

## Thinking

John Dunnigan

How does a RISD education promote critical making? John Dunnigan, Professor and Department Head, Furniture Design, introduces the practice of "thinking" as one path to developing the creative process and understanding the symbiotic relationship between thinking and making in art and design. Drawing from the curriculum and connecting it to the work of alumni, Dunnigan describes how thinking—the union of critical making and critical thinking—supports a creative process steeped in exploration and results in tangible outcomes while promoting self-knowledge, self-expression, and an understanding of one's relation to the world.

Recently I had a conversation with some of my students in which we tried to sort out what was happening as they developed their projects. We talked about what they were making, how they were making it, and why they were making it. We talked about how it looked. We talked about where it had come from, where it might go, and how their thinking was changing as they went through the process. At one point I asked them what we should call this process. Most of the terms we used seemed inadequate to describe it fully but one rang true: "thinking."

Artists and designers are form givers who bring ideas into the material world. In the studio we think about things. We think around things and through things. Yes, you could say we are engaged in thinking. Thinking expresses the symbiotic relationship between making and thinking in art and design, between object and idea. It connects critical making and critical thinking and relies on embodied knowledge, practice, and research. It integrates multiple ways of knowing and promotes holistic reflection and learning. Thinking is situated in contemporary and historical frames of reference. It includes the making of new artifacts that reflect the effects of the creative act on the maker, user, and system.

Thinking also involves engagement as it takes into account the consequences of those processes, phenomena, and artifacts. The presentation and critique of one's work is a key moment in the process of understanding what we really think. To stand beside an object that represents one's effort and growth and to get feedback on that performance can be a profound experience. This is often the point at which we compare what we thought we were doing with what actually happened, what discoveries were made along the way and what new doors opened. Though these artifacts may be idiosyncratic, they all tend to be material expressions of the complex interdependent relationships among culture, technology, and identity. We brought forth a thing and it shaped us as we shaped it. Thinking.

While thinking is contemporary, aspects of it have ancient underpinnings. When Pasiphae, the wife of King Minos of Crete, was charmed by



Fig. 18  
Daedalus presenting  
the cow to Pasiphae,  
first century CE

the sea god Poseidon into falling in love with a bull, she turned to Daedalus, the most famously skilled person in the kingdom, to create a beautiful cow of wood so that she could climb inside and mate with the bull (see fig. 18). To make a lifelike cow out of wood implies expertise, internalized skills, familiarity with material properties, and the tools to manipulate them—all of which could be characterized as a kind of embodied knowledge.

The Greek myths predate Aristotle's fourth-century categorization of ways of knowing, which included knowing through skill (*techne*), knowing through intuition (*nous*), knowing through practical reasoning (*phronesis*), and knowing through fact and theory (*episteme*).<sup>1</sup> Mythology assumes integrated ways of knowing and demonstrates fluid relationships among them. The response to Pasiphae's request was dependent not only on physical skill and creativity. It also demonstrates that knowledge of materials and techniques, along with a deep understanding of structures and physiology, were necessary to make a faux cow that would protect a queen and support

an amorous bull. The kinds of conceptual and intuitive capacities that were required to successfully complete such an extraordinary task incorporate other ways of knowing that span the realms of abstract and practical knowledge. This type of knowledge guides decisions about how tools should be applied to materials while helping to organize the possibilities of the whole endeavor, relying on critical thinking as much as intuition.

Embodied knowledge refers to skills and information that our bodies understand and remember as a result of sensory—especially haptic—experience and practice. Together, practice—here meaning repeated, thoughtful doing—and embodied knowledge help transform raw materials into a physical expression of an idea. Although the cultures of production and modes of training are very different today, embodied knowledge is still gained through haptic experience and sensory perception, particularly through working with one's hands. At first glance, this dynamic may be less evident in the field of design than other disciplines like painting, drawing, cooking, and making music, which rely more directly on physicality. For example, how much is a pinch of salt and how do you season to taste? How do the musician's fingers express the ideas and emotions behind the composition? How do you hold the brush or the chisel and learn to make a straight line or a crooked one depending on your intentions? This type of knowledge provides not only a way of expressing ourselves and communicating with others but also a way of knowing ourselves.

