Design Issues, Volume 26, Number 3 (Summer 2010)

1 Introduction

Introduction. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 1-5

6 A Natural Death Is Announced

Johann van der Merwe. A Natural Death Is Announced. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 6-17

18 Relevant and Rigorous: Human-Centered Research and Design Education

Bruce M. Hanington. Relevant and Rigorous: Human-Centered Research and Design Education. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 18-26

27 Shared Conversations Across Design

C. M. Eckert, A. F. Blackwell, L. L. Bucciarelli, C. F. Earl. Shared Conversations Across Design. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 27-39

40 The Sword of Data: Does Human-Centered Design Fulfill Its Rhetorical Responsibility

Erin Friess. The Sword of Data: Does Human-Centered Design Fulfill Its Rhetorical Responsibility. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 40-50

51 White and Fitted: Perpetuating Modernisms

Kathleen Connellan. White and Fitted: Perpetuating Modernisms. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 51-61

62 Theories of Technical Functions: Function Ascriptions Versus Function Assignments, Part 1

Peter Kroes. Theories of Technical Functions: Function Ascriptions Versus Function Assignments, Part 1. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 62-69

70 Doctoral Education in Design: Problems and Prospects

Victor Margolin. Doctoral Education in Design: Problems and Prospects. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 70-78

79 The Idea of Socialist Design: Iskra Show Review

The Idea of Socialist Design: Iskra Show Review. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 79-82

83 Must They Mean What They Say? I AM A MONUMENT: On Learning from Las Vegas by Aron Vinegar

Must They Mean What They Say? I AM A MONUMENT: On Learning from Las Vegas by Aron Vinegar. *Design Issues*, Volume 26, Number 3 (Summer 2010), pp. 83-91

Introduction

The first question that the editors of *Design Issues* ask of every manuscript submitted for consideration is "What is the design issue addressed in this paper?" We want to know what question drives the inquiry and deserves the attention of a reader. Is it merely a question growing out of the writer's personal curiosity, or is it a question that goes beyond personal curiosity and reflects the forward moving thought of the design community or of the field of design? Where is the issue located? What are the signs and evidence that the issue is significant? And if the community does not yet recognize the issue as significant, does the author merely assert its importance or does he or she make a reasonable case that the issue is important for new understanding? An issue well stated is the beginning of inquiry—and perhaps, as John Dewey suggests, an issue well stated is already halfway toward a solution.

Today, however, many of the issues in design research are as complex as the most complex problems of design practice. They often cross many disciplines of design as well as the larger body of surrounding academic disciplines that may contribute to our understanding of design. This is why the table of contents for *Design Issues* is often so different from those of other design journals. Instead of focusing on a narrow band of design problems within one or another area of specialization, *Design Issues* seeks articles that may have significance for anyone who is interested in the current state of design thinking and design practice. It is true that sometimes those articles come from within a relatively specialized branch of design, but they may also come from questions that cross disciplines, pointing toward *emergent* issues that are shaping the broad field of design.

This edition of the journal represents the exceptional diversity of issues that we believe is a signature of *Design Issues*. We begin with Johann van der Merwe's reflections on how we may "un-discipline" the disciplines of design in order to incorporate insights from other "disciplines." In "A Natural Death Is Announced," he describes the intellectual rebalancing that is underway at the Cape Peninsula University of Technology, South Africa, which was created by the merger of the Cape Technikon and the Peninsula Technikon. Such mergers are moving ahead in many parts of the world, but at the Cape, the merger led to a further merger of departments that yielded a Faculty of Informatics and Design. Van der Merwe discusses the changing research focus of the new unit and the deeper change in philosophy that underlies its work, pointing toward cybernetics and systems thinking.

In the next article, Bruce Hanington discusses the issue of human-centered research and its proper place in the education of designers. He provides a sophisticated discussion of an issue that is too often reduced to a simplistic polarized opposition of scientific methods and creative action. Hanington, a highly respected design educator with special expertise in the uses of a wide variety of methods and techniques of user research, reviews the many kinds of user research that can be employed in undergraduate as well as graduate design programs. His discussion of the balance of qualitative, ethnographic, and quantitative methods and techniques is a valuable overview of what is possible in introducing designers to the uses of research. The conclusion of this article is so timely in the development of the field that we repeat it here:

> It is not necessary for designers to become scientists, but they ignore the tenets of good science at their peril. Designers engaged in research need a comprehensive understanding of research encompassing the range of qualitative, ethnographic methods, as well as those of science and the experiment. This understanding is necessary to conduct good, credible research, to enhance the reputation of research in the design disciplines, to argue the merits of design research even in the context of critics from other disciplines versed in scientific pursuits, and to persuade others of the usefulness of design methods for their own use.

While Hanington's article focuses on design education as a preparation for professional practice, the next article, appropriately enough, focuses on the patterns of behavior displayed by designers at work. In "Shared Conversations Across Design," by C. M. Eckert, A. F. Blackwell, L. L. Bucciarelli, and C. F. Earl continue to mine the "Across Design" research project, a joint effort between Cambridge University and MIT begun in 2002. The current paper reports on key themes that emerged from the research, where small groups of professional designers from a diverse array of design professions were invited to discuss and report on one or another design project. The effort was not to discover general guiding principles of design practice but, rather, to understand how design manifests itself as seen from the perspective of those who take part in it. This project was discussed in "Witnesses to Design: A Phenomenology of Comparative Design" in *Design Issues*, Volume 25, Number 1 (Winter 2009). Both the method and the outcomes of this research project deserve careful consideration by educators and by others who seeks to provide theory about the nature of design. Once again, this article offers an insight that we are obliged to repeat here for its resonance with the observations of many others:

> Several of the designers stressed the shortcoming in design education, in that it does not set designers up for practically

running projects or businesses. One of the architects stressed that often the difference between a successful project and a failure lies in customer and client relationship. She has gathered much useful experience in the projects she is running, but felt that these skills were largely absent from design education. Similarly the engineers commented, that they were not trained to manage and lead people, but promoted for technical excellence. This was echoed by a furniture designer, who commented on the vital importance of learning how to interact with all people in design teams. For her it was critical for design students to learn to interact with the materials they use and the technicians who help them, rather than use entirely computer simulation.

Erin Friess finds the guiding issue of her inquiry in the uneasy relationship between the creative insight of the designer and the need to justify design decisions with empirical research. In "The Sword of Data," she briefly reviews the history of human-centered design before introducing the idea of rhetorical responsibility in creating effective and powerful design solutions. Discussing designer Douglas Bowman's account of his experience at Google, Friess observes that in some cases it appears that human-centered design has been replaced by empirically-centered design, with a loss of communicative power and a loss of the rhetorical resources of *ethos* and *pathos*. This article offers a sophisticated discussion of the place of rhetorical theory in understanding design and design practice, advancing a theme that may be traced back through the pages of *Design Issues* for many years.

