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Marije Vogelzang

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Volume 6 of the *Journal*, to be published Summer 2012, explores the theme of “Designing for Billions.” Featuring the original work of scholars engaged in various aspects of design strategy within emerging markets such as India, China, and Brazil, the issue surveys new opportunities for designers, entrepreneurs, activists, policy makers and investors in the context of the world’s developing economies.

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LETTER FROM THE DEAN

I'm pleased to present Volume 5 of *The Journal of Design Strategies*, which explores the theme of Transdisciplinary Design and celebrates the launch of our MFA degree program by that name. As the continuing corporate and media interest in “design thinking” shows, design today is increasingly appreciated for the value it can add to organizations and institutions—including those whose own activities extend far beyond the form-giving role traditionally assigned to the design professions. In fields as diverse as education and disaster relief, designers are contributing not just to the conception and development of innovative new products, scenarios, and systems, but also to the effective planning and management of the development processes themselves. Indeed, an emerging hallmark of designers today is precisely their ability to engage productively with a wide range of other sources of knowledge and expertise. In a world beset by intractable problems whose complexity defies resolution within the terms of any single professional perspective, collaboration across disciplines is itself becoming a *sine qua non* of effective action. The MFA in Transdisciplinary Design program registers and responds to this new context, seeking to establish collaborative practice as an essential capacity of design as such.

I am very grateful for the ongoing support of the Karan-Weiss Foundation in sponsoring the Design Strategies Dialogues transcribed in this volume. Through that support, we continue to explore the ways that design innovation and business strategy can ameliorate problems and open opportunities in our complex and changing world.

A handwritten signature in black ink, appearing to read 'Joel Towers', with a long horizontal line extending to the right.

Joel Towers
Dean

STEPHAN WEISS MEMORIAL LECTURE SERIES

Each year, Parsons' School of Design Strategies hosts the Stephan Weiss Memorial Lecture Series on Business Strategy, Negotiation, and Innovation. This lectureship was launched in 2002 to commemorate the life of the late artist and sculptor Stephan Weiss, husband and business partner of the fashion designer Donna Karan. Weiss co-founded Donna Karan International in 1984, and was instrumental in every significant venture the company undertook: launching and structuring new brands, most notably the Donna Karan Beauty Company; signing new licenses; establishing in-house legal and creative departments; devising its computer design technology; orchestrating the company's initial public offering in 1996; and negotiating its sale to the current owner, LVMH, Moët Hennessy Louis Vuitton.

Recent Weiss lecturers have included Fred Dust, leader of IDEO's environmental design practice; D. Michelle Addington, Professor in the Yale School of Architecture and in the Yale School of Forestry and Environmental Science; and Steven Berlin Johnson, author of several popular science books and analyst of emerging trends and business opportunities connected to web-based social networking.

In Spring 2009, the School of Design Strategies became the formal host of the Stephan Weiss Memorial Lecture Series, and inaugurated a new format for the lecturers, the Design Strategies Dialogue, featuring the pre-eminent design theorist Ezio Manzini in conversation with the distinguished cultural anthropologist Arjun Appadurai.

LETTER FROM THE EDITOR

One year after the Stephan Weiss Lecture Series Design Strategies Dialogues featured in this issue inaugurated the launch of the MFA in Transdisciplinary Design program at Parsons The New School for Design, and ten months after the first twenty students entered the program, the question still lingers: *So what is transdisciplinary design?* This introduction is an attempt to address that question, while ultimately acknowledging that it may be more strategic and appropriate never to answer that question, or at least never to answer it fully.

THEORY

The various contributions to this issue of the *Journal* sketch the contours of the transdisciplinary as these are now emerging from within traditional design practice. While it is tempting to assert a chronology that positions transdisciplinary design as the “next new thing,” in fact, it is not. Instead, the inception of the MFA in Transdisciplinary Design at Parsons is a response to a confluence of forces—social, technological and environmental—that have knotted themselves together in a way that make this approach not just timely, but also urgent. From the vexing challenges of sustainable growth to the disintegration of the United States’ nineteenth-century infrastructure; from the intractable complications of risky human settlement patterns to the perverse co-presence of obesity and hunger epidemics in developed and developing countries; and from problems in our own backyard to those of global span: the world is on fire

and many of us believe that design can play a role in extinguishing some of the blazes. Or at least that it is time for practitioners of design to move on from projects that privilege stylistic novelty to ones that grapple with meaningful social change.

From the vexing challenges of sustainable growth to the disintegration of the United States' nineteenth-century infrastructure; from the intractable complications of risky human settlement patterns to the perverse co-presence of obesity and hunger epidemics in developed and developing countries; and from problems in our own backyard to those of global span: the world is on fire and many of us believe that design can play a role in extinguishing some of the blazes.

While local events have been tied to global perturbations at least since the beginning of trade routes, the combination of proliferating information technologies with compounding infrastructural networks has created systemic complexity at an order of magnitude that is quite new. This, in turn, has generated tangled interconnections that have resulted in the “wicked problems” that Horst Rittel and Melvin Webber identified decades ago.¹ The increased awareness—within the design profession as well as outside of it—that designers could

play a strategic role in sparking innovations that might transform the landscapes of these wicked problems has

¹ Horst W. J. Rittel and Melvin M. Webber, “Dilemmas in a General Theory of Planning,” *Policy Sciences* 4, no. 2 (1973), 155-169.

led to a gradual but very real recalibration of the designer’s potential as an agent for change. But in order to play that role, designers must refocus their gaze from the object or artifact of the design process to the complex systems that contextualize it.

This shift—from artifacts to systems—mirrors the global shift in industrialized countries from manufacturing and goods based economies to ones built upon services, information, and innovation. When designers are no longer shaping objects, buildings, and letterforms but processes of innovation and change, the rules of the game and the terms of engagement must evolve as well.

These transformations are forcing designers to reconsider the boundaries of their own design practices. Traditionally, design professionals have been educated for, and have operated from within, disciplines. Clients called on designers to produce books, posters, chairs, toasters, websites, interiors, buildings, or garments. The forms of the outcomes were knowable and known in advance: architects designed buildings; fashion designers designed garments, and so on. They were relatively discrete, bounded, and (for the most part) tangible. The shifting contexts of design practices are now causing these certitudes to fracture and fragment. More frequently now, designers find themselves engaging with entities that range from government agencies and universities to food systems and public health organizations. The protean nature of these kinds of environments more or less dictates that the design outcomes must also change, often in unpredictable ways.

To design protocols, platforms, services or systems, for example, requires that designers invent entirely new form languages and syntaxes. Complicating matters further, these interventions into complexity do not necessarily take material form: they can result in experiences, events, behaviors or rule sets. Designers today are thus being challenged to re-imagine what they are creating—and why. Natalie Jeremijenko’s Environmental Health Clinic is illustrative in this context: it is part service design, part landscape design, and part biology lab experiment. Within the context of the clinic, she designs outcomes that range from infrastructure interventions (NoPARK) to conceptual zoos (the “OOZ Project”) to reconceptualizations of what it means for humans to fly. Jeremijenko reframes existing

problems and intervenes into unlikely contexts in unexpected ways. In her work, design becomes a method through which she reconfigures expectations. This kind of willing experimentation in new contexts and with unknowable outcomes is a hallmark of the emerging field of transdisciplinary design.

Similarly, across the diverse projects that Andrew Blauvelt labels “relational” design, one can see the use of protocols as a way to reconceptualize the role of the designer while giving greater agency to the users of design. Increasingly, designers establish conditions, rule sets, and scripts that can inspire and catalyze new social outcomes. There is no longer a primary emphasis on giving form; instead the role of the designer is to devise executable instructions for operation or play. From do-it-yourself (DIY) kits such as iRobot Create and Ikea Hack to Lust’s algorithmic poster design process, there is a distinctive drift toward ceding control of the final form to the user, or activator, of the designed process.

Originating in part within participatory design and open-source movements, these forces are remaking the relationships between designers, producers, consumers, users, and citizens. The locus of creative energy is now in oscillation between the designer and the user—although there is still an imperative to design the process effectively. Indeed, many emerging design practices indicate a mode of design that is closer to facilitation than to craft. They establish decision architectures and situate the user/activator in a role that blends design, curation, sampling, selection, and *bricolage*. It puts the agency of design into the user’s hands, distributing intelligence, capacity, and creativity away from a monolithic center and toward the heterogeneous edges. In his article “The Center Cannot Hold: Designing For Cooperation in the Absence of Control,” Yochai Benkler describes this evolution toward a distributed production model as a “radical decentralization of inputs and processes, both material and human: sensing, computation, processing, and storage are now in everyone’s hands, as are human creativity, wisdom, intuition, experience, and no less importantly, sociability.” By distributing the capacity for innovation more broadly, the designer seeds a wider field of evolutionary possibilities.

Among other things, then, transdisciplinary design is a connective, collaborative practice. Designers cannot go it alone when navigating issues in public health or disaster relief, for instance. These challenges defy a solitary approach. This means that designers must seek out collaborative opportunities with various other kinds of expertise, and that we must advance collaboration to the forefront of design’s core capacities. While historically the profession has lauded the accomplishments of the lone, heroic designer, this model is insufficient for our current condition. The design process must become more like open-source software development, with multiple contributors across diverse domains each contributing based on their disciplinary perspectives and unique strengths—but with no single controlling agent.

The ability to collaborate, and to do so strategically and intelligently, is not simply the capacity to play well with others. Collaboration is itself a complex process that requires experience and expertise, whether in brainstorming, assessing roles, resolving conflicts, or evaluating one’s peers. It takes many forms: pairs, small groups, large teams, or even crowdsourcing. It can be perilous and full of pitfalls. Thus, if a project is to be design-led, designers must be able to demonstrate that they are fluent in the mechanics of working together, and can deliver methods that maximize the effect of multiple perspectives rather than letting the process devolve into chaos, miscommunication, and dysfunction—as it often can. The aim of transdisciplinary collaboration is for the sum to be greater than the parts ($1+1+1=4$); the corresponding risk is that without skilled facilitation the sum will be less than the parts combined ($1+1+1=2$). Knowledge specific to the methods of collaboration is essential for coordinating the stakeholders in any multi-person process, which is itself the only way to make headway into a complex problem area. It is difficult to overstate just how radical this move toward collaboration will be in its effects. For decades design education—borrowing from fine arts and crafts—has focused on self-expression and the development of an individual’s signature style and voice. While still relevant, these qualities must now begin to subordinate themselves to more urgently needed approaches.

Transdisciplinary design results from a confluence of these larger transformations. Collaborative, distributed, open, and emergent, it arises to meet challenges in diverse contexts that traditional disciplinary approaches have struggled to address. It does not entirely replace these disciplinary approaches, but adds a new kind of design capacity. Because it is open-ended and connective, its outcomes are neither knowable in advance nor bounded by convention. Instead, the aim of a transdisciplinary practice is to collaborate with outside forms of expertise—health workers, elected officials, environmental scientists, bankers, biologists or bamboo foresters—in a designed process to discover new methods and approaches that are unique to that collaboration and not derivable from known disciplines.

PRACTICE

The increasing complexity of the world's problems has created fantastic opportunities for design, as well as threats. Radical change is not a process that any professional field absorbs easily. While it is all well and good to believe that we will merrily march forward through these changes, the reality is that they are putting designers into uncomfortable new positions.

Transdisciplinary design situates its practices within new kinds of contexts—public health, government services, humanitarian relief, public education, infrastructure—and generates outcomes that might range from protocols, platforms, services and systems to those whose forms we cannot even predict. What are the key practices? How does the approach take form? A range of strategic practices have emerged that are beginning to give shape to an approach that, while not yielding a final definition of transdisciplinary design, at least provides an outline of some central practices. As mentioned, collaboration is one of the defining features. Other potential strategies include:

Critical reframing: Examining a situation, analyzing it, and “framing” it in new ways can reveal new opportunities or possibilities. This requires analytical acuity, research and understanding, and—in many cases—an outside perspective. Collaboration across diverse disciplines is itself a key strategy for

reframing a problem and bringing fresh eyes to a situation. Religious scholars may provide unexpected insight into a project on social entrepreneurship, just as a food cart vendor would likely assess the implications of reshaping an urban environmental landscape very differently than a city planner. To reframe critically is to recognize, for instance, that increasing bicycle ridership in the city is not just a matter of building better bike lanes, but also requires coming to terms with national, politically-driven subsidies for oil, highway construction, and automobile manufacturing.

Systems diagramming: Disentangling the complexity that ensnares us in so many aspects of everyday life requires that we piece together the bigger picture, understand the broader context, and visualize the flows and disruptions of resources between stakeholders. Systems thinking provides a rigorous method through which one can begin to manage complexity, or at least start to get a sense of it. By diagramming relationships, flows, and connections one can make manifest the intricacies of a problem to all its stakeholders, while also revealing opportunities for optimizing patterns within complex contexts that might otherwise seem ungovernable.

Scalar thinking: Engaging with complexity means recognizing that any project has both highly localized manifestations and amorphously dispersed global implications. Between those two extremes there are additional levels of impact and opportunity. The first responsibility of a designer is to map out the full spectrum of these scalar gradations. From there, it is a matter assessing the most feasible and strategic level of intervention. The nature of a problem shifts as the scales shift; so it is critical that designers recognize what resources and partners are involved at each level so as to best identify the optimal avenue for intervention.

Experimental prototyping: Keeping an open mind as to the outcomes of a project or, to put it differently, not defaulting to known outcomes opens the possibilities for unexpected results and new kinds of products of the design process. Drawing with video; service performances; storyboarded behaviors; scripted interactions; organizational rule sets: these

are just a few of the hybrid products that might result from a transdisciplinary design project. It is even possible that no two projects will ever have the same kind of outcome. Quick, experimental prototyping ensures that multiple stakeholders can test, react to, and shape the ultimate direction of the process independent of concern for disciplinary expectations.

Assessment metrics: Currently, measurements of the social, environmental, or economic impacts of design are fuzzy at best. In fact, for design to have an impact on large-scale issues, its practitioners and advocates must become better able to demonstrate the value of their interventions. Very few stakeholders are going to take a gamble on empowering design processes if the outcomes are immeasurable. Design needs to take a page from the playbook of public health and start to develop mechanisms for measuring the impact of its actions. Whether quantitative or qualitative in nature, demonstrations of the strategic bearing of designers' work is a crucial step in the maturation of the discipline, and essential to the long-term success of all design practices.

When designers are no longer shaping objects, buildings, and letterforms but processes of innovation and change, the rules of the game and the terms of engagement must evolve as well.

Design-led research: Discovering and producing new knowledge *through* designing involves sensitivity to the knowledge-producing effects of design itself. Design-led research is not the research one takes on *before* designing, but is instead a process of establishing questions and research directions that are solvable specifically *through* the act of designing. This may involve additional, conventional research as one advances through the design process, but the aim is to utilize the process of design itself as a way to discover, reveal, and generate new forms of

understanding. Put more simply, through design we can discover. And through designing in complex and unfamiliar contexts we will discover what transdisciplinary design can become.

Reflective practice: Identifying the subtle deformations that are taking place in the design process while in the throes of it is critical to the evolution of transdisciplinary design practice. Being reflective in this sense affords practitioners a way to make their methods explicit, and in turn to build up awareness and a language for expressing their strategic value. Because so much project work is exploratory and experimental, it is essential that transdisciplinary designers foreground their methods, processes, and practices and be capable of communicating these back to stakeholders in the process. As with metrics, reflective practice puts the burden of proof on transdisciplinary designers to make explicit a value proposition as well as a rationale for their presence at the decision makers' table.

The desire to create a space of experimentation around complex issues, unbounded by disciplinary pressures, was the primary reason that we launched the MFA in Transdisciplinary Design program at Parsons. While we had outlined a pedagogical structure and learning objectives, the excitement came in part from the idea that we would use the program to “discover” what transdisciplinary design itself could be. In other words, we were not going to teach the students what it was, but instead would establish the conditions for the practice to emerge. Around every corner lies the temptation to codify these disparate practices into a new kind of discipline, a temptation we are determined to resist. On the contrary, we are convinced that transdisciplinary design must remain an emergent practice that shape-shifts as the projects change. It is for this reason that answering the question “So what is it?” is actually a fraught one: too much openness and we might be seen as being coy or clueless; too much specificity and it becomes just another routinized process—that is, another discipline. In the end, we benefit more from a willingness to deflect the impulse to define it. Always in a state of becoming, transdisciplinary design emerges within complexity as an evolving set of practices and an openness to change.

OVERVIEW OF THIS VOLUME

The articles collected in this issue of the *Journal* originate from a series of three Design Strategies Dialogues convened at Parsons The New School for Design during the 2009–2010 academic year, to celebrate the launch of the Transdisciplinary Design graduate program. Part of an ongoing series of lectures, dialogues, and conferences sponsored by the Karan-Weiss Foundation, these presentations and conversations allowed us to pair up experts from diverse perspectives around emergent themes in design. Two of the contributors, Anne Burdick and Ayssar Arida, wrote essays specifically for this issue; these contributions bookend transcripts of the three Design Strategies Dialogues.

The first of the Dialogues paired Anna Valtonen, formerly a researcher for Nokia and now Rector of the Design Institute in Umeå, Sweden, with Yochai Benkler, network theorist and co-director of the Berkman Center for Internet and Society at Harvard University. The aim was to explore how networks—global, immediate, and decentralized—are changing the way we live, work, and design. What are the possibilities and challenges of working and living in an always-on, always-connected global marketplace? And how can we leverage the power of these networks to transform everyday practices?

The second Design Strategies Dialogue brought together Marije Vogelzang, eating designer and founder of Proef Studio in the Netherlands, and Andrew Blauvelt, Curator of Art and Design at the Walker Art Center. Each is reshaping the practice of design in surprising ways. Marije Vogelzang is pushing her practice into the realms of eating, its rituals, and the communities it creates. Andrew Blauvelt scans the far edges of studio design practices to identify projects and practitioners that are redefining the relationship between designing and consuming—using design to leverage the creative power of diverse communities in the process.