The human brain has not yet evolved into an organ that can understand fully without sensory perception. As Frank Wilson points out in his book *The Hand: How Its Use Shapes the Brain, Language and Human Culture*, any theory of human intelligence that does not acknowledge the interdependence of the brain and the hand is an impoverished one.<sup>2</sup> Artists and designers acquire embodied knowledge by doing and enhance their creativity by combining that knowledge with critical thinking. In practice-based disciplines, internalizing skills and building embodied knowledge increase opportunities for innovation.

Education in art and design is a nonlinear and open-ended creative process, integrating conceptual, intuitive, sensory, technical, and contextual components. At RISD, this happens through combining hands-on, intense, and immersive studio classes that integrate making and thinking with critiques that encourage reflection and redirection. Studies in the Liberal Arts enrich the experience by providing context and new perspectives. Woven together, these strands establish a theoretical and intellectual foundation for studio practice.

RISD's studio model is built around two key elements: *critical thinking*, the ability to process and evaluate information while challenging assumptions and employing multiple ways of knowing; and *critical making*, the process of creating things by altering materials and giving form to ideas. Critical making requires critical thinking and social consciousness along with embodied knowledge if it is to be distinguished from making in general. Critical making should also be understood as different than production where the thinking is complete before the fabrication begins. In critical making, the very process itself opens up new possibilities for deep, expansive thinking and the serious inquiry that stimulates discovery.

The Department of Furniture Design promotes thingking through one version of the RISD studio model. Students are encouraged to explore ideas and technique simultaneously, to integrate thinking and making, theory and practice. Undergraduates undertake a comprehensive curriculum, moving from focused and technically specific courses in the sophomore year to more experimental, research-based, and idiosyncratic practice in the junior and senior years. They develop embodied knowledge and haptic experience by beginning with hand tools and learning how to use them properly to shape and join wood, metal, plastic, textiles, stone, concrete, composites, and other materials not typically associated with furniture making. Technology is broadly defined and includes hand tools, machines, and digital tools. As a result, students might

use a handsaw, a table saw, a laser cutter, a library, and a museum on any given project.<sup>3</sup> At the same time, they are guided through design principles and the process of conceptualization and design development via drawing and model-making, with all of these experiences culminating in the execution in real materials of their designs at full scale in three dimensions.

At both the undergraduate and graduate levels, courses have conceptual and technical challenges that align naturally in the studio environment, where intuition, abstract thought, and theory meet the material world. As our experience of the world becomes increasingly virtual and abstract, the experience of making physical objects and gaining multiple forms of knowledge in the process are increasingly valuable. Far from being anachronistic in a world where making is more and more digital, these types of knowledge are essential to the success of our alumni as they enter the professional world. Alumni of the Department of Furniture Design embrace developments in new technologies and many design things that often are made entirely, or in part, by others and by machines. But their experience with handling real materials and their capacity for taking a project from concept to finished "thing"—made possible by their immersion in critical making and thingking—are valuable personal and professional assets. These skills have helped to form the basis of many successful careers.

Indeed, while RISD Furniture Design alumni share a similar exposure to making, embodied knowledge, theory, and history, they use the practice of thingking in different ways. The raw materials, tools, and methods of production they choose are as different as the contexts and markets for their work. Two examples of alumni work, one individual, and one a partnership, demonstrate the value of broad pedagogic approaches and the multiple ways thingking is made manifest. These examples emerge from the same curriculum and learning environment, illustrating the adaptability of this form of education.

Matthias Pleissnig (BFA 2003 Furniture Design) demonstrated early on that he had a keen interest in form and sculpture. Throughout the sequence

of courses and specific assignments, faculty guided him through the development of his own remarkable vision. His training in furniture design was useful in applying principles learned through hands-on making that helped to turn raw materials into the expression of complex ideas. In his current work, he uses 3-D modeling software to sketch compounding curves and then translates them into large-scale, one-of-a-kind objects made with wood that is steambent by hand, one piece at a time. Works such as *Providence* (fig. 19) explore the interaction of the human form with objects, but his exquisitely fabricated piece also celebrates making. Formally elegant objects may prioritize aesthetics over ergonomics, but they also suggest that the process of making is the thing against which all other considerations are measured. Matthias's work has been acquired by significant collections, and has been recognized with a Louis Comfort Tiffany Award (2009) and a USA Knight Fellowship (2010). His practice is very labor intensive, requiring a high level of expertise built on embodied knowledge as well as a deep understanding of his materials, their properties and potential, and ultimately, a physics of form in the way that process, material, and structure find embodiment in an idea.