In "White and Fitted: Perpetuating Modernisms," Kathleen Connellan discovers the issue of her argument by probing the connections among "white, modernism and rationalism in design," with an emphasis on power relations in a designed society. She observes: "'White and fitted' presumes a conformity and an anonymity associated with modernist standardization and rationalization in design." Can a person choose not to be "conscripted into normation (white and fitted)?" she asks. This is a thoughtful discussion that leads the reader through the perspectives of Foucault, Bourdieu, Daniel Miller, David Batchelor, and other authors, revealing "the ironies and tensions that are part of democracy and freedom; something much deeper than the color and form."

The next article is a departure for *Design Issues*, introducing an extended discussion of "functionality" from a philosophical perspective that is perhaps associated for some readers with engineering and technology studies. We include it in this edition of the journal because of its intrinsic interest as well as the opportunity for readers to explore a different way of thinking about design and a somewhat different way of building an extended argument about a design problem. The article, "Theories of Technical Functions," is

1 Anthonie Meijers, ed., *Philosophy of Technology and Engineering Sciences*, Vol. 9 of Handbook of the Philosophy of Science, ed. Dov Gabbay, Paul Thagard, & John Woods (New York: Elsevier, 2009).

by philosopher Peter Kroes, who served as associate editor of the eight articles compromising "Philosophy of Engineering Design," an important section of the recently published *Philosophy of Technology and Engineering Sciences*.[1] Functionality is a central theme in design theory and practice, but the nature of functionality is a complex issue. Kroes asks: "what does it mean to say that a technical artifact 'has' a technical function (or a functional property or feature)?" For the designer—whether an engineer or an industrial designer or another type of designer—the issue is pragmatic and practical. But for the philosopher who reflects on the nature of design, the issue is related to the notion of teleology—the study of purpose or, in Aristotelian terms, the final cause in poetics or productive science. In this paper, the first of two parts to be published in *Design Issues*, Kroes seeks to clarify "the general form of epistemic and ontological theories of technical functions." In the subsequent part, to be published in the next issue of the journal, Kroes discusses human intentions and technical functions.

Articles such as that of Peter Kroes remind us that design has become a subject of discussion in many other disciplines, each with their own evolving agenda and community of discourse. However, design itself has an evolving community of discourse, shaped as much by research and formal reflection as by professional practice and the challenges of education. This is the subject of the next article, "Doctoral Education in Design: Problems and Prospects," by Victor Margolin. The issue is "what is doctoral education" and "what is it for" in the context of design. Margolin reviews the history of doctoral studies in the field and then discusses what he regards as the central questions that must be addressed in establishing effective programs. As doctoral education continues to grow, this discussion is a fresh reminder of the need to establish firm foundations for our future work.

The next article is "The Idea of Socialist Design," by Fedja Vukic. It is an exhibition review of "Iskra: Non-Aligned Design 1946–1990," presented at the Architecture Museum of Ljubljana, Slovenia in 2009 and 2010. Exhibitions have long played an important role in the public perception and understanding of design, and the Iskra exhibition is no exception. In this case, it captures a period of central European development that is less familiar in the United States or other parts of the world. Iskra was an industrial company operating within the existing socialist system of Yugoslavia. Vukic's analysis is a useful discussion of some of the issues of creating "good" design in a socialist system.

The final article in this edition of the journal is a review article by Eduardo Vivanco, "Must They Mean What They Say?" It is an extended discussion of Aron Vinegar's *I AM A MONUMENT: On Learning from Las Vegas*. Though the subject is in part architecture, this essay casts a wider circle that we believe will be of interest to designers in all branches of the field. It also demonstrates how "reading" is a part of the field, whether in design practice or in

design research. This edition concludes with reviews of interesting books. Grace Lees-Maffei reviews *Judging a Book by Its Cover: Fans, Publishers, Designers, and the Marketing of Fiction*, edited by Nicole Matthews and Nickianne Moody. Brett Ommen reviews *Design for Democracy: Ballot + Election Design*, by Marcia Lausen.

Bruce Brown
Richard Buchanan
Dennis Doordan
Victor Margolin

A Natural Death Is Announced

Johann van der Merwe

We have, for some considerable time, been living in an era of unprecedented change, but only now are we apparently becoming aware of the paradigm shift overtaking our life on earth. We hardly need the admonishment of Al Gore's *An Inconvenient Truth*[1] to point out the material unsustainability of our manufacturing and consumerist base. We cannot afford to keep focusing on designed objects in isolation from the real problems of the world, and we cannot afford *not* to link the present manufacturing/consumerist base with the changes happening to and in society as a whole. We have to ask what these paradigm shifts are all about, and we will be required to give up our comfortable worldviews and to construct, to *design*, our new and better paradigms of thinking and living. We have to announce our own death in order to live.

However, we cannot do so from within the parameters of any of the design disciplines as we know them today because "*we*" are not enough. But before I bury the corpse of old-fashioned design (because its self-deception ignored the concerns of everyday life), let us pause a moment and reflect upon what could have been by asking this: W*hy do I see a discipline being buried and do I not see something else*?

> "We see what we do and do not see something else because of the *way* in which we look. And these 'ways' constitute … reality-generating mechanisms … [and each of these] schemes has its own characteristic set of tools and methods for answering the question. The methods [produce] a set of rules [that] are of a special type and, in contrast to many other reality-generating procedures, are always subject to revision in the light of new evidence."[2]

The way I see and the way I use design thinking to view the world has changed, initially because I discovered systems thinking and cybernetics, and recently, because our faculty had to change its character when it was subjected to an official merger process. In this article I unfold the development of a way of thinking in, with, and through design theory and practice first by briefly dealing with our new faculty structure and the renewed research direction(s) this afforded us, and second, by following the trail of emergent signs that seems to point to an *undisciplined* future development of design.

An Arranged Marriage

Because of the educational merger (between the Cape Technikon and the Peninsula Technikon) that resulted in the Cape Peninsula

1 I am well aware of the fact that many well-meaning commentators and scientists have made light of this effort to publicize a complex problem, but Al Gore has at least brought to people's attention that business as usual is not an option anymore, and that we are, indeed, living in an era of consequences.

2 John Casti, *Paradigms Regained* (New York: Perennial, 2001), 1–2.

University of Technology, our newly formed Faculty of Informatics and Design provided many unique research opportunities, both disciplinary and interdisciplinary. This merger also gave us a chance to reconfigure our collective research focus, and we soon realized that research into the relationship between knowledge and technology must also view "technology" as any human system designed to classify and organize the world. As a new research group, we have chosen a methodological framework based on the social construction of reality, since industrial, interaction, and information systems designers, in general, agree with qualitative researchers on the need for research data that is sourced directly from the emerging needs and concerns of a specific social group or market.