The third and final Design Strategies Dialogue explored the role that systems design can play in creating resilient responses to crises, whether humanitarian, environmental or technological. Natalie Jeremijenko, a celebrated and provocative designer and activist, and Nigel Snoad, a researcher and change agent with extensive experience in

disaster relief (particularly the use of information technologies in response to global catastrophic events), presented overlapping analyses that charted the nightmares and the opportunities resident in various types of system collapse.

If these Dialogues revolved around the question of how design can respond to new challenges, Anne Burdick, Director of the Media Design Program at Art Center College of Design, scans design from the outside. She surveys other disciplinary practices that are currently taking up design, in novel and sometimes troubling ways. In light of the widespread enthusiasm for “design thinking,” for example, she tracks the deformations of the design process as other fields adopt it for their own uses. Finally, urban theorist and practitioner Ayssar Arida unearths an archaeology of transdisciplinary thinking, exploring the work of Aby Warburg and his attempts to create an instrument for tracing conceptual connections across cultures and historical eras. Pointing out that the transdisciplinary is neither recent nor restricted to design, Arida’s essay plunges us into a historical framework that further contextualizes the rise of transdisciplinarity as a response to the wicked problems we face today.

Like the field itself, these practitioners are shape-shifters, defying easy categorization. Together, they represent the range of thinking and the diversity of imagination that is essential to the development of transdisciplinary design. The sparks of insight ignited by their disparate practices provided both the light and the heat to get the conversation started properly.

Jamer Hunt
Guest Editor, The Journal of Design Strategies
Volume 5

SECTION 1:
DESIGN
BEYOND DESIGN

DESIGN WITHOUT DESIGNERS: New Contexts and Applications

Anne Burdick

Popular culture has been fascinated with design for some time now—think of Ikea, “Project Runway,” *Fast Company*, or *Make* magazine. More recently, this interest has found its way into the academy, where scholars have turned to design as a stimulant or a strategy to address shifts in culture, technology, or theory. Versions of design, alternately called studio-based learning, multimodal scholarship, or media literacy, can now be found within the physics classroom, education theory, ethnography and the social sciences, and the scholarly production of literature, philosophy, and history.

But it is in business education that attention to design is most pronounced. For some time now, academics and business leaders have touted design as a savior for failing corporations, as the secret of savvy managers, and as a factor in the resurrection of the MBA. In certain circles, the evangelism for design and design thinking is so strong that some pundits refer to the 21st century, perhaps prematurely, as the “century of design.”

But in the “century of design,” design is not the exclusive province of design practitioners, researchers, and educators. Instead, design is variably construed as a value-add, an everyday event, a working method, a byproduct, a literacy, and a complete abstraction—and frequently designers are nowhere to be found.

Rather than bemoan this absence, it is useful to explore what kind of future the growing interest in design—but not designers—portends for design and design education. Is the notion of the practitioner steeped purely in disciplinary training a thing of the past? Is our scholarship too little and too late or just in the nick of time? Will formal design education be required for fields of all kinds? And what of the act of designing itself—will it be at the center of an epistemological shift, or will it be relegated to a low-level service?

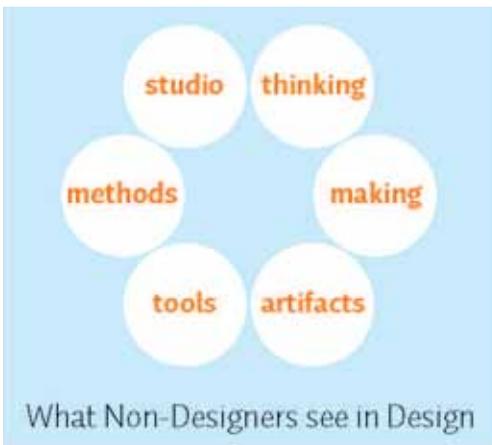


FIGURE 1: Key capacities of design as described by non-designers.



FIGURE 2: Key capacities of design named by “Rethinking Ethnography as a Design Process,” discussion series at Center for Ethnography, University of California at Irvine, 2009.

WHAT NON-DESIGNERS SEE IN DESIGN

A confluence of forces has brought design to this moment of spreading influence. Below I outline multiple contexts in which non-designers have incorporated aspects of design into their own fields, focusing primarily on examples found within the academy. Design educators and practitioners who dismiss or ignore this activity do so at their own peril; each instance provides surprising insights into the power and definition of design, while at the same time raising critical questions about its future.

The diagram shown here (SEE FIGURE 1) indicates key aspects and capacities of design that are in part responsible for its adoption by other fields. Starting at the top and working clockwise, *thinking* refers to the generative and propositional act of ideation; *making* is the intentioned manipulation of materials and the creation of things; *artifacts* are finished, refined things; tools are anything from soldering irons to Photoshop; *methods* refers to the iterative design process and applied problem-solving; and *studio* describes a model of working in small, collaborative groups. To be clear, I distill this version of the design process from the specific language that the aforementioned groups of non-designers use to describe their investment in design.

DESIGN AS A RESEARCH PARADIGM

In the social sciences and education, there is an emerging interest in design as a methodology or approach. One such example is a discussion series called Rethinking Ethnography as a Design Process, which was hosted by the Center for Ethnography at the University of California at Irvine in 2009. Professor George Marcus, director of the center, explains: “I have a personal interest in how the terms and practices of the studio process and design thinking might influence the way ethnography as a distinctive form of inquiry is taught.... In dialogues ... the figure of the design studio emerges as the medium that might improve or reform the classic practice of ethnography.... But aside from this, there is quite amazing and diverse interest in design at UCI among several disciplines and programs.”¹

Similar sentiments can be found throughout the academy. Frequently, this interest in design represents a shift within disciplines, as their practitioners reconsider traditional methods in light of changes in

¹ George Marcus, e-mail message to author, January 18, 2009.



FIGURE 3: Key capacity of design named by Design-Based Research Collective.



FIGURE 4: Key capacities of design named by the Technology-Enhanced Active Learning Classroom, Massachusetts Institute of Technology.

theory. Design-based research (DBR), for example, has grown in the last two decades in tandem with the field of learning science.

In efforts to develop more relevant and socially-based theories of learning, experimental and developmental psychologists have drifted from the isolation of the laboratory toward the naturalistic research setting of the classroom, where they are using iterative, applied, problem-solving approaches borrowed from design. In such cases, the word *design* refers to the planning and creation of learning situations whose components may include teaching materials, tools, technologies, curricula, educational policies, social configurations, the physical environment, and specific teaching methods. One key aspect of this design-based approach is the progressive refinement of actual designs in context, so that the outcomes are grounded in the complex and messy issues that impact learning in an actual

classroom setting. While this approach is not novel to designers, it represents a significant shift in the experimental science arena, particularly for those involved in human-centered design research and participatory design.

Members of the Design-Based Research Collective (DBRC), a group of learning scientists dedicated to promoting DBR, describe their work thus:

Design-based research views a successful innovation as a joint product of the designed intervention and the context. Hence, design-based research goes beyond perfecting a particular product. The intention ... is to refine generative or predictive theories of learning. Models of successful innovation can be generated through such work—models, rather than particular artifacts or programs, are the goal.²

² Design-Based Research Collective, "Design-Based Research: An Emerging Paradigm for Educational Inquiry," *Educational Researcher*, 32, no. 1 (2003), 7.

³ Sara Rimer, "At M.I.T., Large Lectures Are Going the Way of the Blackboard," *New York Times*, January 13, 2009, www.nytimes.com/2009/01/13/us/13physics.html?r=1&emc=eta1&pagewanted=print.

The DBRC makes a strong argument for considering design as equal parts "intervention" and "context." DBR considers every contributing factor in a situation, from social relations to textbooks, a designed aspect. This approach stands in marked



FIGURE 5: Key capacities named by the teaching approach known as Project-Based Learning.



FIGURE 6: Key capacities of design named by the teaching approach of Design-Based Learning.

contrast to design pedagogy that focuses exclusively on the crafting of artifacts while failing to address the field of relations out of which the meaning, utility, and value of those artifacts develops. (By the same token, design education that focuses solely on strategy and systems may also be seen as incomplete.) Perhaps most significantly, DBR offers a model for designers to see how the act of designing can be used to generate new knowledge—that is, models and theories—not only within design but in other fields as well.

It is admittedly disconcerting to design researchers to see terminology such as “design-based research” adopted so readily in another domain. But it is worth noting that these learning scientists face many of the same challenges from their more traditional colleagues that researchers in the field of design face when justifying their work to scholars from other disciplines: namely, that design-based research is difficult to systematize, and the outcomes may be so contextually contingent that they can be problematic to generalize. DBRC members write about the difficulty of being simultaneously a designer and a researcher, and of the challenge of isolating, managing, and interpreting the massive amount of data provided by a real-world context. Nonetheless,

design-based researchers have turned to design as a direct result of changes in theory that call into question more controlled scientific methods.

DESIGNING AS A WAY OF LEARNING

Elsewhere within education, the studio-based pedagogy found within design and architecture schools has drawn attention from a range of disciplines, and is being tested as a teaching approach in a number of experiments across the U.S.

In response to criticism about science education, MIT now houses all introductory physics courses within their Technology-Enhanced Active Learning classroom. They have replaced their 50-minute, 300-student lecture classes with smaller classes of 80 students who solve problems in small groups as a way to understand the principles of physics—with documented success.³

Within the field of education theory, the hands-on, applied activities of design are a natural fit with the pragmatic, student-centered learning theories of John Dewey and the object-oriented pedagogy of Friedrich Fröbel and Maria Montessori. The teaching approach known as project-based learning (PBL) extends this prior work by using hands-on projects

across a variety of subjects to engage students and build upon the knowledge of the world that they bring to the classroom. Proponents of PBL claim that it helps develop high-level critical thinking by incorporating the manipulation of materials, work in small groups, complex problem solving, and oral and language acquisition skills through discussion, presentation, and critique.

Within PBL is a strain called DBL, or design-based learning, formulated by Professor Doreen Nelson within the School of Education at Cal Poly Pomona. Nelson has been developing DBL for years, based in part on her early experience working in the office of Charles and Ray Eames and by watching her brother, Frank Gehry, in the architecture studio. DBL utilizes everyday materials such as pipe cleaners, toothpicks, or cardboard; it intentionally avoids digital technology and de-emphasizes the aesthetics of the finished artifacts, focusing instead on how students use materials to solve problems and communicate their ideas. Additionally, teachers use the concept of “never-before-seen” to encourage students to develop solutions directly from project criteria rather than through mimicry of something they already know. In DBL, invention is key to learning.

The images shown here are from a short video that documents a year’s worth of work by sixth-grade

students in a design-based learning classroom at the Los Angeles Academy of Arts & Enterprise.⁴

The curriculum was built around the creation of a “never-before-seen” (NBS) civilization—that is, a scale-model city—that was integral to the students’ work in math, social studies, English, and science. In the first image, a student designs natural resources for her ecosystem that includes NBS vegetation and landforms (SEE FIGURE 7). The next image shows a student writing a story about an NBS creature that describes how it survives—how it moves and what it eats—within his NBS ecosystem (SEE FIGURE 8).

In design- and project-based education theories, invention is key to learning.

In the voiceover, a student describes a project: “We were challenged to design a never-before-seen shelter. The criteria made us problem-solve when we were limited to the natural resources of our landform. We also had to consider the environment and climate as we made sure the shelter protected us from the elements. Later we studied the mud-brick



FIGURE 7: At the Los Angeles Academy of Arts & Enterprise, this student works on a “never-before-seen” civilization by designing vegetation and landforms.



FIGURE 8: A student writes a story about a “NBS” creature and how it survives within the ecosystem he is designing.

shelters of Mesopotamia.” In the narration, emphasis is placed not on the finished artifacts but on the students’ learning and the activities that made the artifacts meaningful.

Design-based learning allows us to see one of the most powerful aspects of design: the act of designing as a way of knowing. DBL gets at things that designers take for granted and seldom articulate, such as the agency of building and making; the power of objects to embody ideas and serve as tools for understanding the world; and, as in the learning science example, the way our material artifacts sit within a complex matrix of concerns and modes of knowledge. Within DBL, high-level critical thinking relies upon the manipulation of materials to address a situation-specific problem. It is learning by doing, in which thinking is integral to the act of designing.

Design thinking may miss one of the most powerful aspects of design: that the hands-on creation of material culture brings a depth of knowledge and understanding that cannot be achieved otherwise.

DESIGN AS A MINDSET

Contrast this focus on learning-by-making with design thinking, which has been tied closely to the innovation trend in business and business education. Many designers and design educators in the United States have built consultancies and programs around this notion, and its influence has spread into

⁴ Still images and text of following paragraph: “Sixth Grade Opus 2008,” [nd], video clip, <http://www.csupomona.edu/~dnelson/videos>.

⁵ “4 Questions for Roger Martin,” June 21, 2007, video clip, YouTube, <http://www.youtube.com/watch?v=vJydmrRI-Z0>.

⁶ Roger Martin and David Dunne, “Design Thinking and How It Will Change Management Education: An Interview and Discussion,” *Academy of Management Learning & Education*, 5, no. 4 (2006): 512-523.

business education, particularly within the Master of Business Administration degree.

Roger Martin, dean of the Rotman School of Management at the University of Toronto, is one of the most outspoken critics of traditional business school curricula. In a videotaped interview produced for the conference “Overlap 07: Exploring new methods for business and innovation,” Martin states:

I think that throughout the 20th century we had the illusion that we could make management highly scientific and quantitative ... [yet] management is so much about human beings and their foibles.... I want [business people] to think as a designer would think. If that results in them making prettier products and better experiences for the consumer, great—in fact, I think it logically will—but in some sense that’s downstream. I want them to start thinking and adopting the behaviors, the mindset of a designer.... I do not want them to think of their job in life as analyzing in an extremely rigorous way options that are presented to them... [Most business executives today] think of themselves as people who have quantitative [...] analytically rigorous techniques for saying “ah yes!”.... No. [Instead,] look at a situation and say, “Nope, not A or B. What we need is a better option. We need a creation that doesn’t now exist.”⁵

Martin has identified in design a way of working that he believes is more relevant to the messy realities of people, and as a result more effective in the real world. Martin values what he calls “design thinking” for its very difference from quantitative methods and analytics. But it is unclear where and how such “thinking” occurs.⁶ If it is merely a cognitive exercise, what of the artifacts and the making, the dominant activity that designers have historically undertaken to engage with the world, the activity on which DBL is built?

The term *design thinking* originated in an academic context based on research into the cognition peculiar to designers. In the commercial world, it has become an easily branded catchphrase that some designers have been quick to use in order to place themselves at the center of the innovation trend.



FIGURE 9: Key capacity of design named by the Rotman School of Management.

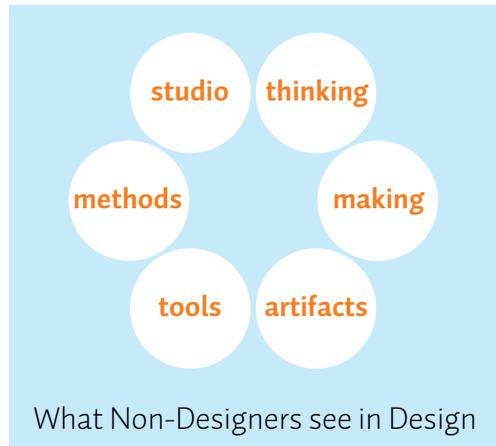


FIGURE 10: Key capacities of design named by the Institute for Multi-media Literacy at the University of Southern California.

One of the most troubling outcomes of this uncritical adoption is the way in which the term has been used within the design community itself to establish a hierarchy between designers who operate strategically—ostensibly at a higher level—and the mere “hands” who do the actual making, whose work takes place “further downstream,” to use Martin’s words.

Design thinking sits squarely in a Cartesian world of divided minds and bodies, despite the fact that recent advances in evolutionary theory and cognitive science point to the inseparability of the “hand-brain complex.”⁷ Furthermore, it reduces the *embodied act* of designing to the *abstract concept* of design. Design thinking therefore misses one of the most powerful aspects of design: that the hands-on creation of material culture brings a depth of knowledge and understanding that cannot be achieved otherwise.

In a more promising implication, Martin proposes a “design mindset” in opposition to a scientific one, echoing the beliefs of learning scientists who are using design-based research. Could these be early indications of a larger paradigm shift with design at the center? Interest in design methods comes predominantly from those working in disciplines with a social dimension, for which quantitative

scientific methods are proving inadequate. We may be witnessing the emergence of a new approach to research and knowledge which could open up new opportunities for those with design expertise.

Design students are seldom taught to recognize or articulate their own unique expertise outside of their value to business. The general emphasis on design as a profession rather than as a discipline has left us without the scholarship that validates other fields.

DESIGN AS A LITERACY

With digital technology, the tools and artifacts that have historically been the domain of the design profession are available to all. Nowhere is this more significant than in the case of young people who

have grown up with computers, videogames, the Internet, and cell phones—digital natives, in the parlance of digital learning. This cohort is believed to be genuinely different from previous generations in terms of social practices, learning styles, and even cognition, due to their early and constant engagement with information technologies. These differences have led digital learning educators to call for a radical reworking of pedagogy in order to accommodate learners who as bricoleurs can piece together information from multiple sources, are intuitive visual communicators, have strong visual-spatial skills, and learn best through inductive discovery.