The work of Theo Richardson, Charles Brill, and Alex Williams (all BFA 2006 Furniture Design) was diverse when they were undergraduates and included interests in scholarship, contemporary design, and installation/performance art, respectively. As partners in Rich Brilliant Willing (RBW), a lighting and furniture design manufacturer based in New York, they discovered the advantages of collaboration and openness as creative practitioners as well as the benefits of their department's diverse curriculum and culture of thinking. In their professional work, RBW highlights the use of pre-made components purchased from a variety of manufacturers to create unique products that are assembled in their workshop with simple tools and shipped directly to customers. Their making is technically, contextually, and ideologically different from Matthias Pleissnig's though they have the same educational background and a shared exposure to RISD's pedagogy. Even if their company brand seems to disassociate itself from the kind of production



Fig. 19  
Matthias Pleissnig,  
*Providence*, 2008



Figs. 20 and 21  
 Rich Brilliant Willing,  
*Bias Clock*, 2010;  
*Bright Side of Life*,  
 2010

that requires craft expertise and embodied knowledge, to some extent, the aesthetic could only exist because of a deep understanding of how to make things. This is critical making that relies on multiple collaborative capabilities while consciously renouncing craft stereotypes.

The strength of RBW lies in their unique vision and in their capacity to reimagine and manipulate industrial components into poetic objects that raise the consciousness of their audience. Their products are disarmingly simple and potentially profound. *Bias Clock* and *Bright Side of Life* (figs. 20 and 21) are two stand-out product designs from 2010 that solve functional needs while encouraging users to think differently about time and light—projecting the embodied knowledge of making onto the user's experience of the objects. In short, RBW is a smart and timely business that celebrates the complexities inherent in the marriage of commerce, art, and design. Their partnership has received much critical acclaim in the last few years, including the ICFF Best New Designers Award in 2011 and *Forbes* magazine's "30 Under 30."

How does one department's curriculum encourage two such different yet successful approaches? Matthias's engineered, sensuous, and fluid forms help to redefine space, play with light and shadow, and relate to the human body, while RBW's work elevates found objects and industrial materials into thought-provoking products, bringing sophisticated simplicity to what could be purely utilitarian. The department is centered around the fundamental pursuit of giving form to ideas, with FORM (Furniture, Objects, Research, Materials) as a subtext. The curriculum has not forsaken making in favor of representation and a focus on systems and strategies, as have many design departments and institutions. Instead, the department fosters the exploration of a wide range of materials and approaches, and of conceptual thinking with hands-on making, which integrates human factors of furniture design with the social value of studio work and responsible citizenship.

At each stage of this pedagogical approach, the nonlinear nature of the design process encourages testing ideas through a variety of means, from drawing to deployment. Along that circuitous route, research plays a critical

role in directing creativity toward innovation. There is a wide range of perspectives on what constitutes research in higher education, and how its definition varies across disciplines, particularly when comparing research in practice-based disciplines to research in the sciences and humanities.<sup>4</sup> Even subtler distinctions have been drawn between research in art and research in design. As an educator, I generally don't see an advantage to distinguishing between the two, but the differences are worth noting briefly. For example, artworks and art practice can constitute both the means and ends of research in art whereas design research is usually associated with problem solving. Generally speaking, research in practice-based disciplines like art and design means focused critical inquiry or sustained exploration aimed at discovery. This can take many forms, ranging from research into or through theory and philosophy, materials and processes, behavior and interaction, social responsibility and sustainability, markets and history, and, of course, form itself.

Research is an important developmental component in thinking, as shown in the work of Jamie Wolfond (BFA 2013 Furniture Design). When I asked Jamie to tell me about research in his new work, my favorite part of his reply was, "I wasn't failing fast enough." He was referring to his methodology, which includes a fairly rapid series of experiments characterized by a high level of spontaneity and a reliance on the empirical evidence of the results, all directed toward an outcome. By his own admission, he learns more from the failures than the successes and the process is open-ended.