Engeström's[3] interactive design, based on activity theory, looks at both designed objects and people as embedded in the same dynamic social structure or activity system, and in this everyday practice, according to Nardi,[4] all human experiences are shaped by the tools, signs, and systems used by them. The closely related ideas embodied by actor-network theory (ANT) are depicted by Tatnall and Gilding[5] as not concentrating on the real differences between humans and machines (artifacts), but rather focusing on their interactions, viewing the social and technological "properties" as "network effects rather than innate characteristics of an entity." Based on the work of Latour and Callon, Tatnall and Gilding view the world as filled with hybrid and co-existing human and non-human entities, and they state that ANT can help resolve situations where these two entities cannot easily be separated and identified each in its own right, as if they exist in isolation from one another. This very brief background illustrates our thinking, leading up to the position we find ourselves in at the moment, and it also illustrates why we chose *designing interaction spaces for usability and usefulness* as our overall research focus.

However, realizing the need for something and knowing how to go about achieving your goals is usually not such a straightforward exercise in logic. To merge[6] two distinct disciplines such as design and informatics (also, confusingly, variously known as Information Systems, Information and Communication Technology (ICT), or Human Computer Interaction (HCI)) is not an easy matter, but to *not* find collaborative ways of working together would have been worse than short-sighted.

For the purposes of examining the concept of *undisciplined*, how is this helpful? Well, we could do worse than to ask this Lewis Carroll[7] question: "'Where do you come from?' said the Red Queen. 'And where are you going?'" Casti's (above) notion of reality-generating mechanisms, subject to constant revision, can be a useful guide to rethinking the discipline of design, and to reconsidering where the subjects you teach have their origins, and where they are going—in fact, to ask who their new friends are and what new influences they are bringing home, as I do in the next section.

3 Yrjö Engeström, *Activity Theory and Expansive Design* (http://projectsfinal.interactionivrea.org/2004-2005/SYMPOSIUM%202005/communication%20material/ACTIVITY%20THEORY%20AND%20EXPANSIVE%20DESIGN_Engestrom.pdf) (accessed June 3, 2010).

4 Bonnie Nardi (ed.), *Context and Consciousness: Activity Theory and Human-Computer Interaction* (Cambridge, MA: MIT Press, 1996).

5 Arthur Tatnall and Anthony Gilding, *Actor-Network Theory and Information Systems Research*, Document from Proc. 10th Australian Conference on Information Systems (http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.10.1265), (accessed June 3, 2010).

6 It would be more accurate to say that "merging" rather refers to an integration of our research capabilities at this stage because an officially curriculated and government-approved program that contains practical and theoretical elements of both design and informatics has yet to emerge. What makes this direction a worthwhile one to follow, however, is that the students (particularly in industrial design) are naturally drawn to products and systems that require the merging of both design and informatics knowledge.

7 To know where you come from is one thing, but to know how you did so is another, and besides, the fact that you are now *here* changes things in terms of where you thought you were going, since you can't get out of *here* by the way you came in. Lewis Carroll, *Alice's Adventures in Wonderland & Through the Looking Glass* (London: Octopus, 1978).

8 Should one ever be surprised? No methodology or discipline was ever immune to the directions taken by other ways of investigating the world. Bruno Latour (philosophy of science) believes the social is to be reassembled each time, Checkland (business administration) has society recreated by its members, and social constructivism agrees substantially with both. Bruno Latour, *Reassembling the Social: An introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2005).

Describing the Perceptible

Systems theory and cybernetics started life as systems of control, but with time and a shift from object to subject, these ways of understanding phenomena needed to be adapted to social issues, and the mechanical, hard approaches that could predict and control (i.e., an assembly line [think of Henry Ford's mass production environment]) became "soft" systems and "second-order" cybernetics: An investigation of *observed* systems became a method of inquiring into *observing* systems, or how humans behave. Surprisingly sounding like Latour,[8] Checkland[9] affirms that systems thinking is not a recipe but a way of looking at the problems of social reality we wish to tackle because "the latter is not a 'given' but is a process in which an ever-changing social world is continuously recreated by its members." On the other hand, a combination of cybernetics and systems thinking is what is needed in design education, according to a *Metropolis*[10] survey, seeing that this hybrid can provide "the very basis of sustainable ethics, aesthetics, and processes" in design.

Still, why would cybernetics change our faith in the structure and usefulness of a discipline? This methodology (a lens, *not* a method!) differs significantly from other methodologies used by *fully described disciplines* in that it appreciates the necessity of selecting from a wide range of approaches, plus a range of tools and corresponding methods, "that best fit—the type of system, the purpose and nature of the inquiry, and the specific problem situation."[11] The notion of design as a groundless field of knowledge[12] follows this same pattern, of necessity sourcing what it needs from many other contextually relevant fields of knowledge, as dictated by the specific design problem. Any discipline that can be depicted as "fully described" can only be seen as such because of the fully satisfied (and themselves "fully described") academics and researchers who keep this scaffolded edifice in place, in opposition to the evidence of social constructivism and the contemporary acceptance of a world in flux, including its bases of knowledge.

To more fully make use of new opportunities for learning, then, my constructivist design theory classroom uses cybernetics and systemic thinking as if they were one system, a combined way of seeing those things that have been in full view but "hidden." In other words, we seek ways to bridge the gaps between Jonas's disparate islands of disciplinary knowledge, and so realize what Polanyi[13] meant when he spoke of arriving at the edge of another reality, after crossing this gap. I regard cybernetics + design as a Nigel Cross–type *designerly way of knowing*, hence my use of the term cyberdesign,[14] both a *thing* and not any*thing* (cf. below); thus, this expanded, groundless field of possibility (making use of more than one field of knowledge) that allows us to see the world through Dooley's[15] "cybernetic lenses," with the consequent unsettling effect this perspective has on our unproblematic and safe way of

9 Peter Checkland is the "father" of Soft Systems Methodology; Peter Checkland, *Systems Thinking, Systems Practice* (Chichester: John Wiley, 1981).

10 Susan Szenasy, *Sustainable Pedagogies and Practices* (http://www.metropolismag.com/story/20040301/sustainable-pedagogies-and-practices), (accessed June 3, 2010).

11 Bela Banathy, *The Primer Project* (http://www.newciv.org/ISSS_Primer/asem04bb.html), (accessed June 3, 2010).

12 Wolfgang Jonas has long been a proponent of an undisciplined field of knowledge for and in design, since what we, as designers, need to work with looks like islands of potential knowledge floating in a sea of disciplines, but not yet connected to each other, that is our contextual responsibility; see Wolfgang Jonas, *The Paradox Endeavour to Design a Foundation for a Groundless Field* (http://www.verhaag.net/basicparadox/fartikel.php?ID=9&lang=e&version=lang), (accessed June 3, 2010).

13 Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (London: Routledge & Kegan Paul, 1962).

14 My use of the term cyberdesign is not meant to be associated with the manner in which unsuccessful (in human interaction terms) and badly navigable website design is foisted onto an unsuspecting user public. Trawl through the links to "cyberdesign" and you will find many promises from capitalist companies that your new website will outperform your rivals and beat them to the next goal post newly established by Moore's Law. The term mechanistic comes to mind. Cyber- was never meant to indicate beyond human and was never meant to replace our bio/meta/physical space of possibility with electronic control. I am demanding that this term, cybernetics (original Greek for steersman, and later, Latin, for governor), be reinstated so that the affordances of the term can, again, be allowed to aid our search for the humanly driven direction of design sustainability.

viewing knowledge and its relationship to the world. It was in this re-enlightened sense that I read the following definition of a discipline as seen through the lens of interdisciplinarity.