A 2005 report produced by the New Media Consortium called “A Global Imperative: The Report of the 21st Century Literacy Summit” was designed to address this generation. This report defines literacy in the 21st century as:

*the set of abilities and skills where aural, visual and digital literacy overlap. These include the ability to understand the power of images and sounds, to recognize and use that power, to manipulate and transform digital media, to distribute them pervasively, and to easily adapt them to new forms.*⁸

In other words, 21st-century literacy is the ability to design. Yet designers are not leading this discussion. With the stated goal of providing skills needed for the current century, initiatives in digital learning, or “multimedia literacy,” are thriving. Their advocates, however, tend to come from technology-related fields or from learning and literacy, which are the domain of departments of education and English.

The Institute for Multimedia Literacy (IML) at the University of Southern California (USC) has

been one of the leaders in the field of digital learning. Despite multimillion dollar research grants and a campus-wide mandate, the directors of the IML have had to tread lightly: they have to promote their new approach to professors and in some cases students who still privilege the text and who remain deeply suspicious of the commercial affiliations held by images and other popular media forms. In order to advance the “radical reworking of pedagogy” that they called for, IML’s directors, who hold Ph.Ds in English literature, cultural studies, and film studies, admit that they have had to intentionally avoid the word “design” due to its negative connotations—design has been seen as an extraneous addition, and most designers seen as valuing aesthetics over content. Hence, the language and images of the IML’s promotional video emphasize technology, media, and learning, rather than design.⁹ In the video narrated by IML faculty and administrators, Holly Willis, the director of academic programs states: “The mission of the Institute for Multimedia Literacy is to experiment with moving beyond reading and writing to include multimedia in the classroom.” Stills from the video showed students manipulating images on computer screens, and digital images are shown as demonstrations of student work.

Nancy Lutkehaus, chair of the Gender Studies Program and an associate professor of anthropology at the University of Southern California, says to the camera: “Doing these multimedia projects forces students to be more engaged with the material. It’s not only a matter of learning the information that I’m teaching them—the content—but it’s also learning how to present that content in new ways.” Tara McPherson, an associate professor of critical studies, explains: “With the explosion of visual images around us, with the rapid acceleration of new technologies, we need to make sure that students can author in multiple media and have a critical awareness of those media The students who are taking multimedia classes are learning by doing They think of themselves as producing knowledge that the world will share.”

As the example illustrates, the IML students are not thought to be practicing interface design, filmmaking, or even media design; they are “doing multimedia.” To a media designer, this is like

⁷ Frank R. Wilson, *The Hand: How Its Use Shapes the Brain, Language, and Human Culture* (New York: Vintage Books, 1999), 287.

⁸ New Media Consortium, *A Global Imperative: The Report of the 21st Century Literacy Summit*, (New Media Consortium: December 1, 2005), www.nmc.org/pdf/Global_Imperative.pdf, 2.

⁹ This video is no longer on the IML website. Text and still images from this paragraph: “Introduction The Institute for Multimedia Literacy,” [video]. (2009). Accessed via YouTube December 9, 2011, <http://www.youtube.com/watch?v=KRZOHLCihYQ>.



FIGURE 11



FIGURE 12

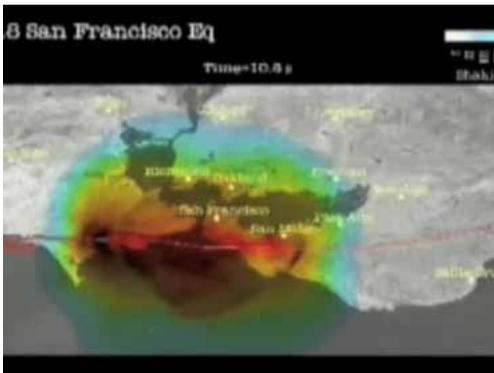


FIGURE 13



FIGURE 14

FIGURES 11-14: Students at the Institute for Multimedia Literacy manipulate images on computer screens.

calling writing “doing paper.” However, this shift in emphasis is not all bad. With students engaged in authoring, producing, presenting, and displaying, “doing multimedia” presents both a way of working that is in synch with students’ daily lives and a mode of understanding. Most importantly, in “doing multimedia,” students are producing knowledge. Few designers would identify their work as such, despite the aptness of the description.¹⁰

Programs outside of digital learning share many of these features as well. In 2009, the goal of the Media Arts Initiative, part of the Arts Education Branch of the Los Angeles Unified School District

(LAUSD), was to establish what it calls media arts as a content discipline alongside dance, theater, music, and the visual arts. Within media arts, students are exposed to the artistic foundations of new media through new and nontraditional teaching methodologies, including physical and virtual learning spaces, project-based student work, peer-to-peer knowledge sharing, collaboration, critical thinking, and multimodal skill sets. The concept is familiar, and the program shares many goals, strategies, and claims with the USC project; however, it differs in that its director’s background is in media arts, not an outside field.

Living in the realm of design and the arts may be the initiative's undoing. The New Media Consortium's report on 21st-century literacy cited earlier identifies the erosion of the arts in school as a key obstacle to reaching the Consortium's goals. It reads:

Emphasis on math and science and the traditional "three R's" (reading, writing, and arithmetic) coupled with concern over student performance leaves little room for "extras," as visual and media arts are often perceived to be. A failure on the part of policymakers to understand media and the arts compounds the problem.¹¹

For these reasons, the digital learning community advocates moving multimedia production to the center of the curriculum.

While pitching multimedia as a literacy rather than an art may be a practical move, it has wide-ranging and nontrivial implications, the most prominent being that it moves multimedia back into the purview of educators rather than of artists and designers. Multimedia literacy is a movement that carries with it a sense of inevitability, or at least momentum. As it proliferates throughout the educational system, will a design education still be necessary? Will designers increase their knowledge of design through work with K–12 educators? Will students bring to design school a more sophisticated understanding of the power and capacity of design to produce knowledge? Or will design educators have to undo 12 years of a poorly executed "design" education?

The time to ask these questions is now. The institutionalization of multimedia form-making within general education is a far more complex and pressing issue for designers than the proliferation of digital tools and DIY culture—not because it is a

¹⁰ "Introduction The Institute for Multimedia Literacy," [video]. (2009). Accessed via YouTube December 9, 2011, <http://www.youtube.com/watch?v=KRZ0HLclhYQ>.

¹¹ New Media Consortium, 12.

¹² The American Design Communities, "Redesigning America's Future: 10 Design Policy Proposals for the United States of America's Economic Competitiveness and Democratic Governance," U.S. National Design Policy Initiative, January 2, 2009, <http://www.designpolicy.org/usdp/policy-proposals.html>.

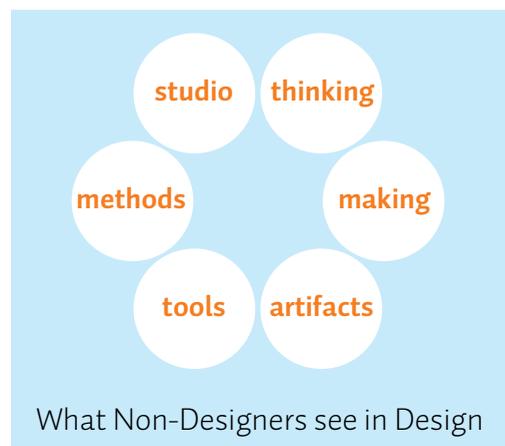


FIGURE 15: Key capacities of design named by the Media Arts Initiative at the Los Angeles Unified School District.

threat but because it is an opportunity. As we work to develop the discipline of design, it is important that designers participate in contexts outside of commerce in order to explore the fuller dimensions of what design can do. Both the LAUSD and the USC projects were built upon the ability of design to meaningfully form new ideas. With the right design scholars and researchers—perhaps designers with Ph.Ds—we could enter this arena in partnership with educational specialists to address multimedia as both a literacy and a creative practice, and strengthen design in the process.

WHAT DESIGNERS SEE IN DESIGN

All of the programs discussed above are united in their view, explicit or implicit, of design and designing as a powerful way of operating: one that is in sync with emerging theories, that signifies a shift from scientific traditions, and that aligns fields with new technologies and cultural practices. In other words, this thing called design appears to be well-suited to address our current moment.

In 2009, a group of leaders from the professional organizations of design presented a document to the U.S. Congress called "Redesigning America's Future: 10 Design Policy Proposals for the United

States of America's Economic Competitiveness and Democratic Governance”—a significant step forward in a nation that has had no national design policy or governmental support body since the Carter administration. The proposal, supported by every major design organization from the AIA to the AIGA, begins:

*Design serves to advance the goals of the United States' economic competitiveness by saving time and money and simplifying the use, manufacturing, and maintenance of goods and services. It enhances democratic governance by improving the performance and delivery of government services.*¹²

Rather than taking its place at the center of a cultural revolution or major paradigm shift, design is here being presented, by designers themselves, as a mere service. Imagine how different this document would have been had it defined design not as the packaging of products, goods, and services, but rather as the shaping of culture, knowledge, and the human-made world (including commerce).

Yet this comes as no surprise. In the United States in particular, the rhetoric and self-definition of design have centered around its relevance to commerce. Design students are seldom taught to recognize or articulate their own unique expertise outside of their value to business. The general emphasis on design as a profession rather than as a discipline has left us without the scholarship that validates other fields. The inability to advocate for design in larger terms, demonstrated by the “Redesigning” proposal, limits our ability to participate in discipline-defining, knowledge-producing, and policy-generating activities, especially within research, education, and government.

The responsibility to do so falls on design educators. The academy is not only where a field is theorized and developed, but where the foundational assumptions of its new practitioners are built. The way in which design educators respond to “design’s big moment” is critical, and will help determine the role of designers in the so-called century of design. For as we have seen, design expertise has increased in value at the same time that it has proliferated far

and wide, eluding many designers along the way—a development at once exciting and terrifying.¹³

¹³ Article originally presented on April 29, 2009 at the School of Design Strategies at Parsons The New School for Design and on February 7, 2009, as a keynote for a Conference on the Future of Art and Design Education in the 21st Century in celebration of 150 years of art and design at the University of Brighton, England.

SECTION 2:

COLLABORATION AND

CONNECTION

DESIGN: Alone, Teamed, Networked

ANNA VALTONEN

The role of the designer has changed radically from the 1950s to today. Tracing the path of design in one region—Scandinavia—provides an opportunity to understand the cultural, environmental, social, and psychological forces that have contributed to this change, and to speculate on the expanding place of design in the future.

1950: DESIGNER AS CREATOR

For many people, Finnish designer Tapio Wirkkala's famous Kantarelli vase represents the classical way to view design.¹ Designed in the 1950s, it is a beautiful object—but that is it. Many objects at that time were, like this one, intended in part to

define and popularize a national identity, to emphasize a national idea of design. However, in general, these objects

¹ Tapio Wirkkala, *Kantarelli* Vase, 1946, blown glass with engraved decoration, 21.5cm, Philadelphia Museum of Art, Philadelphia, PA.

The cultural, environmental, social, and psychological role of the designer has changed radically from the 1950s to today.

were identified with the designers themselves, who were often represented as weird, artistic types who had somehow created a beautiful thing.

Wirkkala, for example, was a well-educated man, but when this vase was shown at the 1951 Milan Triennale, he was presented as a *uomo naturale*, a “man of the woods.” Despite knowing several languages, he stood completely silent during the press event held for him. His role was to be the eccentric artist-designer.

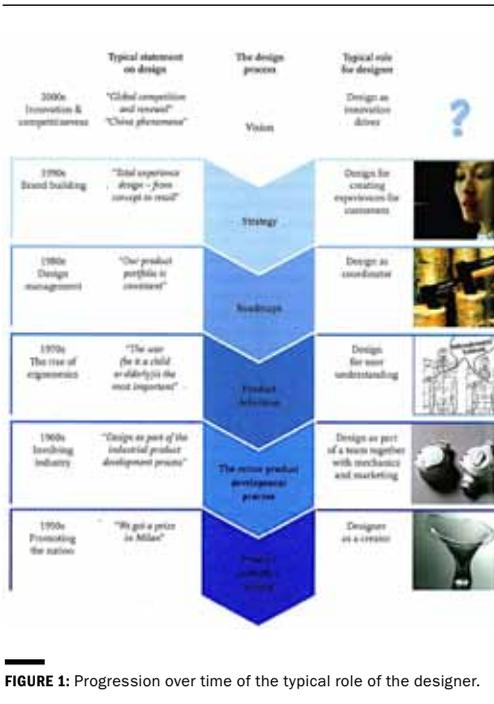


FIGURE 1: Progression over time of the typical role of the designer.

1970: DESIGNER AS SOCIAL FORCE

With the economic downturn of the 1970s, designers, who had previously been associated only with the wealthy, turned their attention to special-needs groups, including children, the elderly, and the disabled. Reflecting the times, an increased emphasis on design for the social good took the place of more luxury-oriented design, such as for private cars. At the same time, ergonomics began to play a larger role in the design of everything from consumer goods to transportation systems.

This design viewpoint—that of the designer as one who understands users—is still relevant. The simple user interfaces of the 1970s, when a tractor, for example, needed little more than a lever that said “stop” and “go,” gave way to the era of electronics. Suddenly, more information needed to be fitted into smaller spaces, usually a display. Many designers today are still involved in this type of practice; user-centered design remains with us even as the field of design requires ever more specialization.

This idea still exists, of course. Numerous companies use the designer’s name to give an object cachet. But on the whole, the role and purpose of designers today no longer fits this “artist” model.

1960: DESIGNER AS TEAM MEMBER

The 1960s saw designers beginning to work together with engineering and marketing professionals as a team. This change included Wirkkala himself, who designed a plastic ketchup bottle as part of an industrial design team. Far from being an object for display, the bottle is a product, a necessity of life. The identity of the designer had transitioned from being a weird and wonderful creator of something magical to a product developer. In Finland, educational programs were created specifically for industrial design.

Design as part of the product development process is still a very common and entirely valid role for the profession. But as they emerged from the 1960s, designers also took on a larger role: that of defining not just how to design, but what should be designed and for whom.

1980: DESIGNER AS MANAGER

In the 1980s, the design world as a whole was re-oriented back toward business and conservatism over social awareness. Increased demand for the practice of design management, as it was called at the time, was reflected in the launch of training programs, beginning with those at the London Business School. Designers began to view themselves as coordinators; a source of unity, that accessed all sectors and understood all aspects of the company, and brought the varied components together. As corporate mergers proliferated, this focus on coordination became even more timely.

1990: DESIGNER AS BRAND BUILDER

No longer content to merely define what a product should be, coordinate the roadmap, and control the final product development, designers in the 1990s began to talk about branding, or “total experience” design. Design rhetoric came to encompass not just products but services and retail solutions—in other words, the entire process from initial idea to market.

The result was a new focus on the experience of usage rather than the product. Understanding lifestyle became part of brand building, a shift that gave designers an entirely new set of tools, including mood mapping, the consideration of scenarios, and other means of expressing feelings. Designers moved from managerial to strategic thinking; while continuing to participate in the design process from initiation to road mapping to finished product, they once again expanded the possibilities of design.

2000: DESIGNER AS INNOVATOR

By the new millennium, design, at least in Nordic countries, had become heavily linked to national supporting innovation, in part as a reaction to competition from emerging markets such as China. In Finland, design policy was linked with national innovation policy; design was necessary to regenerate thinking and come up with new products, based on the mentality that good design leads to a happy life.

This took the discussion of design beyond the cultural sphere to the economic and political. Design was a way to make a stance; it had increased in importance and become recognized as vision work—the step before strategy.

Today, designers continue to work in a broader and ever more diversified range of ways.

CONCLUSION: THE FUTURE OF THE DESIGNER

Today, designers continue to work in a broader and more diversified range of ways. In many cases, design has become a way to add creativity to processes that already exist.

For example, consider what happens when a block of houses needs new plumbing, which happens every 30 years or so. The traditional approach is to remove all the piping and reinstall it all, a process that typically involves a number of companies supplying products and performing various tasks. This creates an enormous disruption in people's lives, potentially even causing them to relocate. In response,

the Finnish government is currently funding work that explores more user-friendly methods of restoration—ones that consider design in rethinking the problem, and take into account the perspective of the apartment dweller rather than only the convenience of the workers.

Involving designers in helping to solve these sorts of thorny problems is extremely timely in a world in which the issues we are facing are entirely new. These professionals are the creative sparkle in the mix, the ones who dare to ask the uncomfortable questions that kindle new ideas. With time, they will help bring about a better world. By asking the right questions, we are already halfway there.

THE CENTER CANNOT HOLD: Designing for Cooperation in the Absence of Control

YOCHAI BENKLER

In today's context of increasingly centerless and loosely coupled systems, what is the role of human cooperation? How are systems, institutions, and organizations designed in terms of affordances and constraints—that is, in terms of regularities of expected effects that can be planned and executed? Essentially, we find a tradeoff between predictability and change, with human agency and the freedom to choose in the balance.

SHIFTING THE BALANCE

At one time, the Toyota production system was believed to be unique to Japanese culture. Then, in 1984, the GM plant in Fremont, California,

¹ The bankruptcy of General Motors eventually forced the closure of the Fremont plant in October, 2010.

traditionally one of the worst-performing plants in the country, was reengineered in a

joint venture with Toyota, with almost the same workforce and union leadership, but restructured organizationally, technically, and institutionally in ways that completely changed the dynamic. It rapidly became one of the most productive plant in the U.S. in terms of low error rates, lack of absenteeism, and output.¹

The plant made an organizational shift away from Taylorism—that is, from highly-structured scientific management of a physical system working in tandem with the legal apparatus demanded by the National Labor Relations Act—and instead adopted the Toyota production system, with its intense collaborative union negotiations set within a much more fluid, team-structured workstation.

This approach engages multiple systems, including institutional, organizational, technical, and social, in a single solution to structure human cooperation.