The Furniture Design department's "Senior Studio" is focused on seating as well as the development of the proposal for their degree project, a capstone experience comprised of a related group of objects and a written component. In response to the five-week assignment to design seating using soft surfaces, Jamie came up with the idea of inflatables and sketched several versions of a stool with wood legs and an inflatable seat. He sought a manufacturer that could produce his design on an experimental basis and, in the process of discussions with them, made many adjustments to the form, learning about that technology and designing a product with potential for

future production. When he realized that he might not get this stool completed by the critique deadline, he began to think about an inflatable object he could purchase locally and adapt to suit his intentions. Exercise balls fit the bill and he set out to bend and weld the steel wire frames himself that would alter the shape of the inflated balls, resulting in his *Ball Ottomans*. Several iterations and adjustments were made, each one having incremental improvements over the previous version, resulting in a group of finished pieces in time for the critique. During the critique, feedback provoked discussion about production at the broadest scale of making, what he could produce himself, and what he potentially could produce using outside fabricators when he had a longer time frame. The conversation influenced his approach to the subsequent project.

For the next assignment, which was to design a chair, Jamie decided to find some recycled materials that he could repurpose using the technologies available to him on campus. *Frumpy Chairs* (fig. 22) are the result of a remarkably prolific and intense investigation into reheating recycled low-density polyethylene thermoplastics into chair forms using sacks or bladders that Jamie cut, sewed, and stapled into rough, chair-like forms. The forms were filled up with ground-up thermoplastics then heated in an oven to a particular temperature (determined through lots of trial and error), at which point they were removed and draped over a steel form to make something that resembled a chair, once it cooled and became rigid. The chairs are hollow, which is the result of several tests to determine the ideal temperature and duration of the slumping to achieve the desired wall thickness. Although the process was messy, highly intuitive, open-ended, and maybe insufficiently documented, his was an empirical, focused, and directed inquiry that yielded original results. Jamie's work involves an idiosyncratic type of research that depends more on the fact that he is prolific and highly intuitive than it does on methodological consistency or scientific controls. It serves as one example of what research looks like in art and design education—and a case study in thinking.



Fig. 22  
 Jamie Wolfond,  
*Frumpy Chairs*, 2012

While the undergraduate Furniture Design program has a core sequence of projects built around acquiring skills and expanding conceptual understanding in a progressive sequence, the graduate curriculum is highly experimental and individualized, as it attracts students from diverse backgrounds, each coming to RISD prepared in distinct ways for research in art and design. The graduate curriculum often begins with a challenge for new students to question what they already know and develop wholly new contexts for their work. This is effectively encouraged by specific assignments of different durations and subjects that encourage exploration of new materials and unfamiliar processes.

One outstanding example of the potential of this experience shows innovation through a specific focus on materials research. Daniel Michalik (MFA 2004 Furniture Design) entered RISD with a strong sense of contemporary design and very good woodworking skills. His response to the challenge of developing a new direction in his work was to explore underutilized materials and use them in new ways. When he discovered what he called the strange, unique, and useful qualities of cork, he was drawn to experiment with the material to see if he could make larger scale structural objects like furniture, an uncommon application. His 2004 thesis *Cork Stories* documents his research into cork's material properties, limits, and potentials. He studied its elasticity, porosity, buoyancy, impermeability, tensile strength, compression strength, and resistance to wear and discovered that it has a natural resistance to microbes and bacteria. He conducted a number of tests to see what was necessary to make parts of relatively large mass and how to create furniture-size objects with structural integrity.

This particular type of materials research considers aesthetics as much as material properties, which situates the inquiry and the product more in the realm of art and design than engineering. Daniel's *Cortiça Chaise Longue* (fig. 23), for example, utilizes cork's antimicrobial and buoyancy properties to function equally well on land or floating in a pool. His resulting body of work brought him wide critical acclaim and demonstrated good methodology

for materials research in art and design. While Daniel developed this specific research into his thesis, the process of letting the material properties guide the design proved to be a way of working that was successful for him beyond the project, and he continues to work with cork and other materials, applying the same research principles.

While Jamie Wolfond's research derived from exploring how process can be the platform for thinking, and Daniel used the exploration of materials to generate new furniture forms featuring the properties inherent to those materials, work by Tanya Aguiñiga (MFA 2005 Furniture Design) illustrates another outcome of thinking. Her socially oriented furniture is as expressive of interpersonal relationships as it is of multiculturalism. *Hole Table* (fig. 24) may be an exercise in solving a problem that didn't really need to be solved, or it may be a humorous commentary on dining practices, but in either case it is an elegant object that serves to bring people together as tables do. What may be less evident is how it expresses Tanya's personal history. Tanya grew up in Tijuana and crossed the border into San Diego twice a day to attend school, spending hours each day in "the space between" of the border crossing. She carried the notion of "between" into the space between the top and bottom of the table, where dishes and flatware hover suspended in "the space between." The table is an experiment in approaching design from a behavioral perspective. *Zinacantan Chair* and *Teotitlan I* are similarly beautiful objects that invite us to see the potential of cultural diversity in the exquisite, unusual combinations of form and materials.