Parncutt,[16] in discussing what he identified as "controversial terms" (musicology, discipline, interdisciplinary), attempted to clarify what was meant by the term discipline, both in terms of a chosen field of knowledge (musicology) and in terms of what we could mean by using the term *inter*disciplinary, since the scope of any academic field of knowledge, surely, will obstinately transcend its own boundaries if defined too narrowly.

Reading a particular passage from his work, it struck me that the questions Parncutt was dissecting so carefully also applied to my own discipline, and, in fact, to all contemporary academic disciplines. If we are prepared to admit—even if simply for the sake of a rhetorical argument—that in our modern, connected world, with its dependency on information-sharing technologies, we would find it nigh impossible to keep any discipline as pure as we would like, then the term *natural hybrid* springs to mind. What Parncutt seems to be saying (my interpretation *and* transformation of his text) is that the academic study of any field, besides containing a core fidelity that differentiates it from other fields of study, contains yet larger areas of overlapping interest; thus, if researchers in both music analysis and music history discover that analysis is strengthened by history, and vice versa, then the core fidelity of music can only be enhanced by an interdisciplinary approach (while, of course, questioning the very meaning of the term interdisciplinary).[17] I would assume, at this point, that design researchers would not find it problematic if I call the discipline of design a *natural hybrid* and, given the potential of the Parncutt example, I transform this passage from his work merely by substituting the term *cyberdesign* for *musicology*, and the term *design* for *music*. In the result, then, we can begin to discern the *un*disciplined nature of contemporary design investigation.

Cyberdesign is design scholarship. It is the academic study of any and all design phenomena. It addresses the physical, psychological, aesthetic, social, cultural, political, and historical concomitants of design, design creation, design perception, and design discourse. It incorporates a blend of sciences and humanities and is grounded in design practice. It involves a wide range of non-design disciplines and corresponding research methods.

Our faculty's research group has found this integrative approach to be closer to the systemic thinking we surmised would be necessary to our merged research efforts—hence, our focus on the broad question of designing *interaction spaces*. We have to keep in mind the network effects of the interactions between the hybrid and co-existing human and non-human actors who populate our fields of investigation. We simply *have* to become undisciplined to deal with a blend of sciences and humanities, especially if we are willing to listen to non-design disciplines, as our Informatics staff have found to their

15 Dooley speaks of "The process of things being cybernetic together," and further describes the cybernetic way of seeing as essentially constructivist. Jeff Dooley, *Systems: The Science of How Things Are Connected* (http://www.well.com/~dooley/systems.html), (accessed June 3, 2010).

16 Richard Parncutt, *Definitions* 3rd Conference on Interdisciplinary Musicology, Tallinn (http://www.uni-graz.at/~parncutt/cim07/definitions.htm), 2007.

17 If music, analysis, and history are subjects integral to three independent disciplines, how is an analysis of music history possible? Or indeed the history of musical analysis? What happens to the "original" discipline when selected elements are used in such cross-border raids?

credit.[18] Our research efforts are based on the qualitative aspects of social reality, relying on a wide range of corresponding research methods, since our approach is largely interpretivist. I thus consider the concept of cyberdesign as a hybrid lens, an approach that, in finding its investigative level, continually generates undisciplined moves toward a coming-into-being of individual, as well as of "disciplinary" understanding. In the next section I question the viability of the old working definition of a discipline.

Unlicentious Freedom

Undisciplined: what do we think of when encountering this word? Would we not assume that the design researcher is *without discipline*, working in a disciplinary vacuum with no official support for whatever results may emerge, no official *network of opinion* against which to evaluate those results? How else is one to maintain rigor in design research and design education? What *is* this thing called a discipline, and why would we need one?

To put these questions in context, we have to take notice of the emerging scenario of a networked socio-technical society, one that requires undisciplined design theory and consequent practice, which is not to acknowledge that this is something unforeseen or even radically new. All designers are likely familiar with Simon's definition of design as changing existing situations into preferred ones, but how many believe Jonas's definition of design as a groundless field of knowledge? These two definitions, in combination, point to the necessity of an "undisciplined" approach to design's renewal because the notion of *preferred situations*, today, implies innovation and creativity in order to integrate (systems, manufacturing processes, technologies, etc.), and therefore to change (the designed artifacts we surround ourselves with), while the concept of a *groundless field* highlights, not a serious disciplinary vacuum, but the added advantage of being able to share in an array of foundations of knowledge.

In our modern and technology-scaffolded everyday lives, can we identify any designed object that is the product of a single discipline? Were the products of the Industrial Revolution based on single-discipline-restricted thinking? I can only assume that we have become so used to the perceived safety of a "discipline" that at all costs design must be *disciplined into submission*; the original meaning of the word discipline is thus enforced without being adapted or understood in modern terms. As Cohen[19] states, the hierarchical organization of a university *segments* fields of knowledge, but trying to teach within rigid disciplinary frameworks cannot satisfy the demands of a complex modern society. Increasingly, design has to deal with the networked society,[20] and after exposing itself to this natural hybridization, the next step has to be that (silo) disciplines will have to network as well. These are real world challenges, and in *Brighton 05-06-07* a number of international designers[21] ask that

18 It is worth mentioning that many of the authors in the information systems field have backgrounds in "non-design" disciplines (e.g., Terry Winograd [Mathematics & Linguistics], Bonnie Nardi [Social Sciences & Ethnography], Yrjö Engeström [Educational Psychology], Kalle Lyytinen [Economics], Ari-Veikko Anttiroiko [Public Administration & Local Government], and Bruno Latour [Philosophy & Anthropology]).

19 Eli Cohen, "Reconceptualising Information Systems as a Field of the Transdiscipline Informing Science: From Ugly Duckling to Swan," *Journal of Computing and Information Technology* 7:3 (1999): 213–219.

20 See Manuel Castells, *The Rise of the Network Society* (Oxford: Blackwell, 2000).

21 Anne Boddington, Bruce Brown, Jonathan Chapman, Rachel Cooper, Dennis Doordan, Ken Garland, Catherine Harper, Soonjong Lee, Victor Margolin, Jiri Pelcl, Oscar Salinas, and Jonathan Woodham, "Brighton 05-06-07," *Design Issues* 24:1 (2008): 91–93.

the design community take on the challenges confronting design today—something that sites such as NextD, Doors of Perception, and dott07 (the U.K. Design Council's designs of the time 2007), amongst others, have been doing for some time. We should rather ask the question, why does it take the design community, and design education, such a long time to change the course of this lumbering ship?

In the *Brighton* declaration, Boddington et al. are asking designers to seriously look at ways to transform society through the powerful influence of design. What *does* this mean? What will give us the freedom to maneuver within/without the present disciplinary boundaries, and yet retain the un-licentious regard for order that *rigor* promises? Move beyond personalities, move beyond vested interests, and we hear Boddington et al.; we hear the many voices that have sounded the call to change design in a fundamental way. Let's accept the necessity for change, and ask, "how do we change?" and change quickly. Perhaps we are obtusely refusing to ask our friends and cousins what they think. The following paragraph was suggested by and deconstructed from the work of Rees,[22] a theoretical astrophysicist.