CAUSES AND EFFECTS OF DECENTRALIZATION

The Toyota plant cited above is but one example of what has clearly been a shift from centralized and hierarchal control of organizations to a decentralized web that no one controls completely. This trend is evident in domains far beyond manufacturing, for example in telecommunications, where the breakup of the Ma Bell telephone monopoly in 1982 was one indispensable factor in the emergence of voice over internet protocol (VOIP), including the free service Skype.

For the first time since the Industrial Revolution, human actions, always important for cementing social bonds, have moved from the periphery of the economy to its core. Weekend amateur builders of electric cars never threatened General Motors, because of the cost of the assembly line; the same is not true for the authors of Wikipedia or free and open-source software.

Social systems have shifted as well. In 1968, economist and Nobel laureate Gary Becker characterized crime in a classic, rationalized form: criminals are rational; they will be deterred from committing crimes if the penalty multiplied by the probability of detection outweighs the total expected value of a successful criminal act.² In the 1980s, as that concept failed, community policing emerged: another example of the ability of integrated systems to achieve better results than traditional methods of hierarchal control.

The Internet is a main embodiment of this shift towards decentralization. Traditionally, knowledge-generating organizations have been institutionally embedded in the idea of copyright and control over

information, and structured around an authority based on credentials such as professorships, press passes or Nobel prizes. The Internet, on the other hand, is an open system that allows anyone to contribute whatever he or she wants. There is continuous communication, continuous negotiation over control. Knowledge is accumulated and shared in a completely different way, one that is unique to the Internet.

Throughout most of the latter part of the 20th century, we saw relatively stable systems with relatively limited freedom of action that were relatively predictable. But as processes start to speed up and predictability is lost, more human agency is needed to sense, adapt, innovate, and change, which in turn requires that systems be more loosely coupled. As a result, there has been a reduction in the degree of determinism—that is, the degree to which a system characterizes its inputs and outputs to connect action to outcome.

In essence, this scenario characterizes the Toyota production system, with much more innovation occurring at the individual level. It is what happens when innovation no longer comes from somewhere like Bell Labs but from all over the Internet, or when communities attempt to diagnose problems and come up with solutions locally. Systems are being built that provide the affordances for learning and adaptation in a distributed form. In a movement from the tightly bound, hyperstructured, and hierarchical systems of the late 19th and most of the 20th century, we are beginning to recognize that we are all responsive to a wider range of incentives beyond narrow self-interest.

While an increasing number of academic and popular sources say that markets, hierarchies, and social processes will inevitably reorient for faster learning and innovation, which is resistant to full specification, what we're seeing is the emergence of the network information economy. There is a radical decentralization of inputs and processes, both material and human:

sensing, computation, processing, and storage are now in everyone's hands, as are human creativity, wisdom, intuition, experience, and no

² Gary S. Becker, "Crime and Punishment: An Economic Approach," *Journal of Political Economy*, vol. 76, 1968, 169-217.

³ See creativecommons.org.

less importantly, sociability—the social processes that allow us to organize ourselves independently of traditional hierarchical models.

For the first time since the Industrial Revolution, the most important inputs into the core economic activities of the most advanced economies are widely distributed throughout the population. At the same time, human actions, always important for cementing social bonds, have moved from the periphery of the economy to its core. Weekend amateur builders of electric cars never threatened General Motors, because of the cost of the assembly line; the same is not true for the authors of Wikipedia or free and open-source software.

These shifts are bringing about a more participatory culture and arguments in favor of a more democratic public sphere. Capacity and authority to act are increasingly located at the edges of loosely coupled systems that no longer determine outcomes. With the removal of command structures and market hierarchies, we need systems that enable people to act based on social motivations.

Along with this shift toward participatory action comes a shift in the way we understand the relationship between the internal structures of systems. Rather than thinking of systems as interdisciplinary in the sense that they are made up of institutional, organizational, technical, environmental, social, and other components, we need to think of the way these components are integrated; if we understand how they act together, we can delegate some of the necessary controls.

INSTILLING SELF-MOTIVATION BY DESIGN

The idea of self-interested rationality has gained prominence since the 1950s. Even so, disciplines as diverse as organizational sociology, experimental economics, political science, anthropology, social software, even human evolutionary biology and neuroscience increasingly acknowledge the fact that humans are not all self-interested all of the time. While some people may have a baseline of being more or less cooperative than others, cooperation is also situational. Context can either promote or undermine cooperation in the service of shared goals.

Decentralization presents a significant new design challenge: how do we establish a context

where people, rather than caring only for their own interests and taking advantage of others, feel that they are “in this together”—where there is a jump between the “I” and the “thou,” and an expectation of fair and appropriate behavior? And how do we move from this general statement toward discrete targets that indicate what we need to achieve and how to achieve it?

With the removal of command structures and market hierarchies, we need systems that enable people to act based on social motivations.

The essence of my work lies in specifying a set of design levers that will improve the degree to which a given group of people in a given situation cooperate. The most important of these levers involves communication—the means by which people come to understand what they want and negotiate their requirements. The second of these design levers concerns intrinsic motivation and commitment to cooperation. How do we instill empathy? How do we create a sense of solidarity with a group? How do we foster trust? How do we enhance people’s own understanding of fairness and teach fairness toward others?

Human behavior is the product of motivational vectors. These include not just material interest but moral commitment, emotional needs and responses, and social connection. Motives may be practical, such as those that lead to a job, or identity-driven: “I see myself as part of you. This is how I understand myself.” Inherited social norms also play an important role, falling somewhere between intrinsic and extrinsic motivation. In other words, behavior is influenced both by conformism and by “integrated regulation,” a self-chosen sense of doing what’s right. The website Creative Commons, for example, allows users to legally access, copy, and share music in exchange for voluntary donations.³ After five years and 75,000 transactions, the average donation

is eight dollars, a fact indicated on the site. Fifty percent of users donate this “normal” amount; only fifteen percent donate at the minimum level, and a few give amounts indicated as “generous” and “very generous.” Clearly, having focal points for what is considered appropriate behavior encourages people to act accordingly.

Online music distribution can be designed to encourage users to act in this way. Conversely, artists can use the Internet to observe and control behavior: they can sue for unauthorized usage, for example. But by making fans part of the conversation rather than passive recipients, online distribution enables music to be mixed, sampled, and utilized in new ways, which some artists enjoy. At the same time, they need to sell their music in order to make a living, a fact that creates an impetus for musicians and users to develop cooperative relationships.

Another source of motivation that can be built into systems, albeit a problematic one, is the capacity for people to watch each other and know that they are being watched. Too many exterior controls such as these, however, can result in the removal of internal controls, thus undermining the cooperative goal. Additionally, an increased emphasis on material incentive can diminish prosocial motivation. Blood donation is the classic example of this: once payment is introduced, the positive effect of viewing oneself as generous is compromised.

CONCLUSION

In the end, what matters are the building blocks of communication: the I, the thou, the us, and the them; the question of what’s right, what’s fair, and what’s normal; the calculation of material interest and social-relational motivators. Increased connectivity enhances a host of social dynamics: trust and transparency, reputation, network-building, leadership, and the ability to accept that some are able to give more and some less, be it money contributed for music downloads or time spent compiling Wikipedia entries.

Why do we fly great distances to talk with each other face-to-face? Because we need to humanize. Why do we write “hmm” in a text? We’re saying, “I’m a human, too. Listen to me.” It’s critical to integrate this element into design. Creating platforms

that allow people to communicate, human being to human being, is the first step toward the mitigation of conflict and the beginning of consensus.



DESIGN STRATEGIES DIALOGUE: Anna Valtonen and Yochai Benkler

—
MODERATOR: KATIE SALEN
—

KATIE SALEN (KS): Innovation seems to be the word of the day. How is the movement from interdisciplinary to integrated or interoperable design important in terms of innovation in design and business?

YOCHAI BENKLER (YB): From the perspective of somebody who looks at networks and network design as opposed to the real, physical world, interoperability is absolutely critical. By interoperable I mean the ability of different systems and different components, be they appliances, applications, or network components, to talk to each other at the necessary level so that they can deliver whatever combined output is needed. If the idea of the network is that innovation, creativity, and socialization can happen anywhere, that each component can develop on its own as fast as it can, then integration, too, is absolutely critical.

The core idea of the Internet, in terms of engineering design, is that there's a very thin and

—
The meaning of coordination varies depending on which realm you work in and what you're trying to achieve.
—

minimal TCP/IP algorithm that everybody who's designing anything can use.¹ All they need to know is how to translate into this one common language, and it transmits.

This requires accepting not only that different systems develop differently for different purposes and are optimized in a variety of ways, but also that systems must be designed in such a way that they can converse with completely alien systems. Communications networks play a large role; it's essential to get suppliers together with buyers in a

context where the relevant interoperability is the fact that they see each other face-to-face and recognize the humanity that connects them.

ANNA VALTONEN (AV): The concept of innovation has also changed, even over the past 10 years, from a top-down concept to one that's also bottom-up. It's more dispersed, and more uncontrolled. A good idea somewhere becomes an innovation, which hopefully is supported and enabled to grow; that's very different than the idea of innovation as a big, national, or organizational command to think new, which didn't get us far.

KS: One theme you've both discussed is the notion of coordination and the design levers that give rise or create barriers to that. In this context, what roles do consensus and conflict play?

AV: In the context of design, coordination is always relevant. In the context of the sort of joint efforts that go into big, global issues, it's more collaboration than coordination. And in the context of an enterprise, it's important in terms of doing some things well rather than trying to do everything, with mediocre results. So the meaning of coordination varies depending on which realm you work in and what you're trying to achieve.

Even in the context of tackling big issues, especially on the individual or small group level, it may be more effective to focus on one idea that gathers people together than on many ideas that are working toward the same goal. Collaboration is trickier in larger groups, but likely to be more beneficial in the long run.

YB: Different people have different ideas about creativity in the context of innovation. When they're brought together to genuinely express their experience, their wisdom, and their perspective, conflict is inevitable.

John Seely Brown and John Hagel have this beautiful concept of "creative friction," in which organizations allow people from different perspectives to come together and basically

1 TCP/IP (Transmission Control Protocol/Internet Protocol) is a descriptive framework for the Internet Protocol Suite of computer network protocols created in the 1970s by DARPA.

rub those differences against each other—to some extent seeking consensus, to some extent seeking accommodation—in order to try to fit things together.

Similarly, the critical feature of systems, particularly online, that have distributed innovation is that they contain free and open-source software development; they also have very different mechanisms for conflict resolution. At Wikipedia, for example, consensus is a target; in long conversations, sometimes going on for pages and pages, people use norms to keep each other within the bounds of what is determined acceptable conflict. Media sources that are skeptical of Wikipedia focus on occasions where this process fails and leads to shutdown, because that's sexy. However, in the vast majority of instances, people go another round. This is true even in issues that are far from trivial, such as debates over creationism. But through this friction and acknowledged difference, by setting common goals, and by going one more round and another, you can eventually come up with something that, at least to those participating, see is better than what it was before. Being open in this way, allowing individuals to create both conflict and, if not consensus, at least a commitment to working through and accommodating is absolutely central to effective outcomes.

AV: I think it's also understood that this creative friction is needed to move forward. Design can't develop alone; it needs to involve people from other fields, such as the social sciences or humanities. Even if it's sometimes uncomfortable, taking these varied viewpoints into account drives development.

KS: In our approach to transdisciplinary design—that is, a diversity of minds being brought together—what particular problem do you believe is important for us to solve?

YB: I believe we need to consider how to reintegrate concepts of virtue and morality into practice. For instance, how do we, over time, develop into different societies with different attitudes? Look at the New York City blackout in 1977, which resulted in widespread looting, and compare it to the blackout of 2003, when people didn't perceive each other as threats but rather as sources of information. What happened during those years? Social processes are at

work that connect with how we organize, how we build our environment and social institutions, and I would love to see those processes studied and better understood.

AV: I'm interested in working toward solving practical problems that we've already started to tackle, such as sustainability. The health care system, for example, is made up of pieces that no one really has control of. Now, with design thinking, we can reconsider health care from the patient's perspective. Issues like this affect people every day, but they've become so complicated that no one wants to touch them. How much more could we achieve if we put aside the politics and differences, if we saw beyond the doctors, nurses, machine producers, and other little parts of the puzzle, and took a more holistic, human approach?

Creative friction is needed to move forward. Design can't develop alone; it needs to involve people from other fields, such as the social sciences or humanities.

KS: Historically, have we trended back and forth between a human approach to design and a more formal approach? How might that change going forward?

AV: These trends have traced the development of how we view the human—from understanding our physical measurements to understanding what makes people tick. What do they dream about? What do they aspire to? That's quite different from thinking, can I reach that knob? The latest development is about understanding humans as social animals. How do they act in a network? What makes us tick not just alone but together?

AUDIENCE MEMBER (AM) 1: You've discussed how the idea of expertise has been constructed, propagated,

and challenged. Could you comment on the role of expertise and what's motivating these shifts in design? Secondly, with the emergence of transdisciplinary design, might we also see a return to a mystification of the designer?

AV: I look at expertise from the point of view of education. How do designers find themselves? What makes them designers? Design has become so many things. I find that my students usually burn for something; they put together topics of study that may initially seem like odd combinations but in the end provide them with a unique skill set. They become specialists in an area no one else has covered. As a result, they bring something to the table that not everyone else does. We've moved on from training masses of people with the same approach to giving people wings to find a good niche and find themselves.

Regarding the mystification of the designer, I think the fact that design is more common today, more known to more people, saves it from mystification and makes it an area of knowledge like any other. It's become part of what many organizations and people do. This is very different from the days when design was seen as a phenomenon that the average person couldn't understand.

AM 1: But is there expertise in design? If not, why does this discipline exist?

AV: There is expertise in design, as in any other profession: a defined process, a way to reach from the problem to an end result. This helps to increase the importance of the field, while at the same time removing the mystification.

AM 1: One issue that comes up in design school is how to find money. You have to propose projects, with experiments and research, often in a scientific mode. You're asked to deliver, but by what markers can you measure your design? It's easier in science, where accepted standards of disciplinary expertise are involved, or economics, where you can say, here's the experiment.

AV: Design is a young profession. Part of what we're doing now is developing and defining our methods.

Beyond being a good professional—that is, making the end result understandable—we have to formalize the way we think and make that understandable.

AM 2: What about the question of responsibility—for example, when Toyota blamed problems in acceleration not on the design but on the questioning of design?

With the creation of the Transdisciplinary Design program, we're acknowledging that there are also other things we might make—whether they are material, or a combination of materiality with electronics or software, or immaterial, such as services, systems, and, potentially, prompts for behavior.

AV: In most professions, moral consequences seem to arise when the economy goes sour. When the economy is good, you can question what you do, who you hire, but when the economy is bad, you just try to keep your job and stay under the radar.

In design, for some reason, the opposite is true. When times are hard, we become more moral.

Ethical standpoints become more important. In the '60s and '70s, during the oil crisis, designers were questioning the people who hired them, really pushing the industry. This is also the case now: show me one designer who isn't talking about sustainability. It's in our substance as designers to question the world around us.

AM 2: The person who creates a solution must also take responsibility for the problems they cause. Given that we've created plenty of problems, is this a valid expectation of designers?

AV: I think it's very timely that designers are asking themselves that question.

AM 3: I left a 15-year career in international development because of design methodology, which I'm now looking to apply to the type of work the United Nations is doing. As a historian, where do you think this new social design movement is going?

AV: This is a beautiful example of taking design into areas where we wouldn't typically have seen it. Many designers today, by taking creativity and design thinking into longstanding processes and places, such as the United Nations, are stirring things up and creating more effective results.

KS: Which leads me to think about the challenges in terms of design that were evident in Haiti, where there was a complete breakdown of the network, along with loss of infrastructure. It showed us the limitations of design in the absence of the infrastructure that enables thinking to take root. What does this say about the relationship between design and design thinking, and the need for certain contexts in which this type of work can thrive?

AV: In a critical situation like Haiti, design thinking returns to its starting point, to providing functioning products so that people can cook or a hospital can be built. There's a need for basics that help with everyday life. Then, once network and infrastructure are back, you can return to social networking and so forth. In other words, when you strip away society, you also strip away the possibilities to work.

AM 4: Could you speak about the relationship between making useful things and “designing”? What is the actual derivation of the word, and when did we separate design from making?

AV: The classical view is that this separation happened with the industrialization of the late 18th century, which supplanted craft. Before that time, the same person designed and produced the product, but with industrialization the two became separated: one person designed a product, and other people produced it, using machinery. Interestingly, it's coming full circle today. There's a broad network

of craftspeople, and many design people are doing craft part-time or in a socially connected way. It seems part of human nature: designers want to do something themselves.

AM 4: In the Transdisciplinary Design program, will there be a design studio that serves as a workshop for actually building these systems, whether on the system level or a handheld scale?

JAMER HUNT (JH): I think this goes back to the question of expertise. Are we developing a new expertise or are we abandoning expertise—that is, expertise as form-making, something between engineering and poetics? A portion of the design spectrum will always make chairs and fridges and other items that are part of the history of design. With the creation of the Transdisciplinary Design program, we're acknowledging that there are also other things we might make—"make" being a very expansive notion. These things may be material, or a combination of materiality with electronics or software, or may be fairly immaterial, such as services, systems, and, potentially, prompts for behavior.

How do you then construct an educational environment around outcomes that are multivariant? Can you begin to develop certain competencies? With design education, and in particular with this program, we try to nail some of those things down. Prototyping is an important part of this: we can prototype not just objects but social scenarios, for example. Additionally, collaboration becomes not an aftereffect of design but a core skill. Understanding how, when, and with whom to collaborate—whether it's one person, 10 people, an industry, or crowdsourcing—becomes itself a form of expertise, a method for working.

