, such questions about the primary motivations, purposes and assumptions of a project (i.e., the “critical path”) enable a designer to properly scope a problem, extract relevant data, and prioritize high-risk features for resource negotiation later. This demonstrates the designer acting as a leader shaping the project direction and pacing, rather than struggling against unforeseen difficulties.

From these initial questions the designer should discern interpretive structures or “models of thought” to establish a common frame of reference for a team to understand user experience issues, like user context and goals. Reinforced by “deep dive” research via ethnography and competitive analysis, these models become relevant to highly specialized domains like healthcare, automotive systems, urban planning, consumer electronics, and so forth. The designer should visualize such models as maps, flows, schemas, or diagrams to clarify understanding and forge agreement with the team's collective analysis of the problem. This strengthens the communications channel between designers and product stakeholders before major decision-points are reached.

Together, knowing how to ask key questions and rapidly generate frameworks enhances the designer's flexibility to bend as problems change, from dynamic business conditions. This is a skill that provides long-term advantage, with models and questions that preserve a confident heading amid the fog of complexity. Also, this augments a subtle but powerful ability of anticipating patterns of problems and maneuvering novel ideas towards successful delivery.

Lesson 3: *Process documentation is vital, not just for “nice portfolios” but for recording decisions and rationale, capturing knowledge, and providing visual evidence during project reviews. Creating a routine habit for documenting and communicating is important, as a protective mechanism for designers to sustain their work under scrutiny—and constant change.*

Every industrial designer knows that concept sketches make great portfolio fodder. But as teams become more intertwined with non-designer collaboration, conveying design progress with process artifacts becomes vital. Moreover, such artifacts are crucial to staging an ongoing conversation with stakeholders about various problems and solutions, as anchor points for debate. Thus, the project review is more than a

¹² Friedman, Thomas L. 2000. *The Lexus and the Olive Tree*, 23-8. New York: Anchor Books.

“star showcase”, but the necessary means to sustain the critical path of development. This attitude builds confidence and trust throughout the process, minimizing surprise. Finally, process sketches enable a designer to serve as a facilitator, advocate, and guide educating stakeholders on the merits and risks of design alternatives, while speaking to agreed business goals. Such process artifacts should be organized among three major areas:

- Exploratory: helping to understand, or “probe”, the domain, context, users, goals
- Interpretive: learning the elements of the product features and system
- Generative: providing alternative solutions to previously identified problems

Together, this structured documentation legitimizes the designer’s decision-making with defensible, meaningful artifacts that encourage buy-in from stakeholders and reinforces the designer’s confidence in deal-making situations. Furthermore, to take full advantage of internal networked systems, the designer should compose an information strategy for sharing process artifacts with teams, particularly those persons distributed across time zones. Blogs, wikis, e-rooms, and email updates can create channels for rapid feedback, to help the designer iterate faster, and establish a posture of credibility. Ultimately, learning how to open up the mystical “black box” of design will only foster support towards getting a concept implemented.

Lesson 4: *Design can be a challenge, but influencing non-design stakeholders to implement the desired solution is more difficult.* Navigating the Byzantine levels of organizational structure and social networks implicit in a company is a vital skill for every designer who intends to lead complex problem solving.

In any practical design situation, solving the specifics of a problem can be quite demanding. However, securing the necessary agreement from key decision-makers for implementation of the chosen design is a different matter, and often more difficult. Recall that design is merely one player in a complex game, and often with less political clout. Given the deeply social, collaborative nature of conducting business, influencing stakeholders becomes the path towards success. Rooted in Classical traditions of rhetoric, influence is the art of persuasive communication, a “subtle maneuvering of ideas” towards achieving specific outcomes. Accordingly, influence requires a nuanced balance among skillful argument, negotiation of conflicts, tactful compromise, and all around decisive leadership, with conviction and purpose.

How should a designer develop that pathway of influence? One approach relies upon the sheer force of personality—akin to the myth of the “lone design hero”. Another, however, concerns cultural sense-making of a business environment. As educational philosopher John Dewey describes, for an organism to become an animating force in its environment, it must engage in a dynamic “push-pull” relationship with its “field of activity”.¹³ This takes time, and astute observation of team behaviors, attitudes, and values. Several basic questions can guide this approach: What are the driving motivations and intentions behind various non-design decisions? What goals were sought and how did they impact the design outcomes? What are the common methods of decision-making in this culture—consensus or mandates? What are the kinds of authority structures in other departments? How should the designer engage with those departments?