In the new world of emerging (hybrid and interactive) design, there's always the thought-provoking possibility that the way we see design, and the way we use design thinking to view the world and our interactions with the world, are by now inadequate and should be changed. Design "as subject" is beginning to interest people more and more, as more designers and "designers" launch projects visible and accessible to the public. Design can be seen as asking fundamental questions dealing with the very world we live in and on—theoretical/practical, figurative/literal questions that allow people to focus on their interactions with the world itself (recycling/sustainability/reducing the carbon footprint), and to question their interactions with their fellow human beings (advanced information systems technology). Perhaps we should look on this general development as an extra motivation for change, and look to this willingness to explore our world and the way it operates for ideas for design's renewal. The modern world of interactivity that today's youth and tomorrow's designers find themselves inhabiting can provide them with the very reasons for studying an exciting and revealing design course—one that will help them to become designers-of-living-circumstances and explorers of what's *out there* and, to me more importantly, what's *in here* (below).

Another and very fundamental reason for design to change is that designers need to begin to understand how societies evolve to deal with the undoubted world of complexity we face every day. Too much of our thinking is still based on simplistic cause-and-effect perceptions, while the world has to cope with, for instance, the complex and networked causes and effects of global warming. Possibly the best reason for change is that the-world-out-there

22 Martin Rees, "An Ensemble of Universes," in J. Brockman (Ed.), *The Third Culture: Beyond the Scientific Revolution* (London: Simon & Schuster, 1995), http://www.edge.org/documents/ThirdCulture/x-Ch.15.html, (accessed June 3, 2010).

can be treated as a living laboratory that allows designers to explore the hybrid vigor[23] effect of design on the world and all its living ecosystems. By going out to the world and, in addition, finding innovative ways to bring that same world-in-motion to an educational setting, we can extend our knowledge, not of design principles per se, but of the reasoning behind human interactions.

Latour,[24] a sociology of science philosopher/anthropologist, regards texts, in his "discipline," as "the functional equivalent of a laboratory. It's a place for trials, experiments, and simulations." This same *laboratory* situation that Rees and Latour have in mind is fundamental to the intellectual activity of Castells,[25] since his version of social theory is a form of grounded theory based on a combination of theory/research. "That is, I literally cannot think without observing and understanding what's going on in the world," and that world is defined by "the interaction between the network society and the power of identity and social movements."

Bovina Sancta!

Ask not what a single discipline can do for the many, but rather ask what creating a socially situated problem space can achieve, inspired by multiple disciplines.

To talk about the big issue of a discipline—that very wide view of what we would call our knowledge in design—I need to step back and, as it were, look away toward who is doing the viewing, toward the individual. That would mean looking at both the networked effects of social change and design intervention, as well as the forming of identities *within* those networks. To understand what's going on in the world, as Castells says, is first to understand what's going on within your own world of identity formation, which in turn means looking at this interaction between the networked society and the identity of both the designer as individual and the designer as the person-within-the-discipline. This is a viewpoint that can help you "design" *and* re-assemble[26] your own new self, and the new "self" of your discipline, by exposing it to what it can become, in true Heideggerian fashion.

However, this is a vast topic of investigation, and in this article I can only focus on one necessary aspect that could help in our search for an *un*discipline: death. A personal identity, as much as a discipline, needs to die so that it can live; it needs to reassemble itself. A discipline needs to be undone for its own sake. According to Genosko,[27] Baudrillard regarded the concept of death as a theory of symbolic exchange, "an incessant cycle of symbolic reciprocity obliging the code to respond in kind." A cybernetic conversation, between observer and what is being observed (the knowledge contained in a discipline), has to include this element of reciprocity: Each partner has to give up something of its safe ground to reach out to the other; to understand is to lose, before regaining.

23 See The Hybrid Vigor Institute, "a global network of diverse thinkers from both public and private sectors who are comfortable with these kinds of boundary-crossing inquiries" (http://www.hybridvigor.org/about). (accessed 6/7/2010).

24 Bruno Latour (2005:149), op cit.

25 Manuel Castells, Interviewed by Harry Kreisler, *Identity and Change in the Network Society: Conversation with Manuel Castells* (http://globetrotter.berkeley.edu/people/Castells/), (accessed June 3, 2010).

26 Bruno Latour states clearly that there is no such "thing" as a society, except as an assembly of individuals, and even then they have to recreate or reassemble that thing they wish to name society; see Latour (2005), op cit.

27 Gary Genosko, *Undisciplined Theory* (London: Sage, 1998), 13.

I subscribe to the ontological phenomenology of Heidegger,[28] which deals with the ongoing and developing relationship between "the world" and the self—a relationship between the *out there* and the *in here* that uncovers the processes of *coming-into-being*. Not only does Heidegger not make any distinction between ontology and phenomenology, but he stipulated that its essence lies in possibility rather than actuality. As such, we may experience a *moment of recognition* of our *new* selves, and we can do so precisely because we do not and cannot uncover the processes of *coming-into-being* alone. It is these formative moments of recognition that take us forward, especially in design education, as long as we remember that the world of education, of the classroom, is but another aspect of the world *out there*. This world of people, designed objects and events, contains three elements that are always at work in our phenomenological and ontological development: the observer, the observed, and the results of that observation. It is the importance of this third element that we should focus on, instead of assigning too much relevance to the authoritative discipline, the observed, that is only one of the aspects of education. Baudrillard used theory as his instrument to undermine, to undiscipline, the disciplines. For him, the results of observation is this undisciplined and *inbetween* theory that refuses the absolute authority of the disciplines, and its very inbetweenness, its positioning of itself in this new *nomansland* between the disciplines, this act creates a refusal "to reconcile itself with the disciplines and the disciplines with themselves."[29]

For a design student, this taking of a position *inbetween* would normally be an impossible task, given the rigor with which any design discipline is deployed in too many design schools. The self is not encouraged to develop; indeed, it is discouraged to develop except as a carrier of "design knowledge," as a solver of linear design problems. To really see what a design discipline can become, we cannot afford to neglect the future architects of that discipline. Design students must be taught the meaning of learning, and how to deal with the relationships between the "I" and the "other."[30] It is for this reason that I use cyberdesign as a way of knowing, since this allows designers to act as transformative change agents. Emancipatory and transformative, as working ideas, must equally apply to the individual as much as to the basis of knowledge used for learning (i.e., the discipline). The rigour of new design disciplines should be redirected at the new associations between designer, user, technology, designed objects, and the contextual and social systems within which all these actors have to network. Rigor should be emphatic in nature when reassembling methodologies because of hybridization and integration (while asking what was rigor for in the first place?), but rigor, as a concept, should be scaffolded, given a backbone, in shaping network society alliances. The way to change anything (and how to know why a change is necessary) is the way shown by ontological phenomenology, or as Maritain[31] put it, this

28 Martin Heidegger, *Being and Time* (San Francisco: Harper Collins, 1962). See also Anne-Marie Willis, *Ontological Designing* (http://www.teamdes.com.au/whatsold.htm), (accessed June 3, 2010).