Design has operated very effectively through a tightly described set of skills, which have been wonderful for producing buildings and products and communication pieces. But if we want to take on a different set of problems, we have to develop a different set of tools and outcomes. One thing that interests me profoundly is what it means to design a beautiful experience. Can we bring aesthetics back into immaterial things? Can we re-inject that sparkle and look to design not just for operational problem-solving but to help us live the way we'd

prefer to live—even if it's with less—because that's more exciting to us than the way we live now? Design gives us the opportunity to consider this perspective.

Do designers have some special magic? It's a difficult question. At a presentation years ago, I talked about the "magic box of design," about how some people are good at it and some not as good. Somehow, Apple creates the iPod, but Microsoft, using 10 times the resources, creates the Zoon. Is it the system? The structure? Something in the water? I think there is something indescribable that goes on, but we don't need to mystify it. Some people are physically stronger than others, some have better memories, and some come up with better ideas. Projects such as the necessary redesign of the American university require not just architecture, not just products, not just information, but those things plus a whole series of others. How do we think about designing these more effectively?

So, yes, we will have a studio: an easily reconfigurable, very smart studio that will support project-based work that persists over time and will help us consider the material and immaterial outputs we're making. How do we come together to craft these things, whether they're diagrams or protocols?

AV: Returning to the idea of prototyping, there's been a huge surge in the amount of basic research we do in design, in how it develops. Prototyping is a good way to make this research aspect more relevant, tangible, and understandable. Once you understand something, you can develop it further, whether it's a service that's prototyped or a human behavior or a product. This ability to prototype is crucial in incorporating the top research from top universities into education and society and making it relevant.

JH: The word that comes to mind is the "delamination" of the vertical corporation. Part of what's created this mystique around design is the notion that we've been removed from the means of production for the last 70 years of corporations and management. We're now seeing that verticalization shrinking back a bit, and as a result the designer is no longer someone you only see in press photos but instead someone in your neighborhood, on your

local council, whom you bump into every once in a while. Our networks allow for closer and closer relationships between user and maker, which reduces the hierarchical separation. As Yochai indicated, this enables us to form much more human relationships, and ultimately find ways to reconnect those human levels of interaction so that the designer or corporation is no longer somebody you look up to, but something within reach. That's a really powerful transformation.



SECTION 3: **EVOCAATION AND** **PARTICIPATION**

FOOD DESIGN: Revolutionizing Our Experience of Food

MARIJE VOGELZANG

As a food designer, what does one actually design? Food is perfectly designed by nature. Imagine a red cabbage sliced in two. It's beautiful; there's no need to change it. What interests me more are the verbs of eating: sowing, harvesting, cooking, sharing food at the table, as well as discovering what happens in your body and your brain when you eat.

SOURCES OF INFLUENCE

Inspiration for new ways to work with food comes from a variety of sources, the senses being an obvious starting point. Taste, smell, and appearance are important, but also sound and touch: what is your experience when you hold food in your hand or put it in your mouth? Science comes into play when you integrate food into your body: how does it make you feel? Culture is a source—the ways people eat, their rituals, the history of food, foods once considered

poisonous. These histories can also inspire new ideas for food and design.

Again, think of food as a material, the endless combinations available, or perhaps the role of nature, or education. Why do children think milk comes from a factory, or that a forest smells like shampoo? Another aspect of food that is often overlooked is psychological: for instance, the way food can bring back a flood of memories, the way food can be used as a method of self-comfort, and so on. The experience of eating—our surroundings, our mood—also plays a part, as do social conditions. Who produces our food? Do we know what's in it? Do we eat alone or with others? These kinds of questions can ultimately lead to new designs and, potentially, to a positive impact.

¹ See www.droog.com.



FIGURE 1: A funeral dinner.

EXAMPLES OF EXPERIENTIAL DESIGNS

The name of my company, Proef, means both to taste and to test, reflecting its role as both a workshop and design studio and as a restaurant. Along with designing interiors, we do edible art projects, performances, installations, and restaurant and food business concepts. This can involve everything from the clothing workers wear to the lighting, menu, and sourcing of products.

In an early project, (SEE FIGURES 1 AND 2) I was asked to do something with the color white. In many cultures, white is the color of death. This led me to consider the meaning of funeral rituals around the world, and the ways that food, with its ability to comfort, is often embedded in these rituals. I created a funeral dinner composed of simply prepared white foods, and found they combined very well together, with some flavors subtle and some strong.

Years later, I was asked by the Amsterdam design firm Droog to do a Christmas dinner.¹ My initial thought was that Christmas dinner is full of clichés. How would I design something that's already fully designed? But by thinking of Christmas simply as a time when people eat together, I decided to create a simple "intervention," (SEE FIGURE 3). I used a table with a tablecloth, but instead of putting the cloth on the table, I made slits in it and suspended it in the air so the participants sat with their heads inside the space and their bodies outside. This physically connected each person: if I pulled on the cloth here, you could feel it there. Covering everyone's clothing also created a sense of equality. Initially I was concerned the participants would reject the experience, particularly because they didn't know each other beforehand, but the cloth actually increased their desire to relate to one another. It fostered a feeling of being in something together as a group. However, I didn't

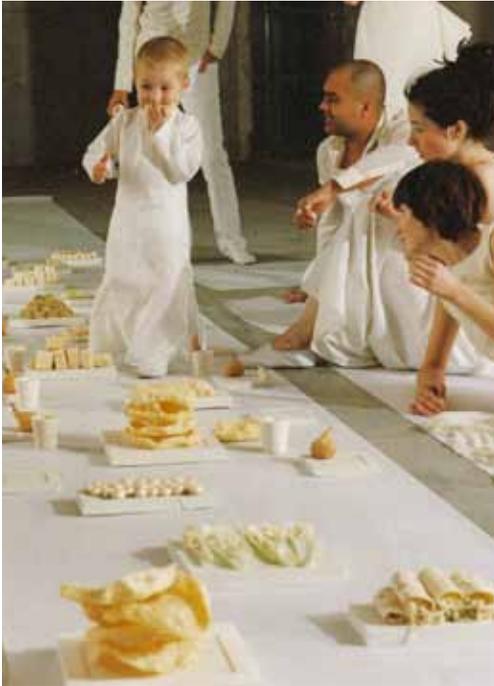


FIGURE 2: Funeral Dinner with guests.



FIGURE 3: Christmas Dinner commissioned by Design in the Netherlands.



FIGURE 4: Two dishes from the Christmas Dinner.

want to close people up in my design, so the participants were given scissors and could cut themselves free at any time. By allowing the participants to remove themselves from the design, by giving them the option of engaging or not, they were included in different ways.

The food was also part of the Christmas Dinner project. One participant was served a slice of melon on a plate that was cut in two; the person opposite was given ham on a similar half plate (**SEE FIGURE 4**). The combination was so classic that, without being told to do so, the participants naturally began to share their food. We recreated this experience in Tokyo. People were very formal when they entered the lunch, but once inside the tablecloth, they became as playful as children.

In another project, entitled Food Wave, I covered a three-meter-long table with a row of thirty different snacks. Each snack was made out of three ingredients, with the next snack differing from the

What interests me are the verbs associated with eating: sowing, harvesting, cooking, sharing food at the table.

preceding snack by one ingredient. The aim was to force participants to test their taste buds.

In a similar vein, I created a project for my two-year-old daughter, who refused to eat vegetables. I had read an article that claimed children needed to taste a flavor seven times before accepting it. Using this as inspiration, I invited my daughter and her friends to a jewelry-making party where the jewelry was composed of food (**SEE FIGURE 5**). Given no other tools, the children used their teeth to make shapes, inadvertently eating the food.



FIGURE 5: Jewelry-Making Party



FIGURE 6: For the Museum Rotterdam.

I utilized this sort of problem-solving in my work with a pediatrics clinic in the Bronx, where I was asked to create a healthy snack corner to help fight childhood obesity. I believe they had envisioned some sort of variation on a salad bar. But as I watched the children, I realized no matter what they ate, they would still have negative feelings about themselves. They knew a hamburger was bad for them, but didn't know how to change their behavior. When the children ate healthy food, they didn't know how to enjoy it.

This led me to think about how certain foods can make you happy or energetic or sleepy. Basing the project on Leonardo da Vinci's color philosophy (blue induces relaxation, red gives you energy)², as well as similar philosophies claiming green makes you rich, yellow brings you friends, orange makes you happy, and so on, I created snacks in all the colors of the rainbow. The snack packages were color-coded by the positive emotions they were intended to make a person feel. The children began

to associate these positive emotions with the healthy foods they were eating. They would say, "I'm going to eat green because I want to have a lot of money" or "I'll eat yellow because I want to have a lot of friends."

Adults too can be encouraged to look at what they eat or drink in new ways. Many Dutch people don't know that Holland has extremely pure tap water, the purest in the world. I wanted to raise awareness of this fact, so when asked to design a project in a huge, empty water basin, I devised a national tap water tasting. I collected water samples from various cities across Holland, all of which have different sources for their water. I presented the samples as the wine industry does, by pairing each water sample with a food based on that sample's terroir. So with fish, a participant might drink water from Rotterdam, or water from Amsterdam with meat.

For the Museum Rotterdam, I was asked to create a piece in connection with an exhibit on the severe bombing of the city during the Second World War.³ Focusing on the starvation so many people experienced during the winter following the war. I obtained beautiful hand-written recipes from that time and cooked those foods, but in very small quantities, the size of canapés (SEE FIGURE 6). When people came to the exhibit, they were given a coupon for coffee and their ration of food. I was primarily interested in presenting young people the flavor of the time, but many survivors of World War II attended as well. They hadn't eaten these kinds of food in 60 years, and they began to recall strong memories, both beautiful and painful.

CONCLUSION

A designer can create anything. For me, what is meaningful is creating something emotional, evocative, and touching. Working with food is one embodiment of this goal.

² Leonardo Da Vinci, *Treatise on Painting*, trans. John Francis Rigaud R.A. (London: George Bell & Sons, 1877), 87-134.

³ See www.hmr.rotterdam.nl/index.php.

THE RISE OF THE RELATIONAL: Five Themes in Relational Design

ANDREW BLAUVELT

Design practices have radically shifted since their inception during the age of modern industrialization. The story of this transdisciplinary evolution compels a larger, more theoretical framework—one that I term *relational design*. Relational design is preoccupied not just with design's form or meaning, but with its effects; not with isolated objects, but rather with situations embedded in everyday life. Here I identify five influences that have helped to generate this emerging paradigm.

1 Michael Anastassiades. *Social and Anti-Social Light*. Resin, light fitting, electronics, c. 2001 (Walker Art Center, Minneapolis).

2 Andrea Sanna and Piergiorgio Robino at Nucleo. *Terra!* Cardboard frame, seeds, c. 2000, Macef Exhibition, Milan.

3 Anthony Dunne and Fiona Raby, *Design Noir: The Secret Life of Electronic Objects* (London: August, 2001), 75-89. GPS (the Global Positioning System) is a network of satellites providing geolocation and navigation data.

THE BIRTH OF THE USER

An understanding of the relationship between people and things has moved from an anthropometric view of the user—emphasizing the physical fit between the human body and tools or products—to consumer ethnography, which appropriates research practices from cultural anthropology. (While other terms could be used, I choose the term *user* to avoid the conceptual baggage and limitations implied in concepts such as *viewer*, *reader*, or *consumer*.)

Before the advent of electronic equipment and digital media, and with it the need for human-computer interaction design, little thought was given to readers' behaviors. Having existed for hundreds of years, conventions around the printed book and reading habits presented little mystery for the designer. However, the development of multifunctional devices such as the television remote control, the video cassette recorder (VCR), the automated teller



FIGURE 1: Andrea Sanna and Piergiorgio Robino at Nucleo. *Terra!* (2000)

machine (ATM), and the microwave oven made the relationship between users and products much more complicated. These new types of devices were modeled on a command-control model whereby the user controlled the functionality of the product increasingly through instructions and options appearing on screens. Later, the introduction of the personal computer and growth of the World Wide Web presented an entirely new scenario whereby the user becomes part of a feedback loop and begins to influence the design, leading to much more iterative design practices. This expanded view of the relationship between users and objects has become the subject of design itself.

Michael Anastassiades' *Social and Anti-Social Light* (2001) features a "social" light source that functions in the presence or absence of silence. The *Anti-Social Light*'s illumination is linked to a sound sensor, so the lamp doesn't function in the presence of noise, raising the question, *Who's controlling what? Is the object controlling my behavior, or am I trying to control the object?*¹

Another complication is added with Nucleo's *Terra*, a grass chair (2000), which consists of a

Relational design is preoccupied not just with design's form or meaning, but with its effects; not with isolated objects, but rather with situations embedded in everyday life.

cardboard frame and a packet of grass seeds that the user literally grows by supplying dirt, rocks, and water.² If you don't cut it or water it, the chair may no longer exist as such; in other words, to remain both legible as an object and functional as a chair, its uses must commit to an ongoing maintenance regime (SEE FIGURE 1).

Perhaps more famously, in Dunne & Raby's *Placebo* project, the surface of a simple wooden table is embedded with a GPS sensor that flashes the word *Lost* when it's unable to make contact with its tracking satellite.³ As part of the project, people were able to adopt these objects and record their

experiences. The daughter of one of the adopters became so distraught when the table was unable to make contact with its satellite from inside the home that she made her father move it outside to the greenhouse to reestablish contact.

THE DEMOCRATIZATION OF THE DESIGNER

The second major influence on the emergence of relational design is the creation by designers of platforms or systems that empower users to generate their work, effectively becoming designers themselves. Contemporary manifestations include *Make* magazine,⁴ Ellen Lupton's design-it-yourself projects,⁵ various DIY kits, and even Internet-based customization platforms such as Zazzle, which allows the user to create merchandise from a series of options in a predetermined matrix.⁶ Designers and artists are also able to offer their goods online through distribution platforms such as Arts Project, Supermarket, and Etsy.⁷ In another example, James Goggin's project Dear Lulu (as well as Dear Blurp,

Dear Kolofon and others) establishes standards and reference manuals for those engaging print-on-demand publishing services.

Larger companies have also begun to play a part in the democratization of design, both consciously and inadvertently. The website Ikea Hacker is dedicated to the purposeful reuse or modification of Ikea products: for example, an Ikea Lagan countertop may be repurposed into a standing desk.⁸ Meanwhile, the company responsible for the Roomba vacuum, iRobot, itself sells iRobot Create, a DIY kit designed to allow people to hack into their machines.⁹ Through one such project, the Bionic Hamster, a hamster controls the Roomba with its movements: at last, the domestic animal exacts its revenge on the vacuum cleaner.¹⁰

A related shift can be seen in the rise of open systems and what I call distributed subjectivity. By subjectivity, I refer to the personalization that the designer normally provides in a creative engagement; by distributed, to the idea that the decision-making process might be delayed or deferred to others in a system. Linux is a familiar example in which a worldwide network of programmers and enthusiasts continuously refine, fix, and develop new computer code.¹¹ Less well known is a project by the Copenhagen-based group Superflex called Free Beer.¹² In cooperation with a Danish university, Superflex developed a beer recipe that relies on the same ideas as open-source computing. In this case, the user accesses a free downloadable recipe and is able to tinker with that formula as long as the results are uploaded and shared.

The same ideas can be applied in architecture. In Iquique, Chile, Elemental Architecture has created 93 units of affordable housing for the families of Quinta Monroy. The site is composed of basic, 380-square-foot, \$10,000 units that can be expanded to double in size by the occupants themselves.¹³ The architecture provides the basic or structural framework that others can deploy later when they have the resources to do so. In a similar vein, a project called Manufactured Sites, by California's Estudio Teddy Cruz, uses the factory system in the *maquiladoras* on the border between California and Mexico to produce a micro-infrastructural support (a steel frame made from surplus materials) intended to reinforce the preexisting, vernacular architectural

4 See makezine.com.

5 Lupton, Ellen, *D.I.Y.: Design It Yourself* (Princeton Architectural Press: New York, 2006).

6 See www.zazzle.com.

7 See www.etsy.com.

8 See www.ikeahackers.net/2012/01/standing-desk-with-invisible-data.html.

9 See store.irobot.com/product/index.jsp?productId=2586252.

10 See video at www.irobot.com/create/videos/bionic%20hamster.html.

11 See www.linux.com.

12 See freebeer.org/blog/.

13 "Housing Projects > Quinta Monroy," Elemental Architecture, accessed January 3, 2012, <http://www.elementalchile.cl/viviendas/quinta-monroy/quinta-monroy/>.

14 See <http://www.informalism.net/2008/11/estudio-teddy-cruz-manufactured-sites.html>

15 Daniel Eatock. *Utilitarian Poster*, 1998. <http://eatock.com/projects/utilitarian-poster/> (accessed January 5, 2012).

16 Manuel Raeder. *Loose Leaf, Wall Calendar*, 2006. <http://www.manuelraeder.co.uk/looseleaf/looseleaf01.html> (accessed January 5, 2012).

17 Martino Gamper. *100 Chairs in 100 Days*, 2007. 5 Cromwell Place, London, October 2-15, 2007.

18 See conditionaldesign.org/.

19 See <http://conditionaldesign.org/workshops/human-processing-unit-workshop-1/>

20 Lust, *Posterwall*, 2008. Graphic Design Museum, Breda, the Netherlands.

practice.¹⁴ This in-fill project helps to support both a literal platform and a structure for other architectural practices.

Turning to the field of graphic design, the Utilitarian Poster by Daniel Eatock (1998) provides a blank advertisement template and guides the user through the process of creating his or her own message by entering the title, headline, date, and other information (SEE FIGURE 2).¹⁵ Graphic decisions typically provided by the designer—the choice of typeface for instance—are deferred to the user. Similarly, The Loose Leaf Wall Calendar by Manuel Raeder (2006) offers all the components of a traditional calendar, but drawn from different systems (wall calendars, sheets from a date book, yearly calendars and so on). It is the responsibility of the user to compose these elements, thereby designing a self-customized wall calendar.¹⁶ In a slightly different vein, Martino Gamper's 100 Chairs in 100 Days used discarded furniture found on the streets of London to provide a constraint in which to make a chair a day.¹⁷ In both cases, the tabula rasa condition of original design is exchanged for a more ad hoc or *bricolage* approach, where the acts of finding, selecting, and assembling are recast as primary design actions.