Tanya's use of modernist forms that look industrially produced is mitigated by soft and impermanent materials hand applied in several ways. The works resonate on aesthetic, technical, political, and commercial levels. In addition to furniture, Tanya's work includes jewelry, clothing, performance, and installation, often engaging multiple participants. The production of these works involves socially responsible practices and includes family and an expanding community of friends. The way things are made is important to her. For many years, Tanya has been a social activist and her commitment



Fig. 23  
Daniel Michalik,  
*Cortiça Chaise  
Longue*, 2006



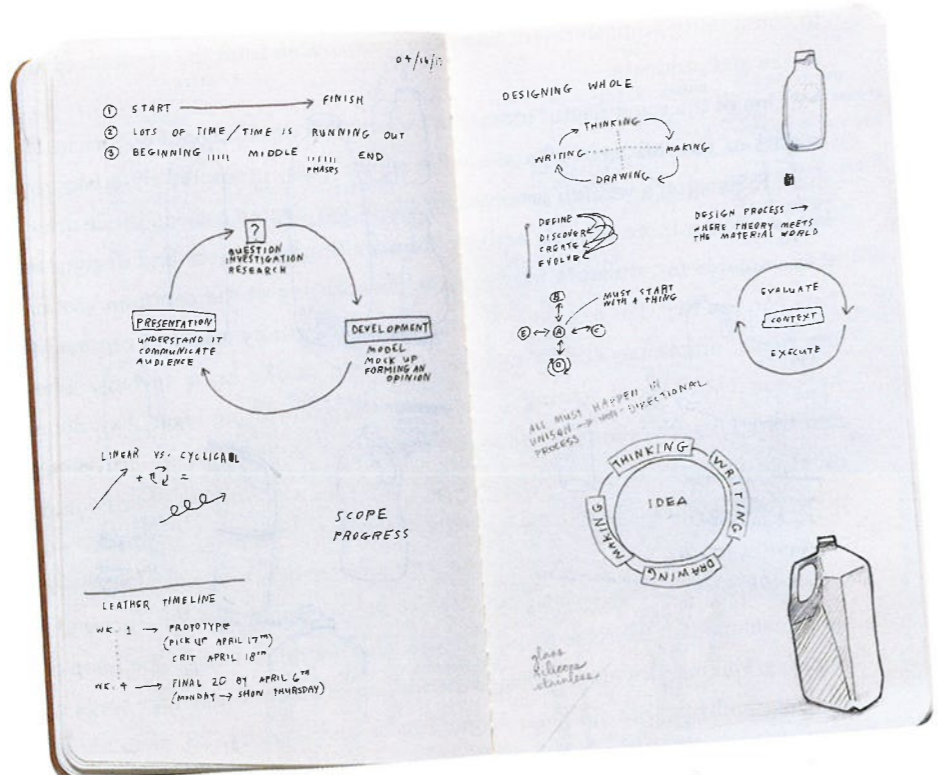


Fig. 24  
Tanya Aguiñiga,  
*Hole Table*, 2005

to community empowerment has been inseparable from the creation of artworks and products.

One of the most useful moments for creative development occurs in the middle of the fall term of a student's senior year, prompted by a requirement to develop a written proposal for his or her degree project. Since drawing is often a more regular activity than writing for artists and designers, it is valuable for students to gain an understanding of the common ground between the two. For example, if drawing is essentially a way of representing ideas, emotions, and things by inscribing marks on a surface, what happens if we look at writing similarly as communicating ideas, emotions, and things by inscribing symbols on a surface? Although they are vastly different in many ways, on some levels drawing and writing share something fundamental: They are a means to develop ideas through the act of making marks and thus useful as comparative ways of expression and as integrated learning. Understanding the value of this type of learning, I have developed an exercise as part of an ad hoc seminar I call "The Loop of Thinking/Making/Drawing/Writing," in which we locate these four ways of doing on a circle with no clear beginning or end (see fig. 25, sketchbook of Sarah Pease, BFA 2013 Furniture Design). The point of this exercise is to demonstrate the value of circling through these ways of doing repeatedly, where any of them might be the starting or end point of the process. This way of working unifies critical thinking and critical making and exemplifies thinking.