29 Genosko, (1998:4), op cit.

30 Normally, when the word "Other" appears in a text (capitalized) it is taken to refer to the philosophical "other", and usually a person taking up a socio-political position in contrast to yours. Here the "other" is used to refer to anyone and anything outside the self.

31 Jacques Maritain, *Art and Scholasticism*, J.F. Scanlan, translator (London: Sheed & Ward, 1939), 52.

journey or method of discovery "must be steeped in logic; not in the pseudo-logic of clear ideas, not in the logic of knowledge and demonstration, but in the working logic of every day [social reality], eternally mysterious and disturbing [in its complexity], the logic of the structure of the living thing."

The logic of the continual restructuring of the living "thing" constitutes the third element that education and design practice should focus on, and in this process a discipline becomes one part of that "living thing" that various philosophers have described as *das ding an sich* (things in themselves), or the essence of "things" in the world.

De Integro

The seeming confusion around the term *de integro* is rather revealing, I think. Most websites give the translation as *from the beginning*, while another professional site tells us that, in legal terms, it means *as regards the whole*. One version of the term *integrity*, of course, refers to the wholeness (of the structure) of something. Whatever the case may be, *de integro* set me thinking about the character of a discipline as the structure of a "living thing." What does this word/term *thing* refer to, and what makes it a *living* thing?

> *There ain't no rules around here.*
> *We're trying to accomplish something.*
> —Thomas Edison

A *thing* is a place, or, rather, a thing is an unfolding event, but since that cannot happen without the concept of place or space, a thing can be associated, at least, with place. In Afrikaans[32] a thing is a *ding*, and a *ding an sich*, despite Kant's opposition, *can* be known; the question is how we come to that knowing/understanding. In Afrikaans we say *hier kom 'n ding* ("I see a thing coming"), which of course does not refer to an object, but to an event that has yet to take place. How do you *take* a place? By positioning yourself, and it is this *positioning* that we can trace and describe.

A discipline develops by exactly this same means because, as a discipline, "it" is not alive but is constituted by the people who participate in its construction: it is socially constructed. As a constructed *thing*, or a *ding an sich*, a discipline should follow the human rules of *thingness*, or, in this argument, the rules of the *topoi*, as Latour[33] reminds us: Like the renowned Icelandic Thing, or the Athenian agora, topoi are both places and events (assemblies, or meeting places), but never objects; indeed, they are places where "new interpretations and revisions of history" take place.

Design has moved from objects to processes, but this in reality means it has moved to focusing on human interactions—with object-*things*, yes, but more importantly, also with topoi-*things*. What Latour had tried to do with the *Making Things Public* exposition is what

32 Described by Wikipedia as "an Indo-European language, derived from 17th century Dutch and classified as Low Franconian Germanic."

33 Bruno Latour, *Making Things Public: Atmospheres of Democracy* (http://www.bruno-latour.fr/expositions/002_parliament.html), (accessed June 3, 2010).

design researchers and practitioners should be doing with their discipline: *as* participants, they should realize that a renewal will entail a process that will "reassemble them and make them part of a totally new Thing." Design participants will have to redesign themselves *and then* their own discipline. To understand something, or to come to know this *ding an sich*, the self must realize that this *knowing* is only possible "through the subject surrendering itself to the idea as subject-object."[34] You cannot take part without jumping into the water, as it were, the way I was rudely taught to swim at age 9. A much bigger boy pushed me into the deep end of the municipal swimming baths, a very big and alien place, a watery environment that you have to make your body part of, surrender to, or drown. I died as a non-swimmer somewhat afraid of the water and was reassembled as a non-drowner; only with practice was I, later, able to more fully adapt to this alien watery environment and become a full participant, a swimmer, my new self. With hindsight, what I learned at that early age was how to redesign myself by phenomenologically rethinking my changed environment, one that suddenly changed from terra firma (familiar and safe) to terra aqua (unfamiliar and dangerous). As an individual I had to reassemble my "self" by surrendering to something *un*disciplined, and, perhaps not so surprisingly, this process still works today as an ontological/phenomenological reorientation of thought.

Not Last-Wording but Tagging

We, designers and users (that means just about everyone on the planet), can and should use every means at our disposal to make this world, this manufactured, socially constructed, and (let's be honest), for the most part, artificial world, a better place in which to be human. Design can change the world *and* transform society, but *we* are not enough since we, as just the small design community, cannot do so from within the parameters and confines of any of the design disciplines as we know them today. If we want to keep up with the contemporary flux in world affairs, we need to learn how to start conversations/dialogues, and learn how to listen to the other, *all of them*.

At the Cumulus Kyoto 2008 Conference, titled *[Cu:] "emptiness" Resetting Design–A New Beginning*, a declaration[35] was signed stating that all the people of the world live in interdependent systems for living, a veritable groundless and perfectly cybernetic field for design investigation. This declaration calls for the merging of the sciences and humanities, technology and the arts, and puts it clearly that design thinking places itself in the midst of this important paradigm shift and must therefore redefine itself. Findeli[36] has warned designers about this transformative paradigm shift, and he called upon them to "open up the scope of inquiry… and push back the boundaries of our system in order to include other important aspects of the world in which design is practiced."

34 Michael Eldred, *Heidegger's Hegel and the Greeks* (http://www.arte-fact.org/untpltcl/hegelgrk.html), (accessed June 3, 2010).

35 Kyoto Design Declaration, *Cumulus Kyoto 2008 Conference [cu:] "Emptiness"* (http://www.cumulusassociation.org/), (accessed June 3, 2010).

36 Alain Findeli, "Rethinking Design Education for the 21st Century: Theoretical, Methodological, and Ethical Discussion," Design Issues 17:1 (2001): 5–17.

The Kyoto conference gives us a valuable clue about how to do this—by listening to the other, which is hardly a conquering alien, but constitutive of the new self in possibility. Through the term *basho*, expressed as *emptiness* and *nothingness*, we are offered a cure for what ails us—this Western duality of mind and body. A very natural death is again announced because *basho* refers to more than simply the place where one lives, physically; it also denotes the space within which we can reassemble our relations with the other. We seem to be afraid of terms such as death, loss, emptiness, and we use negative expressions such as *deathly quiet*. I can, with gratitude, claim that I have experienced this last sensation in a positive sense, in a town like Arniston. Go past the turn-off to the cave (tourist attraction), down the last incline to the sea, round the bend, and over the line of dunes to your right. Suddenly, the roar of the ocean disappears, and it is *deathly quiet*. An all-encompassing presence has seemingly been withdrawn, although the ocean is still "there," except that I am now in a *place* where a silence (expressed first as a lack of the ocean's roar, this absence of a previous presence), an "emptiness," comes rushing in to fill the void. But now a new presence can be felt, one that represents all possibility. I learned to swim again, only this time in an *emptiness* that filled itself with an awareness of the other.