While a logic of form (aesthetics) or function governs traditional modernism in design, today's radical design practices are guided primarily by a social logic.

Luna Maurer, Edo Paulus, Jonathan Puckey, and Roel Wouters of the Netherlands, adopt the term *conditional design* for their work.¹⁸ Although they're media designers, much of their collective work is analog. In the project, Human Processing Unit Workshop #1, Maurer and Puckey provide a series of instructions for creating a poster within a workshop situation;¹⁹ they use these instructions—like a typical programming language—as a framework that guides others to create new work. In this case, the point isn't to make the process machine-like, but

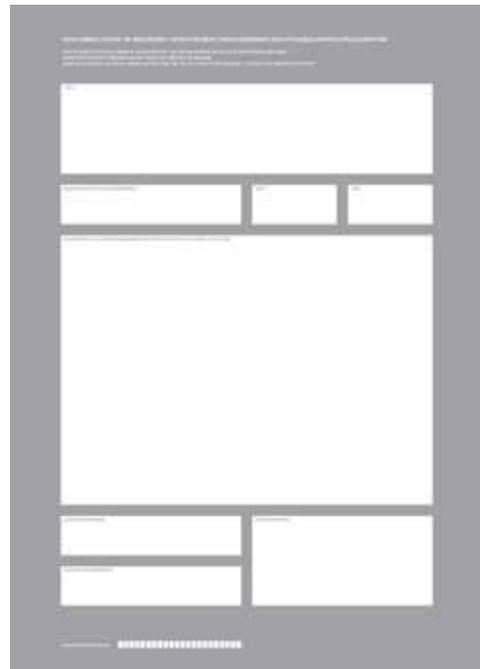


FIGURE 2: Daniel Eatock, *Utilitarian Poster*, 1998.

rather to constrain the subjective decision-making that must take place in order to realize the work.

A long projection wall consisting of video posters was created by the Dutch graphic and interaction design firm Lust for the Graphic Design Museum in Breda (2008).²⁰ They first developed an algorithm that pulls in images and text from various Internet sources to create the designs. In one day it produces about 600 posters (SEE FIGURE 3). Recent modifications to this project allows viewers to interact via texting messages for poster display and generating cellphone readable bar codes to retrieve personalized designs. Meanwhile, Philip Parker, a professor of professor of management science at the international graduate business school INSEAD, has authored more than 100,000 books and produced more than 200,000 using computer algorithms he created that searches the Internet on obscure topics and publishes print-on-demand books and reports to sell through channels such as Amazon. Parker adopts a very “long tail” business model, selling small numbers of many



FIGURE 3: Lust, Snapshot of Posterwall, (2008).

different things. He may devise a report on, say, the projection of hot dog consumption in China, because somebody out there wants this information, and he has actually figured out an economical system for creating, distributing, and selling it.²¹

THE CONTEXTUAL TURN

Imagine three large circles in a Venn diagram formation representing users, designers, and objects respectively. At their convergence are concepts such as context, experiences, scenarios, situations, and systems, all of which compose larger frameworks by which the three entities may begin to renegotiate their conventional roles. And within that larger framework lie some interesting new problems.

Modernista, an advertising agency, relaunched their website using a contextual navigation bar that overlays onto other search engines or websites, such as Flickr or Google.²² Instead of going to a portfolio

page, as on traditional design websites, the user is redirected to a Flickr pool of images. This small navigation bar is the site's most consistent presence. This design approach not only comments on our highly interconnected digital world but also points the user not deeper into its website but outward across the web for more information.

In another example of a radical rethinking of wayfinding and environment, the Shared Space Program, developed in the Netherlands, removes all traffic markings and signs as a way to increase public safety, the theory being that signs and networks of markings isolate individual players in a landscape.²³ Removing them, rather than creating a more dangerous situation, actually makes people *more* aware of cyclists and pedestrians and in fact has reduced traffic fatalities.

Through his creation of corner seats on tree and plant containers on the streets of Berlin, Martino Gamper, in collaboration with Rainer Spehl,

creates designs adapted to very specific situations.²⁴ Similarly, Stefan Sagmeister's logo generator for Casa da Musica in Porto generates a color scheme based on a scan of a particular photograph.²⁵ LettError's Twin typeface for the cities of Minneapolis and St. Paul (2003) uses a web application to distort the letters based on dynamic data such as current air temperature and wind speed.²⁶ In each example, the final design is contingent on its immediate context: a pre-existing planting box, the photo used in an advertisement, or today's weather. The designer has created not an immutable object but a differential system through which design is enacted.

THE POWER OF THE MANY

A number of business models today reflect the concepts of the one (the individual designer or user) and the many (multiple designers or users). The website Threadless, for example, enables a designer to upload a t-shirt design for users to order; similarly, other web businesses invite designs to be posted online and voted on: when the number of votes is sufficient, the items are produced.²⁷ Models like these actually stem from the Japanese company Elephant Design (2000), one of the first to propose using the web to solicit not just product designs but also users to purchase them.²⁸ Both of

these concepts are more readily understood today as platforms, which encompass both productive and distributive functions. Perhaps the most popular closed platforms are iTunes and Apple's App Store; open platforms include Wikipedia and Linux. Expanding on this model, World Bike, a worldwide group of bicycle enthusiasts, borrows the open-source model from computing in order to redesign and modify inexpensive passenger bikes for cargo use in the developing world.²⁹ And finally, in a social model now common with many communities, the Brooklyn microfunding organization Feast invites participants, for a small fee, to a dinner at which artists make pitches for their projects. Participants vote, and the winning project is awarded funding.³⁰

Relational design privileges process over product, open platforms and systems over one-off objects, and design understood as situated experience.

THE RISE OF THE SOCIAL

While a logic of form (aesthetics) or function governs traditional modernism in design, today's radical design practices are guided primarily by a social logic. I would argue that the most interesting examples of design at this time make use not only of traditional technologies but also of social technologies that require people to come together in physical and real space for a social connection and experience.

Many such projects have originated in the graphic design industry. Examples include a project by London graphic design firm Hudson Bec called *If You Could Do Anything Tomorrow, What Would You Do?*—a series of interviews with participants across London that was made into an exhibition, catalog, and book.³¹ In Stockholm, an organization called Vintage Plant offers a location where unwanted houseplants can be taken and adopted by others upon the signing of a contract.³² Greensboro, Alabama, located near one of the poorest counties

21 Noam Cohen, "He Wrote 200,000 Books (but Computers Did Some of the Work)," *The New York Times*, April 14, 2008, accessed January 6, 2012, <http://www.nytimes.com/2008/04/14/business/media/14link.html?pagewanted=all>.

22 See www.modernista.com/#/latest-work/.

23 See www.pps.org/blog/shared-space/.

24 Martino Gamper and Rainer Spehl, *Berlino Bench*, 2004. Reclaimed furniture, wood.

25 Stefan Sagmeister, *Casa da Musica Identity, Logo Generator*, 2007. Software. Museum of Modern Art, New York.

26 See www.letterror.com/portfolio/twin/index.html.

27 See www.threadless.com.

28 See www.elephant-design.com/en_index.html.

29 See worldbike.org.

30 See feastinbklyn.org.

31 See www.ifyoucould.co.uk/.

32 See www.byggstudio.com/pages/about.html.

33 See pielab.org/about/.

in the United States, is the home of Pie Lab, where participants make and sell pies as part of an effort to create a social space that erases divisions between gender, race, and class.³³

CONCLUSION

“Relational design” does not name a style, a school, or a movement. Instead, it is an analytical tool by which we can better understand the historical evolution of ideas in design. It privileges process over product, open platforms and systems over one-off objects, and design understood as situated experience. If the old modernist maxim was “form equals content,” its contemporary is “form equals context.” While most 20th century design is autonomous, independent, isolated, and closed, relational design is synonymous with interdependence, connectedness, and openness. It evokes today’s network culture, both literally and metaphorically, and the web of associations, uses, and contexts determining design today.

While most 20th century design is autonomous, independent, isolated, and closed, relational design is synonymous with interdependence, connectedness, and openness.

DESIGN STRATEGIES DIALOGUE:

Marije Vogelzang and Andrew Blauvelt

MODERATOR: JAMER HUNT

JAMER HUNT (JH): Why do you think food is so relevant as a design practice?

MARIJE VOGELZANG (MV): In the world of design, there's been a shift in the notion of luxury, from expensive materials and products to feelings and things that you can't really grasp. This focus on the ephemeral ties in closely with the experience of food.

In the world of design, there's been a shift in the notion of luxury, from expensive materials and products to feelings and things that you can't really grasp. This focus on the ephemeral ties in closely with the experience of food.

ANDREW BLAUVELT (AB): Food is a social lubricant. It allows people to come together. In fact, it's an essential ingredient if you want people to cooperate or participate. If you have a meeting, you have to bring donuts. Otherwise no one comes, at least in my institution.

JH: Why has food become more prominent recently? Weren't these same qualities there before?

AB: I think it's because designers are looking to create social situations and experiences, and they rely on food as a vital ingredient in making that happen. In Minneapolis, where I live, major corporations such as General Mills, Pillsbury, and Cargill consider design in the food they manufacture, but they're also becoming more interested in curating how people put their meals together not by transforming raw ingredients but by combining pre-made food—almost like a DJ.

JH: Is sociability a new form of luxury? Is it a form of value? Is it an object or artifact that we're now trying to generate using these kinds of props and tactics?

AB: Social capital is the new value, replacing cultural capital—education, wealth, expressions of wealth. Now it's about connection, access to the local. Think of Dutch still life painting: the depiction of fruits, vegetables, citrus, and other exotic things. To have access to the exotic was the measure of wealth. Today, the new measure of social capital is access to the local. It's easy to find global products now, so the question has become who has the local connection.

To have access to the exotic was the measure of wealth. Today, the new measure of social capital is access to the local. It's easy to find global products now, so the question has become who has the local connection.

JH: Historically, design has been perceived as something that produced good form. One thing that's interesting to me about the projects you've discussed is the question of form. Where is form? Is there a form? What are the limits of that concept? Does it matter anymore, particularly when one is designing with sociability in mind? Clearly, you've faced form and chosen process or ritual instead. Are designers moving beyond form, and if so, what's replacing it?

MV: I use form to communicate my ideas. Basically, I'm trying to tell a story. If I shout the story to you, you won't listen. I use form to tell my story in a nice way, so you'll remember it.

AB: I sometimes want to tell people to use the word format instead. The designer's form is the essential question, right? Are you just a strategist, are you something else, are you a problem solver? Everyone

solves problems, so designers really aren't unique in that respect. The question is, as a form giver how do you arrive at form?

The idea of context opens up much more. So many things impinge upon form. In architecture it's zoning laws, in food it may be food safety issues or allergies. There's always something that limits what you can do. Many designers, the interesting ones, are embracing those constraints. We used to be trained in school to see constraints as bad, or to think beyond them, but I think what's more important is to creatively incorporate all of those constraints in order to force the form into a new shape or a new thing.

AUDIENCE MEMBER: I think we're talking primarily about the luxury of time. For example, the Free Beer project.¹ How many people are actually engaging in making free beer? With food, it's the luxury of shopping and cooking, picking up local produce and actually putting it together. So how has this idea of time as a new luxury impacted the design practice?

AB: I think you hit the nail on the head. In the post-war period, fast foods, convenience foods, were an expensive luxury. That's shifted, and now slowness is the new luxury. It's a transfiguration of value.

¹ See the article "The Rise of the Relational: Five Themes in Relational Design" in this volume.

SECTION 4: **INTERDEPENDENCE** **AND RESILIENCE**

DESIGNING FOR PARTICIPATORY ACTION: The NYU Environmental Health Clinic

NATALIE JEREMIJENKO

The global climate crisis has revealed an interesting, almost more insidious crisis: the crisis of agency, of what to do. How can we, as people with every advantage when it comes to technology, communication, education, and location, act in the face of the collective, uncertain threat of climate change? Small gestures like buying local produce, driving the speed limit, or taking the subway don't seem sufficient. Who, then, defines and implements the means to solve environmental issues? Who designs the solutions? The good work of environmentalists has globalized environmental problems sufficiently to make them newsworthy; the unfortunate consequence is that these problems are not perceived as local enough to be actionable. How can we change our institutions to address this?

Through the Environmental Health Clinic,¹ a new lab and clinic I have established at New York University, we are reframing environmental issues as health issues, and health issues as environmental

How can we, as people with every advantage when it comes to technology, communication, education, and location, act in the face of the collective, uncertain threat of climate change?

issues. Environmental issues aren't just in the polar icecaps, or the Pacific region, or the developing world; they are implicated in the air quality of our rooms and the water in our homes. But neither is health something that's internal, individualized, or pharmaceuticalized; rather it's shared and collective, thus it is something we can act on.

In this context, at the Environmental Health Clinic we are reviewing what we consider to be health and rethinking how to create transformation in the health system. Take for example a recent study by Philip Landrigan at Mt. Sinai, which found that pediatricians spend the great majority of their patient hours dealing with a small number of increasingly pervasive problems: developmental delays, speech delays, autism spectrum issues, childhood diabetes and obesity-related issues, the 400-fold increase in rare childhood cancers that has developed in the last 10 to 15 years, and the common thread across all of these, which is asthma. All of these problems are environment related, and our medical system is radically unprepared to deal with that. In response, we have designed our clinic to approach health not as an individuated phenomenon but as a shared one—one that we can localize and change.

PROTOCOLS

The Environmental Health Clinic functions like a standard health clinic, using a very familiar institutional script, but our clients come with environmental health concerns rather than medical health concerns and walk out with prescriptions not for pharmaceuticals but for actions they have determined they can take to measurably impact their health by improving their local environment. The medical records we keep reflect this: because they concern environmental improvements that can benefit anyone who shares that environment and, they are available online, rather than being individualized and private. As a further distinction, we call our clients imPatients rather than patients, because they are too impatient to wait for legislative change.

At the clinic, we have developed a number of protocols for making sense of complex environmental challenges. One of these involves asking patients not for a urine sample but for a mouse sample, and monitoring the mouse. This begins, literally, with designing a better mousetrap. Ours is an enclosure outfitted with a cell phone that automatically calls the clinic when triggered by the mouse. We then pick up the

¹ See www.environmentalhealthclinic.net/.

² www.environmentalhealthclinic.net/projects/nopark/.

mouse and bring it to the lab to study its blood and hair and discern the body burden it bears.

Mice are the gold standard of model organism; the great majority of our pharmaceuticals are tested only on rats and mice before they are administered to humans. Mice make an even better environmental health model for humans, because they share our mammalian biology, consume a similar diet, and suffer environmental stressors such as lead and asbestos just as we do; however, because they have a smaller body mass and a shorter lifespan, we are able to see the effects on their health more clearly.

The Environmental Health Clinic reframes environmental issues as health issues, and health issues as environmental issues.

One of our imPatients was on several antidepressants. To discover whether mice, given the same environmental stressors, would self-administer these medications, we offered them Prozac, Zoloft, a black jelly bean, and a muscle relaxant. We also presented vodka in solution, gin in solution, muscle relaxant in solution, and plain water, to see if they would self-medicate. And they did. They liked Zoloft much better than Prozac, as it turned out, and they liked vodka as much as they liked plain water.

PRESCRIPTIONS

The greatest pollution burden on the New York–New Jersey estuary system is not big industrial facilities, but the massive network of impervious surfaces we call roads and sidewalks. To address this issue, we have created NoPARK, which prescribes the removal of asphalt from no-standing zones such as those associated with fire hydrants in order to create an engineered microlandscape.² With NoPARK, we intercept road-borne pollution and infiltrate it with surface rock and subsoil, thus rehydrating the entire block and preventing pollution from entering the estuary system. This also creates a healthier

environment for street trees, positively affecting the leaf area index, which measures the capturing of particulates and the sequestering of carbon dioxide. We are actually surgically inserting leaf area index into the boundary layout.

The NoPARK space meanwhile remains available for emergency vehicle parking, but now it also serves to address the environmental health emergency. It actually redefines what the emergency is.

The greatest pollution burden on the New York–New Jersey estuary system is not big industrial facilities, but the massive network of impervious surfaces we call roads and sidewalks.

PROJECTS

Another current design challenge concerns the quality of our cohabitation with nonhuman organisms. Many of us are aware of biodiversity issues in Costa Rica, but what about in Manhattan? At the clinic, we've renamed Central Park "Decentral Park" to emphasize the fact that nature isn't just inside the little boxes we call parks: it's everywhere, and biodiversity matters in many environments outside those boxes.

Our OoZ Project—"zoo" backwards, and without cages—is a set of interfaces that tracks the behaviors of nonhumans in the New York area. One of these, which we have deployed in the East and Bronx rivers, consists of a series of buoys outfitted with lights that turn on when fish swim underneath; the fish leave a trail of lights as they travel. Other lights sense the level of dissolved oxygen in the water at all times. We use fluorescent ultraviolet lures, because that's how schools of fish coordinate their complex movements through murky waters. Visitors to the site are encouraged to act on their natural desire to engage with nonhumans, unlike at parks and zoos, where "do not feed the animals" is the norm.

We even provide business cards with contact details on the fish, so people can "communicate" with them through texts and track their progress.³

CONCLUSION

New technologies such as the ones we're using at the Environmental Health Clinic present new opportunities to address and reimagine our institutional frameworks. But seizing these opportunities requires each individual's participation and intelligent sense-making. We need to ask ourselves, "Does this work? Does it work for me? Does it work here? What kind of lifestyle experiment can I do?" In other words, it requires "thinking," or critical making as opposed to just critical thinking. Only through this sort of hands-on coordination can we begin to understand the complexity of our urban ecosystems and determine solutions.