Timothy Liles's (BFA 2005 Furniture Design) senior Degree Project offers an excellent example of the power of this kind of integrated learning, and of how a deep understanding of the process of thinking and making can lead to influential and thought-provoking work. *The Wellness Project* investigated perceptions of health and proposed that for many people getting healthy takes a lot of work to achieve and, as a consequence, illness is the more normal state of being. With an effective undertone of humor, he designed pieces around three stages of illness awareness—prevention, detection, and medication.



The objects themselves are minimal wood structures, with paper, steel, and aluminum parts as required by their respective functions. Well Design, his temporary company established for the project, offered three products: a chair, a table, and a medicine cabinet. *Be Well Chair* (fig. 26) addressed sanitation phobia with a roll of paper across the backrest that could be pulled down the back and across the seat, then torn off and changed for each person who used it. *The Detection Table* supports self-diagnosis by providing a place for a small computer next to a sterile-looking aluminum clipboard. According to Tim, the clipboard had a contrived checklist for keeping records of past illnesses and sorting out symptoms while scouring the Internet for information on the latest maladies. *The Medication Cabinet* looked much like an archetypal medicine cabinet except that, in order to hold massive of amounts of medicines, it was long enough to reach from the top of the sink to the ceiling, and it came with a tall wood ladder. The furniture objects were the material expression of a contextually complete project and a holistic way of working that together formed a commentary on contemporary psychology and health care, and demonstrated the potential of furniture design to reflect and influence behavior.

Tim's work highlights the importance of directing art and design outward toward others. Tim has continued to do so in his professional career, which has included connecting regional artisans to high-end production work to support their economic viability. Such efforts remind us that no things are truly autonomous. Everything has a context. Although the critical making of things as a way of knowing and expressing oneself is perhaps the single most significant outcome of a practice-based education, that outcome would be largely inconsequential if weren't directed toward human engagement. It is in relation to others that we come to know ourselves and see where art and design make a significant contribution to society—by raising consciousness, posing questions, solving problems, and providing new ways of understanding.

The thoughtful making of things creates new objects, but also new ways of thinking about manipulating materials and imagining complex forms,

Fig. 25  
Sarah Pease,  
sketchbook, 2013



Fig. 26  
Timothy Liles, *Be Well Chair*, 2005

about manufacturing processes and industry, about identity, behavior, and cultural commentary. Examples of RISD student and alumni work demonstrate how critical thinking and critical making support creative invention and expression, and suggest how engagement gives them greater purpose. They provide a glimpse into how an education that supports critical making through the development of embodied knowledge via practice and haptic experience, of critical thinking through context, research, and engagement, provides unique opportunities for innovation. In the twenty-first century, the fundamental pursuits of raising consciousness, solving problems, and creating new insights through original ways of seeing and making remain essential to art and design practice. Making things contributes positively to that. Critical making depends on critical thinking, and both guide the process of giving form to ideas, which can be observed and critiqued. Thinking is a practice that unifies critical making and critical thinking, and promotes engagement and reflexivity as part of open-ended exploration. Thinking is a practice that looks inward and outward and reflects on the effects of making on the maker, user, and system.

#### Notes

1. Aristotle, *The Nicomachean Ethics, Book VI*, in *The Basic Works of Aristotle*, Richard McKeon, ed. (New York: Random House, 1941), 13.
2. Frank R. Wilson, *The Hand: How Its Use Shapes the Brain, Language and Human Culture* (New York: Pantheon, 1998), 7.
3. The Fleet Library at RISD houses over 145,000 volumes, almost 400 periodicals, and a materials library. The RISD Museum contains 86,000 objects and a notable education department. Along with the Edna Lawrence Nature Lab, these make a remarkable contribution to the educational experience of students and faculty.
4. Among many current books on art and design research, see Henk Borgdorff, *The Conflict of the Faculties* (Leiden, Netherlands: Leiden University, 2012), 44–63. Though Borgdorff's emphasis is on artistic research, some of his observations could apply to design.