What I now realize is that I had found a *basho* that has never left me, this "whole paradigm of conceptions of place, field, topos, or context,"[37] and yet, as Cipriani further puts it, "we are less and less well disposed to 'empty' ourselves with care and consideration," because what we "fill" our consumerist lives with is truly and contradictorily empty. The absolute nothingness that is *basho* is not a *thing* (object) but a *thing* (space for reassembly), a relational principle, the so-called empty center that is a consequence of "the betweenness of selves in the world . . . one becomes a social self by rejecting one's individuality. The real self . . . occurs between these two contradictions."[38] This approach by the Japanese philosopher Watsuji is explained by Carter[39] as a loss of self that, in fact, reassembles the self as authentic, but only because the self can forsake its claim to independence from the other (read as the non-dual relational principle of *basho*).

I can only reiterate that our design discipline(s), and in fact, any other academic voice, can play the role of the other; indeed, our Faculty's research focus of *designing interaction spaces for usability and usefulness* depends on this happening. The process of the subject surrendering itself to the idea as subject-object (above) applies equally to the self *and* to a discipline, seen as the principle of *basho* and not as a definitive dictionary. Our renewed disciplinary resource for design thinking can resemble the aggregation of a tag-cloud phenomenon, a topos for design's (re)assembly. Using Web 2.0 technology as a modern prompt to achieve *basho*, this redesigned and real-time configuration for reassembly is possible because this new platform has "a gravitational core. You can visualize Web 2.0

37 Gerald Cipriani, "The Wrong Form of Emptiness in Global Design," *Cumulus Kyoto 2008 Conference [cu:] "Emptiness"* (http://www.kyoto-seika.ac.jp/cumulus/e_programs/oralpresenters.html#os1), (accessed June 3, 2010).

38 Robert N. St. Clair, *The Phenomenology of Self Across Cultures* (http://www.uri.edu/iaics/content/2004v13n3/02%20%Robert20w%20st.%20clair.pdf) (accessed 6/7/2010).

39 Robert Carter, *Watsuji Tetsurô* (http://plato.stanford.edu/entries/watsuji-tetsuro/), (accessed June 3, 2010).

as a set of principles that tie together a veritable solar system of sites that demonstrate some or all of those principles, at a varying distance from the core."[40] It seems to me that what O'Reilly calls the *architecture of participation* can also be achieved by means of this tagging phenomenon[41]—a place, topos, a transformative *basho* that will, by its very open-source cybernetic nature, help to *un*discipline design thinking, to the benefit of all.

40 Tim O'Reilly, *What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software* (http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html), (accessed June 3, 2010).

41 I do not refer to cloud computing in the business sense, but to an open source, interactive method to display and change/add to "data packets" (information) and the links between these. By now everyone is familiar with the "tag clouding" addition to a web site that displays "tags" or key words and terms in a static "cloud"—now imagine this as a virtual, four-dimensional cloud reacting to your interest in it, and doing so in a research-based, academic way in real time, as a full-blown image-and-text communicative tool for learning.

Relevant and Rigorous: Human-Centered Research and Design Education

Bruce M. Hanington

Introduction

The process of human-centered research and design rightfully demands the active consultation of people (users). However, the approach to research and the selection of methods employed in this process are a matter of frequent debate, particularly when placed in an interdisciplinary context. Bartneck, for example, presents a discussion of the evident conflict between designers and scientists within the human-computer interaction (HCI) community.[1] Designers often must answer to critics well versed in research methods, and this dialogue frequently centers on issues of rigor and relevance.

If the argument were simplified into extremes, two propositions would exist. Designers could ignore the critique of the established scientific (and social scientific) disciplines, highlighting a creative process that resonates with a strictly qualitative approach, small sample sizes, and anecdotal evidence, bolstered by an argument of relevance in connecting real-world research to real, human situations. At the other extreme, the design community could prescriptively follow the strategies and methods of science and the social sciences, recognizing the need for rigor in research, and understanding the necessity of employing established, replicable protocols, particularly when attempting to generalize outcomes or target design applications to large, diverse audiences.

However, holding such a polarized view of the world does little to advance the status of human-centered research and design. A more useful model is to understand all realms of the qualitative, ethnographic and quantitative experimental paradigms, and to seek balance in employing methodologies appropriate to the context and timing of research questions in the human-centered design process.

This paper will present an argument for equipping designers with such a balanced view of research for human-centered designing. The argument is grounded in several years of teaching project-based courses and studios in human-centered research and design, as well as consulting. The term "human-centered research and design" is used here to indicate an integrated process that includes active consultation with people (users) through various means of primary research during all phases of design development. Expertise is based

1 Christoph Bartneck, "Notes on Design and Science in the HCI Community," *Design Issues* 25:2 (Spring 2009): 46–61.

primarily on experience in industrial design, communication design, and interaction design. Furthermore, the author's perspective is informed through interdisciplinary interactions with students and professionals that commonly intersect with design, including those from human-computer interaction and the social sciences. Finally, it is acknowledged that the arguments presented here are primarily applicable to North American design curriculums, recognizing that schools in Asia, Europe, and elsewhere may present very different experiences and viewpoints, and that there are exceptions even within North America.

Science and Design: The Relevance of Rigor

The measure of good research often is associated with a rigorously scientific process, and this is justified for many areas of inquiry, such as medical science. Typically, the scientific method involves a process of identifying a problem or question, forming a hypothesis, testing the hypothesis by conducting an experiment or study with proper controls, checking and interpreting results, and communication.[2] The established research practices of the sciences and social sciences have built their credibility on an extensive history of disciplined methodology that attempts to isolate cause and effect, eliminate bias, maintain objectivity, and generalize findings. These hallmarks of scientific inquiry are important for designers to understand, and to strive for in practice when and where appropriate.

However, approaches and methods from non-scientific disciplines are equally valid, with particular merit for the purposes of design. Methods created by design or those adapted from other human-centric disciplines such as ethnography correspond to the requirements of design as a creative process, and in holistic content inclusive of relevant, emotive human concerns. For example, the intent of exploratory research in design is clearly exemplified in this definition of ethnography: "The study of people in their natural settings; a descriptive account of social life and culture in a defined social system, based on qualitative methods (e.g. detailed observations, unstructured interviews, analysis of documents)."[3]

Ultimately, there is benefit in utilizing a wide range of methods throughout the process of human-centered research and design. For example, design ethnography is appropriately employed in exploratory research, while other qualitative methods describe participatory design techniques, and experimental models of research often are most appropriate in product testing.

Excellence in the conduct and methods of research should be the goal of any researcher, scientific or otherwise. As Robson describes, a scientific *attitude*—being systematic, skeptical, and ethical[4]—will serve to elevate the conduct of research by any profession. Designers with a solid and broad understanding of research can successfully conduct their studies with a degree of rigor appropriate to the situation. They will understand the

2 There are several sources that provide an overview of the scientific method. See, for example, Centers for Disease Control and Prevention (CDC) at: www.cdc.gov. Complete reference at: www.cdc.gov/ncbddd/folicacid/excite/Files_in_use/steps_of_the_scientific_method.htm (accessed 6/15/2009).