³ See www.environmental-healthclinic.net/ooz/projects/fish-restaurant/#more-330.

SYSTEMS DESIGN: Working With Change



NIGEL SNOAD



Getting down and dirty with challenging problems is inevitably about finding more problems every time you overturn a stone, rather than achieving a definitive solution. My work with Microsoft involves determining the tools people need to make a difference themselves, through the self-organizing changes and movements that make something happen. At this point in our societal history, I believe this is one of the only strategies we have.

How does design play a role in complex adaptive systems? Internet technology involves a phenomenal range of services and products, each of which are designed to some extent—some more successfully than others—and each of which create further effects in complex, interesting, and emergent ways. Increasingly, these systems are playing a role in how we deliver social services such as health care, and influencing our notions of community and government: for example, we have social networking

systems that can be used in the field of international humanitarian response and preparedness.

Officially, I research, design, and implement societal networking systems all over the world. This may not sound like a term of art, but trying to contrast these systems—essentially individuals interacting with each other—yields interesting results. How do these systems interact with the beast we call “society”: with organizations, governments, and community groups? Departments of social services, hospitals, and schools all interact with us as individuals, but they are legal entities. If you want to design for change, you have to think about how these actors function. How can we include them in the rich social networks that already exist and flourish? In terms of design, this viewpoint is very different from even twenty years ago.

CONFRONTING UNPREDICTABILITY

When we consider standard systems models in the context of design, we think of cause and effect, parts revealing the whole, rational choice. We have a problem, we can find a solution, we can map it, we can put a boundary around it and say, “Here you go. Here’s how you should do, say, health care reform.” But this model no longer works—and indeed it never really has. Consider this comparison: fifty years ago, great wizards like John von Neumann, the mathematician and early systems thinker, essentially said, “I can map out how this is going to work.” At about the same time, George C. Marshall, in creating the Marshall Plan, said, effectively, “We can figure out how postwar Europe is going to work.” But in reality, the Marshall Plan wasn’t conceived in a back room after a bit of consultation. Marshall did not go in and say, “I’m a great economist or planner with my big think tank, and this is how we’re going to fix things.” It was trial and error. If something did not work, different money was thrown to different groups. It was all contingent: it flowed and developed.

In fact, we have been designing for complex systems all our lives. Today, however, we have the benefit of different tools and a new language. Take as an example a search and rescue team, which one might imagine is organized in a controllable way. People know their roles, deliver on what they have promised, and agree on what to do next. When attempting to define an outcome, one might map it out in a sort of sequence. But in the real world, content isn’t predictable. A process with multiple parts of any complexity simply does not map that way. So what strategies and approaches can we use?

The ability of systems to adapt depends on both the speed and the strength of its linkages—how means and ideas can travel, how quickly the system can be controlled, mapped, or understood. But with today’s increasing speed of change, not only are more and more bridges being built between individuals and parts of the system, they are being broken down and rebuilt far quicker than ever before. So much for our ability to map, control, and predict outcomes.

In my work in international humanitarian response, I am constantly dealing with different

actors, different individuals. Every situation is different, every group of people is different, there are almost completely different roles and responsibilities, and we end up having to make it up as we go along. I am deeply dissatisfied with that, which is why the second part of my job description is to try to put some order into thinking about how we do these sorts of things. And slowly, we are making a difference. The situation in Haiti, for example, crystallized new thinking about ways to improve international humanitarian response. The idea that we can simply map and design aid or development programs and deliver a set of services or outcomes to a set of individual “beneficiaries” somewhere is starting to break down. People are realizing that these situations are much more complex, that everybody is a part of the system and the outcomes, and that there might be some tools to help us figure out how to do this better. Nevertheless, thinking within the field of international aid and development clearly has a long way to go.

ACCOUNTING FOR COMPLEXITIES

I recently gave a talk to the chiefs of police for the major Canadian cities. They are engaged with the problem of how to work with communities in the age of both Twitter and terrorism, when they don’t quite know who their communities are any more. Their audience and their constituents are massively complex. It’s no longer about working with a small, local community who you can know or at least define in some homogeneous way. As responses scale, problems don’t just get linearly more complex, they get massively more complex; the ability to coordinate completely disappears.

Even the military, which itself admits to a frequent inability to coordinate anything, looks at the international aid system and thinks, “How on earth does this ever work?” Most military officers who work with international humanitarian aid and development actors say, at least initially, “You have no idea what you’re doing. Let me take over; I’ll put some order into this.” Yet those who have been around for a while often begin to understand that, despite the complete lack of order and what may appear to be chaos, things happen. The process may not seem efficient, but the actors involved are able to

work together to figure out how to get things done, which is a property of an emergent system.

Most services, unfortunately, are designed for a simple world with a small number of neighbors. In reality, life as a citizen is much more complex. There are different jurisdictions, different contact points for government agencies. We actually live in multiple communities at once: the places we work, the places we travel, where our parents live. How do agents such as our chiefs of police reach out to everybody?

Most services are designed for a simple world with a small number of neighbors. In reality, life as a citizen is much more complex.

TOOLS FOR ADAPTATION

I have spent many years trying to predict and control complex adaptive systems from the standpoint of a scientist, and despite telling everybody, including myself, that it wasn't possible, I think there are some strategies for dealing with this emergent interconnectedness and interdependence. One strategy for managing complex dynamic systems is to define a boundary, and to understand your system well enough to know whether the ties within it are strong or weak. For example, the Global Foreign Exchange System, which enables international currency trading, is a very strongly connected system: what happens in one place massively affects others, however distant. Connections between educational institutions, on the other hand, may be much weaker. Boundary issues like these affect feedback processes.

A second important strategy is to integrate flexibility. At Microsoft, I am constantly engaged in convincing product developers not to build a "solution," but rather to build something that can evolve as users react to it. I want to listen to what people say, and I want them to do things that surprise me, so that we can learn how to change and adapt. There

is no endpoint or boundary to this engagement; it requires being continuously aware.

Fortunately, design offers tools for engaging with users. Simple visual design approaches such as mapping and visualization help us begin to understand systems and their challenges. These tools are more critical than ever, and no one else has them. Second, complex, interactive design approaches help us deal with the risks and interconnections of open systems. And third, service design covers many challenges that happen by accident. The creators of Twitter, for example, did not engineer it with the idea that it would be as big as it is. So, at the onset, they experienced massive system crashes, and occasionally still do. They had to be adaptive. As hash tags and geolocation came along, Twitter changed from being something you used to stay in touch with close friends to being a main way for public announcements to go out from city officials. It became a functionality used by completely unexpected sets of users.

CONCLUSION

Complex systems aren't open to constrained design solutions. We need to think differently. We each have our own maps, our own processes for understanding knowledge and organizing our world. What looks like chaos to you may, in fact, be my ordering system. Or something that seems complex—the controls in a flight cockpit, for example—may merely require skill, time, and expertise to learn. When you come across a system that looks complex, ask yourself two questions. First, is there an underlying simplicity and order that I can make use of, or that the owner has; and second, is the system as complex as it needs to be? These are fundamental points to consider when you encounter or think about designing systems.

DESIGN STRATEGIES DIALOGUE: Natalie Jeremijenko and Nigel Snoad

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MODERATOR: JAMER HUNT
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JAMER HUNT (JH): Both of you mentioned sense-making as perhaps a new capacity, a new kind of acumen that we might need to survive this complex mess that we've created. Can you expand on that idea?

NIGEL SNOAD (NS): The tools we have for existing in small, structured environments such as our house or workplace don't scale to the scope of interactions we need to survive in a bigger, complex world—one in which things change quickly and the challenges seem to be beyond individual action. And the social systems and structures that were put in place to mediate and simplify this complexity aren't coping either. We need new tools like social networking to help us understand and reformulate, and that's a design process.

NATALIE JEREMIJENKO (NJ): It's very easy to think that what we do as individuals has no significance, that it's not measurable. But there are actually things we

can figure out. For example, if every fire hydrant in Manhattan were changed to a NoPARK, at the cost of a couple thousand dollars each, we could prevent a major pollution burden.¹

NS: Similarly, in my work with police chiefs and public safety officials, I can see that the institutional context hasn't adapted well to changing circumstances in communities. In response to external threats like terrorism, there's been a focus on institutional strengthening. Weakening the institution just isn't something they want to be involved in. So there's an interesting conversation that happens around new ways of facilitating community formation from the bottom up.

NJ: People's creative imaginations and the generative capacity of collective design are our renewable resources. Historically, the institution of design has been about selling your creative skills for money.

Now, in teaching design to the next generation, we need to discuss what design is and what it's for. The Environmental Health Clinic model nurtures interesting designers by helping them set up referral networks and residencies so they can work on real designs, and we also support them in figuring out how to fund these projects. It's an institutional rethink of who gets to design, in what context and with what kind of accountability.

NS: What you're effectively designing is a community, or the ways that communities interact with each other.

People's creative imaginations and the generative capacity of collective design are our renewable resources.

NJ: And it's evidence-driven—you create collective sense-making opportunities, mediagenic opportunities, lifestyle experiments. As designers, we can work with communities of experts, block associations, and local community boards in a hybrid way, so it's not just about one community design but rather about figuring out how to institutionalize this process of evidence-driven feedback within complex adaptive systems.

NS: Here at Parsons, I help run a lab for graduate students on designing for the Red Cross. The local chapter is excited to work with them. These students could potentially come up with solutions that could help the organization in some way, but there's no guarantee. There could be exploratory pieces, or there could be very practical pieces. But either way, as the head of Red Cross for the region told me, they've gained new recruits, people with a particular

skill set who could be active as volunteers well into the future. It's been great to see the students completely engaged with

1 See the article "Designing for Participatory Action: The NYU Environmental Health Clinic" in this volume.

the local and global community, focusing on the problems the Red Cross is trying to solve. It's not just about the educational experience; it's about contributing, participating, and collaborating. And it's very interesting to see this different mode of being a designer.

JH: You've both touched on the potential for phenomena seeded in hyperlocalized situations to take root and pollinate into other seedlings that spread widely. We've seen examples of this with YouTube, Twitter, and other technologies that within a few months scale up from local to systemic, forming the basis for a whole new range of ancillary services and opportunities. Yet so many small, interesting design projects end up being seen by only a couple hundred people. What does it take to design something that can scale up at the same rate as these other technologies?

NJ: What I do are experiments. You don't have to be a professional scientist to experiment. As John Dewey said, it's important that participatory democracy be based on the skeptical experimentation of many people. Particularly with complex, urban systems, maybe we want to figure out how to playfully experiment with difference, though differently; maybe we don't want to wait until a Hurricane Katrina to reimagine and change our aquatic infrastructure, for example.

NS: It's all about preparedness, about building resiliency into the system. The project I'm working on now is very much about getting systems in use ahead of time that are suitable for lots of different uses, including helping people respond better.

New methods are changing how we design individually and share those designs. New communities are being built that enable that sharing of designs and concepts. Many of these ideas won't be useful, but how can we use the ones that are useful to make a difference, to change? How do we use behavioral economics, experimentation, trying and learning and doing different things in a way that allows us to raise questions, look at how people answer them, and interact with them as they do so? How do we build communities around doing things differently that are self-reinforcing and self-supporting? I don't

think we'll ever get it by designing down. We'll only get it by trying up.

AUDIENCE MEMBER: It seems we're talking about a system of education. Are we stepping back? How can we scale this? People like Bill Gates, Bono, and Warren Buffett have leveraged their networks, NGOs, a whole array of organizations to deliver services such as health care and education. From a systems vantage point, do you think that's viable? Is it too much of a top-down approach? Too oligarchic? Or is there room for that?

New communities are being built that enable that sharing of designs and concepts. Many of these ideas won't be useful, but how can we use the ones that are useful to make a difference, to change?

NJ: The prevailing idea in education is that making stuff doesn't matter; it can't get you into a good university. But getting out of the classroom to a place where you're unscripted, where you're not told what to do, where you can ask all sorts of questions is a legitimate and powerful form of education.

Everybody is manipulating the education system and developing metrics and ways to measure and initiate the forms of education that seem appropriate. But too often teachers are constrained in this complex system; their capacity to utilize their good sense is compromised.

As young designers, it's very hard to work within the school system to achieve any measurable change. At our clinic, we codevelop prescriptions, protocols and experiments with many teachers, and several schools have signed up to construct solar chimneys.² But on the whole, it's an incredibly constrained system. I don't think the focus of many philanthropic organizations has made the job of teaching easier.

So I would say let's get the focus off of manipulating teachers. Give them autonomy.

NS: I like the fact that Gates, for instance, asks questions and is at least purported to work in a way that's evidence-based. In theory at least, that should result in paying more attention, doing more sense-making, and trying different approaches. But I sometimes wonder if that's really happening.

I think participatory processes can make a real difference. The kinds of systems we're talking about offer opportunities for conversations and boundary-crossing through exercises and experimentation. For example, the Red Cross Climate Center and students and faculty of Parsons designed a game about climate change that was played in Senegal. The idea was to kick-start a conversation between scientists, meteorologists, and Red Cross disaster managers so that scientific data could be used to help determine when evacuation is necessary or where resources should go.

Even better, the conversations that are engendered through tools such as these can be translated to the communities that are affected by the massive floods and surges and extreme weather events caused by climate change, and they can participate and discuss what these occurrences mean to them.

Clearly, there's much to be gained by stimulating those conversations, by doing things differently, by learning outside of the school system. These aspects of play can be used to teach not just what's expected, but what's unexpected and, potentially, change-making.

² A solar or thermal chimney is a passive building ventilation system that works by pulling air through a vertical shaft using convection of air heated by the sun.

SECTION 5: **DESIGN ACROSS** **DISCIPLINES**

INEVITABLE INDISCIPLINE: The Final Escape from Disciplinarity

AYSSAR ARIDA

Beyond being a pretty date, 9/9/99 marked the first publication in English of the German art historian and cultural theorist Aby Warburg's immense treatise *Renewal of Pagan Antiquity*. Warburg, father of the field of cultural iconography, had died exactly 70 years earlier, and his work had been relegated to dusty academia since then. But at the turn of the 21st century, the time was finally right for his precocious vision to become mainstream.

ABY WARBURG: GEEK AND DESIGNER

Aby was a geek. At age 13, he gave up his right, as heir to his family's banking empire, to his younger brother Max in return for Max's promise to buy Aby any book he wanted for the rest of his life. The pact was kept, and Aby's eclectic bibliomania eventually yielded one of the world's most intriguing collections: the *Kulturwissenschaftliche Bibliothek Warburg*, or KBW. According to Warburg's

biographers, the wide-ranging intellectual and visual stimulation he experienced as his book collection grew led him to challenge his family's conservative religious beliefs. And it catalyzed his later search for primordial cultural energies and memes in their survival across cultural, historical and disciplinary borders.

Warburg's library was tailored to the exploration of his primary interests: the survival of ideas, images and symbols through time, in particular the cultural legacy and contemporary relevance of classical antiquity.

After completing doctoral studies in the field of art history, Warburg began his project in an attempt to bridge the gap between so-called “high” and “low” art, between classical art and popular cultural production. He needed to break down disciplinary boundaries to allow meaning and ideas to flow freely across academic and ethnic cultures, across geography and history, and particularly across value systems. He wanted to share and change the world, and he came to see his expanding library as the instrument for realizing this ambition.

The KBW was designed as a nonclassical library, tailored to the exploration of Warburg’s primary interests: the survival of ideas, images and symbols through time, in particular the cultural legacy and contemporary relevance of classical antiquity. In the library, images and texts could live in a dynamic, ever-changing order, and connections and relationships could emerge between data items based more on their position vis-à-vis one another at a particular moment—a moment of time, a moment of study—than on a fixed and predetermined hierarchy. Typical of the projects Warburg undertook in and through his library was the Mnemosyne Atlas, a set of around 80 panels covered with approximately 2,000 images from the collection. Warburg used these panels to tell stories, and constantly moved the images around to create connections and themes. In effect, they were conceptual mood boards—highly advanced for their time—that helped him design, test and communicate his theories.

Warburg and his two cofounders, Fritz Saxl and Gertrud Bing, eschewed canonic categories of library science, instead devising taxonomy systems that allowed multiple tagging of each item. For 10 years, they kept an annotated diary of their daily work in the KBW. Some 550 pages long, the diary reads like a three-pen start-up blog peppered with short marginal tweets and comments among the three colleagues. Data hoarding, adaptive user inter-

faces, flexible disciplinary boundaries, horizontal value systems, relational interactions and emergent meanings, logged collaboration and short messages, icons and taxonomies,

social responsibility and experimentation: Warburg’s 100-year-old story is rife with themes relevant in today’s digital culture.

Warburg died in 1929 in Hamburg, aged 63. In 1933, 60,000 books and 20,000 photographs from the KBW were shipped to London, sheltering them from the rise of Nazism. Today the collection lives on as the Warburg Institute at the University of London, a respected but less open and dynamic project.¹ With the original founder long gone and the KBW a full-fledged British institution, the extraordinary vision animating the original project has been somewhat forgotten—until now.