In addition, understanding what leadership guru Stephen Covey describes as the “circles of concern and influence” can be vital to design success, thus marking the lines of ownership.¹⁴ For instance, the designer may be concerned about a part of the product she doesn’t own (i.e., concern over the radio controls in the car but another team owns the shape and position of the console). Yet, through effective collaboration techniques, design teams can transcend such boundaries, or expand them to encompass more opportunity for novel solutions to be heard and accepted for implementation.

In *Creating Breakthrough Products*, Cagan and Vogel describe stratified levels among “interests-rights-powers” as an approach to foster a healthy cooperative spirit with teams—yet another path to positive

¹³ Dewey, J. 1980. *Art as Experience*. New York, NY: Perigee Books.

¹⁴ Covey, Stephen. *The Seven Habits of Highly Effective People*. Free Press.

agreement and influence.¹⁵ Debating issues at the level of consensual interest creates a collegiality and trust necessary for constructive team dynamics—and increased likelihood of accepted designs actually getting built for sale. In addition, the following social techniques can encourage positive discourse with teams:

- Cultivating a capacity for empathy, feeling, resonance with ideas
- Understanding the other’s frame of reference for various issues
- Seeing the design problem from multidisciplinary perspectives
- Identifying the costs/risks/benefits of the solution with specific models of analysis like POG (Product Opportunity Gap) or SET (Social-Economic-Technical) factors¹⁶

Lesson 5: *Design leadership has hidden dependencies upon peer designers, support engineers, even sales reps. While someone needs to be “in charge” for a design, collaborative ties can ensure better handling of inevitable conflicts (e.g., scheduling, budgets, resources) and improved design decision-making.*

The ideal cumulative effect of the preceding lessons is the emergence of a design leader—someone prepared to anticipate change and chaos at the “focus or at least the periphery of business functions.”¹⁷ Indeed, operating as a leader is a daunting role, with responsibility for and visibility among key decision-makers in an organization. Part of that challenge of leadership is transposing the chaos of daily ambiguity into a meaningful and actionable order. To facilitate this, the designer should tap into valuable “connectors” that constitute the hidden infrastructure of product development: customer service agents, professional services teams, quality assurance engineers, even interns and contractors, with their fresh outsider insights. Peer designers working on related projects and supervising managers will offer the supporting confidence and authority to proceed with designs. This ecosystem of collective knowledge and interest can reinforce tough calls, by providing information that fuels the designer’s read on the pulse of a situation.

Thus, the designer who finds herself in a leadership position is much like an actor in the spotlight; it is vital for educators to prepare students accordingly for assuming for this role. However, design leadership is not affirmation of the “lone hero” myth, but instead recognition of its profoundly social nature, particularly with modern cross-functional teams distributed across departments and regions. In order to convey a direction amid chaotic situations, the design leader should learn to delegate, identify insufficient data, balance risks with benefits, and know who to contact for further support. In fact, one may argue that the true sign of design leadership is skillful dialogue towards satisfying the ultimate business function and delivery of a fulfilling user experience.

Summary and conclusion

New media design guru Clement Mok recently stated that “designers ought to be aware of the difficult dynamics of change; design is, after all, the art of causing change to occur in accordance with taste and intent.”¹⁸ In the spirit of his statement, this paper advocates for improvements in design education that reflect the emerging realities of design practice, fueled by insights from one of the leading areas of interaction design, Silicon Valley. The traditional craftsman-based model of design education must evolve towards a new model appreciative of the dynamic, contentious reality of emerging design problems—both wicked and complex. This shift of mindset can only occur if educators realize the need to prepare a new generation of designers who can effectively shape strategy, vision, and process for the improvement of human experience in a variety of markets and domains. Fundamentally, designers are agents of change, seeking a “preferred state”, and thus need to be prepared well to handle complexity, so as to provide continuous positive value to the business and profession overall.

¹⁵ Cagan, Jonathan and Vogel, Craig. *Creating Breakthrough Products*. NJ: Prentice Hall. 148-51.

¹⁶ Ibid.

¹⁷ Pacione, Chris. Personal interview, conducted via e-mail Wednesday, May 7, 2003.

¹⁸ Mok, Clement. "Designers: Time for Change" *Communication Arts* May/June 2003. June 2005 <http://www.commart.com/ca/coldesign/cleM_185.html>.