SURVIVAL OF A TEMPERAMENT

The apparently new relevance of Warburg’s fundamental ideas provides a specific kind of vindication: central to his theory of culture was the concept of *Nachleben*, the “survival” of images and motifs, memes and symbols across cultures, epochs and civilizations. Warburg argued that an idea never really dies; instead it wanders across history, surviving on the other side of a disciplinary or cultural border, until it crosses back, or until the boundaries themselves erode:

*In Warburg’s work, the term *Nachleben* refers to the survival (the continuity or afterlife and metamorphosis) of images and motifs—as opposed to their renascence after extinction or, conversely, their replacement by innovations in image and motif. ... Warburg’s concept of survival ... introduced the problem of memory into the longue durée of the history of motifs and images: a problem that (as Warburg himself observed) transcends turning points in historiography and boundaries between cultures.²*

Warburg had an intuition that modern culture was becoming too atomized, too segregated into mutually exclusive disciplines, its understanding too formal and formalistic. He felt that his work on the survival of memes across a collective human memory, visible through the history of art, would help promote the crossing of cultural and disciplinary boundaries. That idea is relevant again, and more pressing than ever. Today, however, all the tools to

¹ See warburg.sas.ac.uk/home.

² Georges Didi-Huberman, Vivian Rehberg, and Boris Belay, “Artistic Survival: Panofsky vs. Warburg and the Exorcism of Impure Time,” *Common Knowledge* 9, no. 2 (2003): 273.

support such a transdisciplinary and transcultural vision have been developed and are widely available.

WARBURG AS A MODERN DESIGNER

Aby Warburg was renegade for his time, but today he would fit perfectly in a culture of founders/designers. While he was not trained as a designer himself, Warburg's library was very much a design project, and one that remained in "perpetual beta" until his death. From a designer's perspective, the KBW indeed presented a fascinating brief. It wasn't a straightforward physical object, but a sort of living organism made of images and texts, set in an architectural exoskeleton. It had to interface with its human curators, physically and mentally. It had to be scalable and communicative and be sustainable for generations to come, and it had to change the world of cultural history. In the Internet age, it would have been conceived as an online digital service, a huge media database with a sophisticated content management system, accessible from anywhere through a web application. It would have involved information architecture, unit tests and user tests, thousands of lines of code, a GUI, a business model, branding, a monetization strategy, a growth strategy—and it would have had to fight off acquisition offers in order to realize its ambition to change the world.

Central to Warburg's theory of culture was the concept of *Nachleben*, the "survival" of images and motifs, memes and symbols across cultures, epochs and civilizations.

Warburg would have loved what can be done with Google, Flickr, and Twitter (perhaps "iKBW" would have been a mash-up of different services such as these). The wonderful data visualization possible today would also have made his life much

easier—imagine a TuneGlue for iconography,³ or a "Viewers who liked this painting also liked that one" recommending agent. Millions of users comparing Botticelli and mobile phone snaps would completely flatten the relationship between high art and popular culture—and they have. One important difference: Google hoards and organizes the world's information in order to sell ads on top of it, but Warburg hoarded information to build up knowledge, and from this knowledge to design a better cultural theory.

A NEW GLOBAL PARADIGM

Warburg's story illustrates the close relationships among data, analysis, art, and vision—in other words, between knowledge and its structure and design. Knowledge is the single most important fuel for any designer. Information and knowledge have been amassing for millennia at exponential rates, but what is unprecedented is how accessible they have become.

An inventory of the world's technological capacity in April 2011 tells us that we are fast approaching 100 percent digitalization of the entire human production of data.⁴ The first time digital media surpassed analog media in quantitative terms was in 2002; by 2007, 94 percent of the world's knowledge had been digitized. This represents around 1.5 zettabytes (1,500 billion gigabytes) of additional information per year, a big chunk of which is produced by individual users and consumers, who in many ways now control the "Information Age" (remember the 2006 "You" Time Person of the Year).⁵ A proper archive of collective cultural memory is a civilization's ticket into history. That's why the ancient Egyptians built encoded pyramids, and why a Gothic church reads like a pamphlet on high medieval theology. Writers, artists, architects, and designers have long taken on board, both consciously and not, the responsibility to embed such memory into their products.

We've come a long way from the Quattrocento. Back then, Leonardo da Vinci could send an "Impossible is Nothing"-style curriculum vitae⁶ to the Duke of Milan, boasting of his expertise in everything from civil engineering and weapons

The democratization of knowledge presents a double-edged sword. In a world where everyone can design their own homes or crowd-source the logo for their business online, capital-D designers may yet find themselves marginalized.

design to architecture, painting and sculpture—and, unlike Aleksey Vayner, still get the job.⁷ In the early Renaissance, a single “universal genius” like Leonardo or Michelangelo could claim to fully understand, if not to endorse, the entire cultural, religious, political, and economic environment of his generation. In total sync with their society’s worldview, their work brilliantly defined, archived, and channeled that society’s values through history.

Less than a decade ago, it would have been futile to search for a 21st-century figure in the image of Leonardo, because the sheer quantity of ever-increasing, ever-changing knowledge that he or she would need to command far surpasses human comprehension. Instead, it had become natural to talk of multidisciplinary teams as the way forward—especially in the context of design education and practice. Today, by contrast, the democratization of knowledge has re-empowered many individual young designers. But this trend presents a double-edged sword. In a world where everyone can design their own homes or crowdsource the logo for their business online, capital-D designers may yet find themselves marginalized.

In fact, many designers have been spending their time social networking and reading blogs, putting themselves on an altogether different interest plane. With increasing social awareness and the coming of age of ubiquitous broadband and mobile technology, proper global collaboration is finally possible. As a result, a new generation of designers is becoming truly transcultural and transdisciplinary.

THE TRANSDICIPLINARY GENERATION

In a world where architecture is less identified with building than with the organization of information, it comes as no surprise that design has opened new fields of operation that are not necessarily object-oriented. Designers have been discovering knowledge outside their own field, and responding to the democratization of their trade, to outsourced and crowdsourced competition, by joining forces with other trades and other complementary designers, forming loose networks of transdisciplinary collaborators.

So while it remains futile to look today for one individual with a scope of knowledge, skills and sensibilities comparable to Leonardo’s in his time, it is not impossible to find many individuals with the collective ability to access an incredible amount of knowledge. It is also quite possible to find among

3 Adobe Flash-based music visualization discovery tool. See audiomap.tuneglue.net/.

4 Martin Hilbert and Priscila López, “The World’s Technological Capacity to Store, Communicate, and Compute Information,” *Science* 332, 60 (2011): 60-65, www.sciencemag.org/content/332/6025/60.full.

5 See www.time.com/time/magazine/article/0,9171,1570810,00.html.

6 J.P. Richter, trans., *The Notebooks of Leonardo da Vinci* (New York: Dover Publications, Inc., 1970), 395-398.

7 In 2006, Yale undergraduate Aleksey Vayner submitted a video resume entitled “Impossible is Nothing” to the investment bank UBS, consisting of a staged interview interspersed with clips of Vayner performing various athletic feats. The video was leaked to YouTube and went viral. See Michael J. de la Mercad, “The Resume Mocked ‘Round the World,” *The New York Times DealBook*, October 19, 2006. <http://dealbook.nytimes.com/2006/10/19/the-resume-mocked-round-the-world-vayner-speaks/?pagemode=print>.

8 “Interdisciplinarity,” according to Louis Menand, coincided with the demographic shift in student and faculty populations in the United States in the last quarter of the 20th century. From being disproportionately white and male, university populations have become more balanced in their gender and race distributions. With the new demographics, new fields of study (post-colonial studies, queer and gender studies, etc.) that wouldn’t fit within the existing framework were born. See Louis Menand, “Undisciplined,” *The Wilson Quarterly* 25, no. 4 (2001): 51-59.

those individuals some who have great sensitivity to current cultural values, or who can be trained to develop such sensitivity.

“Interdisciplinary centers” have been growing across academic departments since the mid-1970s, in response to the erosion of disciplinary boundaries under the pressure of hard-to-categorize study interests.⁸ Academia continues to readjust to new cultural realities today. Universities are taking heed of new market opportunities that are appearing at the same time that their traditional authority as the main repositories and sources of knowledge has been dwindling. With American-born “design thinking” coming of age globally, a new branding exercise is in order. From Stanford’s d.school⁹ to Parsons’ Transdisciplinary Design program to the Pacific Northwest College of Art’s Collaborative Design program,¹⁰ competition is building. Interestingly, the themes declared in these three schools’ programs are not particularly new. Systems theory, holistic design, and design thinking have all been around for more than a decade. But universities have historically been very slow movers.

If we are to believe Thomas Kuhn, all this is fairly predictable: a major paradigm shift has come to fulfillment over the last 10 years, and the new worldview is finally entering the official mainstream.¹¹ This new way of seeing the world has been called the “quantum paradigm” in homage to the theory that brought about not only the electronic age and the life-changing technologies that came with it, but also the most significant changes in the way we understand the universe and our role in it since Galileo gave us the heliocentric worldview, and Newton the mechanical paradigm.

9 See dschool.stanford.edu.

10 “MFA program in Collaborative Design: Design Ecologies, Systems Thinking and Cultural Entrepreneurship,” Pacific Northwest College of Art, Portland, Oregon, accessed January 20, 2012, <http://pnca.edu/graduate/c/cd>.

11 Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962).

12 Ayssar Arida, “Urbanism and Architectures of the Quantum Paradigm,” *Quantum Architecture iA#4* (Netherlands: Jap Sam Books, 2011).

13 Tim Brown, “Strategy by Design,” *Fast Company* (blog), June 1, 2005, <http://www.fastcompany.com/magazine/95/design-strategy.html?page=0%2C1>.

When scientists looked at the heart of matter in the early 1920s, they saw a world made up not of solid objects but of dynamic energy fields and abstract fields of potentiality. Quantum theory described a world of uncertainty and complementarity, and triggered all kinds of metaphysical interpretations of what a reality made up of pure mathematics would be. The movie *The Matrix* plays with some of the notions that are very much on scientists’ minds today—and it is not a coincidence that it was made 70 years or so after that theory.

In true Warburgian fashion, the concept itself of what we now call “transdisciplinarity” has survived. It had been migrating through different disciplinary realms, and as new conceptual tools weaken and dissolve old boundaries, it has finally come into our own realm of design.

Around the year 1999, in Oxford, we called for a relational theory of urban design based on the quantum paradigm. It would be built upon a conceptual metalanguage borrowed from scientific themes (quantum dualities, complexity theory, self-regulation, biomimicry, etc.) that would be generic enough to transcend disciplines, help collaboration, and create wholly new ways of thinking and thus of designing. It fit well with similar notions then under development in other disciplines, from architecture to sociology, psychology, and economics. It was by definition transdisciplinary, but at that time the word was not used in that sense.

Naming a paradigm is important for the congealing effect that a brand has. In our image-centered world, giving a name (and eventually a language) to their shared worldview enables like-minded individuals and groups to recognize one another, come together, and collaborate more effectively. By 2010 it was clear that the exact name of any such theory

or worldview had become secondary. The Internet, and in particular social media, had made such encounters, as well as new forms of collaboration, much easier—and a fresh generation of “quantum” thinkers and designers is now thriving.¹²

IDEO president and CEO Tim Brown once described the best designers as “T-shaped” people: “They have a principal skill that describes the vertical leg of the T—they’re mechanical engineers or industrial designers. But they ... can branch out into other skills, such as anthropology, and do them as well. They are able to explore insights from many different perspectives and recognize patterns of behavior that point to a universal human need.”¹³ If anything, however, the new breed of transdisciplinary designers is best seen as “asterisk shaped”: they continuously absorb skills, practical knowledge, and popularized scientific ideas. Through film, gaming, art, and other means, they incubate a hybrid, science-aware but nonscientific culture. They are confident in their roles and their learning capacities. They form networks and collaborate across cultures and disciplines. And they are disseminating new iterations of knowledge through their work and activism.

In true Warburgian fashion, the concept itself of what we now call “transdisciplinarity” has survived. It had been migrating through different disciplinary realms, and as new conceptual tools weaken and dissolve old boundaries, it has finally come into our own realm of design. Thanks to social, academic, and professional networking, a new generation of creators is now coming together to bring about an emergent movement. Some might think of them as “quantum acrobats,” but perhaps we can call them simply: “transdisciplinary designers.”



CONTRIBUTORS

AYSSAR ARIDA is an urban designer and architect, and currently runs a cross-disciplinary consultancy in London and Beirut. He has taught architecture at the American University of Beirut, has lectured internationally and has published numerous articles on the relationship between worldviews and the development of cities.

YOCHAI BENKLER is the Berkman Professor of Entrepreneurial Legal Studies at Harvard University, and co-director of the Berkman Center for Internet and Society there. Since the 1990s he has played a part in characterizing the relevance of the information commons and decentralized collaboration to innovation, information production, and freedom in the networked economy and society. His books include *The Wealth of Networks: How social production transforms markets and freedom* (Yale University Press, 2006), which won academic awards from the American Political Science Association and the American Sociological Association, as well as the McGannon award for social and ethical relevance in communications. His work is socially engaged, winning him the Electronic Frontier Foundation's Pioneer Award for 2007, Public Knowledge's IP3 Award in 2006, and the Ford Foundation Visionaries Award in 2011.

ANDREW BLAUVELT is the Chief of Communications and Audience Engagement and Curator of Architecture and Design at the Walker Art Center in Minneapolis, where he co-organized the traveling exhibitions, *Worlds Away: New Suburban Landscapes* (2007) and *Graphic Design: Now in Production* (2011). He is a contributing writer for DesignObserver.com and his essays have appeared in *The Electric Information Age Book* (New York: Princeton Architectural Press, 2012) and *Toward a New Interior* (New York: Princeton Architectural Press, 2011) among others.

ANNE BURDICK is the Chair of Graduate Media Design at Art Center College of Design, and a regular participant in the international dialogue regarding the future of graduate education and research in design. She is co-author, with Johanna Drucker, Peter Lunenfeld, Todd Presner and Jeffrey Schnapp, of the forthcoming book *Digital_Humanities* from MIT Press, a book that puts design at the center of changes in the production of scholarship and knowledge. In her own practice, she designs experimental text projects in diverse media and was Design Editor of *Electronic Book Review* for 14 years. She is best known for her unique approach to lexicography and digital corpora in her work with Literary Scientists at the Austrian Academy of Sciences, for which she received numerous awards including the prestigious Leipzig Award for the "Most Beautiful Book in the World."

JAMER HUNT is the Director of the MFA in Transdisciplinary Design program at Parsons The New School for Design. He has dedicated his academic and professional career to design as a means for reinvigorating the public realm. Previously the director of the graduate program in Industrial Design at the University of the Arts in Philadelphia, he is a founder of DesignPhiladelphia, an initiative showcasing innovative design projects. Jamer has served on the board of directors of the American Center for Design and the editorial board of *Design Criticism*, and has presented his work and ideas at the Cooper-Hewitt, Stanford University, Parsons, Cranbrook, CalArts, the Design Institute at UMinn, and Kulturhuset (Stockholm). He co-hosted the symposium *MIND08: Design and the Elastic Mind* with Paola Antonelli, curator of the Design Department at MoMA, and Adam Bly, founder and editor-in-chief of *Seed Magazine*.

NATALIE JEREMIJENKO directs the Environmental Health Clinic at New York University. Previously she served on the faculty in Visual Arts at UCSD, and in Engineering at Yale University. Her work was included in the 2006 Whitney Biennial of American Art and the Cooper-Hewitt Smithsonian Design Triennial of 2006-2007. Natalie describes her work as experimental design, or “xDesign,” since it explores the opportunity new technologies present for nonviolent social change, primarily through public experiments. Her current research centers on structures of participation in the production of knowledge, and the political and social possibilities (and limitations) of information and emerging technologies.

KATIE SALEN is a Professor in the School of Computing and Digital Media at DePaul University, and former Director of the Center for Transformative Media at Parsons The New School for Design, a research center focused on emerging trends in design and media. She locates her work in the field of game design and serves as the Executive Director of a non-profit called the Institute of Play that is focused on games and learning. Katie led the team that founded Quest to Learn in 2009, a 6-12th grade public school in New York City, and is helping to remix the model in Chicago at a new charter school called ChicagoQuest. Katie is co-author of *Rules of Play*, a textbook on game design, *The Game Design Reader*, *Quest to Learn: Growing a School for Digital Kids*, and editor of *The Ecology of Games: Connecting Youth, Games, and Learning*, all from MIT Press. She has worked as a game designer for over 10 years, and is a former co-editor of *The International Journal of Learning and Media*. She was an early advocate of the then-hidden world of machinima, and continues to be interested in connections between game design, learning, and transformative modes of play.

NIGEL SNOAD is currently a Product Manager in Crisis Response at Google. Previously he has worked for a wide range of public and private institutions, including the United Nations, Microsoft, and Parsons, on a series of projects connected to disaster relief, crisis management and humanitarian interventions. His research explores ways that design, crowdsourcing, networks, complexity theory and other strategies can reshape humanitarian operations, and how information management, decision-making and risk management all come together. Nigel is an advisor to the ICT4Peace foundation and the Institute for State Effectiveness, and part of the advisory board for MIT's Geospatial Data Center and Kopernik, a technology and development NGO startup. He holds a PhD in Complex Adaptive Systems.

ANNA VALTONEN has been the Rector of the Umeå Institute of Design at Umeå University in Sweden since 2009. Before assuming this position, she worked for 12 years for Nokia, most recently as Head of Design Research & Foresight. Her research interests include the history of design and society, and the role of designers within society. Her PhD, from the University of Art and Design in Helsinki, Finland (now Aalto University) explored the professional development of industrial design practice. She has previously been active as a researcher in the Department of Strategic and Industrial Design at Aalto, and as visiting professor in the Department of Management at ESSEC Business School in Paris, France.

MARIJE VOGELZANG specializes in "eating-design." She graduated from the Design Academy in Eindhoven, the Netherlands, and set out to develop new directions in food-oriented design practice. After having developed and recently sold two experimental restaurants called PROEF in Rotterdam and Amsterdam, Vogelzang has worked on restaurant concepts as well as long-term medical projects for hospitals. She initiates social projects like workshops to educate and inspire, but also does extensive work for industrial food companies such as Nestlé. She designs art installations and creates new food rituals. Her work has been recognized globally.