3 Ann Bowling, *Research Methods in Health: Investigating Health and Health Services* (Buckingham: Open University Press, 1997).

4 Collin Robson, *Real World Research: A Resource for Social Scientists and Practitioner-Researchers* (Oxford: Blackwell Publishing, 2002).

principles of good research and learn when and how to reduce bias, maintain objectivity, produce replicable or generalizable results, and relate research findings to design outcomes. Equipped with the right knowledge and tools, they also will know what limitations are imposed on their studies when they depart from established principles, enabling them to communicate their research appropriately, and to answer their critics with authority.

Likewise, the sciences have much to learn from research of the humanities and arts, including design. On the spectrum of relevant and rigorous, qualitative methods and studies can legitimately claim success in the former realm, with well-founded criticisms of the reductionist research often conducted in the sciences and social sciences. Regardless of approach and methodology, designers are accountable for the research they conduct, and for advancing the credibility of the profession through the application of sound methods, and a clear articulation of their grounded, creative work.

Exposure: Research Methods and Design Education

Clearly, this comprehensive understanding of research has implications for the fundamental education of designers. Designers must be taught and must experience the underlying philosophy and methods of qualitative, ethnographic approaches, and of science and the experiment as a research strategy. Armed with this knowledge and experience, designers will be equipped to make informed decisions when planning and presenting their own research, and to intelligently critique research conducted by others, in the human-centered process of design.

While many post-secondary students gain exposure to research methods through a fundamental core of their education, this is not consistently true for designers. A student educated in the sciences, including computer science and human-computer interaction, or in the social sciences, frequently will be required to take courses in research methods and statistics, and to apply this knowledge in proposals and the actual conduct of experiments or scientific studies. Through their education and practice, students of these disciplines will learn how to design credible research studies, and to critique studies on the basis of methodology.

Design students, on the other hand, are rarely introduced to research methods in any formal sense; there are few required methods courses taught in design schools, particularly at the undergraduate level. The National Association of Schools of Art and Design (NASAD), responsible for accrediting a vast number of North American design schools, includes the following competency requirement under "Essential Competencies, Experiences, and Opportunities" for most professional baccalaureate (undergraduate) design degrees: "The ability to solve design problems, including the skills of problem identification, research and information gathering, analysis, generation of alternative solutions, prototyping and user

testing, and evaluation of outcomes."[5] While this implies that students must become generally competent in conducting research, it does not explicitly require courses or content in methodology. Requirements for research methods education are made more explicit in graduate and doctoral program descriptions.

Specific exposure to methods also varies by design discipline. Human-centered design is most evident in industrial design and, more recently, interaction design through well-established connections to human factors.[6] However, even traditional courses in human factors have a disproportionate reliance on testing of existing products or design outcomes, rather than on early user research to inform or inspire design directions, or participatory design for generative purposes. Graphic design has an even shorter history of experience with human-centered research; courses in human factors are significantly absent from most graphic and communication design curriculums.[7]

Differentiating Design: Research and the Creative Process

One reason why many design schools do not have explicit instruction in research methods is that there are few design instructors that have the experience or educational qualifications to teach research methodology. Furthermore, many programs, particularly those situated in art colleges, have a skill-based portfolio emphasis in their curriculum, and may be limited to two years for vocational student training. In the university or college setting, disciplines such as psychology and sociology offer suitable methods courses, yet these are not integrated into the creative process of design. It is critical that research be integrated into the creative process, and not isolated from it. This argues for a model of teaching that supports direct experience in research by design students, rather than relying solely on other disciplines for research support.

A successful model of education employed at Carnegie Mellon University is process-oriented, defined by the integration of methods and creative development through specific phases of exploratory, generative, and evaluative research and design. Each phase is generally characterized by approaches, while not limited by specific methods. As indicated in Figure 1, the three phases blend in their transitions, and are each iterative in nature.

5 National Association of Schools of Art and Design, *NASAD Handbook 2009–2010* at: http://nasad.arts-accredit.org/site/docs/Handbook/NASAD_Handbook_2009-2010.pdf. (accessed 6/15/2009).

6 Brad Weed, "The Industrial Design of the Software Industry," *SIGCHI Bulletin* 28:3 (July 1996): 8–11.

7 Bruce Hanington, "Human Centering Design across Dimensions," *Proceedings of the Design Research Society DRS conference, Wonderground* (2006).

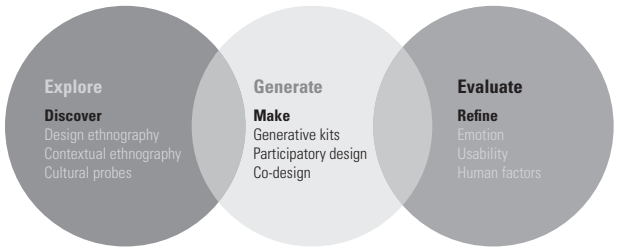


Figure 1
Model of Design Research

The model has been used successfully for several years at the graduate level to frame a required course in research methods, linked with a studio project. The model also has been used a limited number of times at the undergraduate level in a human-centered research and design project course. In the following sections, the three phases of exploratory, generative, and evaluative research will be presented, along with a discussion of corresponding research methods and approaches including commentary on the necessary balance of ethnographic and scientific, qualitative and quantitative, relevant and rigorous research in the process of human-centered design.

Exploratory Research: Ethnography and Design

Within exploratory research, students develop questionnaires and conduct surveys, observe and talk to people, and shop for and try products. Methods are typically ethnographic in nature, and may include participant observation, artifact analysis, photo and diary studies, contextual inquiry, cultural probes, and other methods designed to sample human experience. Exploratory research culminates in a comprehensive understanding of the people and the area under investigation, and ideally results in implications for design.[8]

Even the most basic of methods included in this phase of research warrants instruction and experience. For example, surveys, questionnaires, and interviews must be well-designed, not only to achieve good response rates, but also to avoid asking leading questions, to minimize bias, and to ensure that the right research questions are being asked in ways meaningful to participants and researchers.[9]

It also is important to distinguish between ethnography as practiced by professional ethnographers or anthropologists, and design ethnography. While true ethnographers may immerse themselves in a culture or specific population for months or years at a time,[10] designers are more typically seeking adequate information from time-sampled observations of behaviors. For example, designers conducting immersive research may "sample" real experiences of participants through contextual inquiries, combining observations and conversational interviews, analyzing video footage captured during key moments of behaviors or interactions, or relying on self-report diaries and photo journals provided by participants.

The largely qualitative nature of exploratory research, and the adaptive versions of true ethnographic methods by designers, should not be viewed as an excuse for lack of rigor in this phase of research. As Fetterman states in his description of ethnography:

> Ethnographers are noted for their ability to keep an open mind about the group or culture they are studying. This quality, however, does not imply any lack of rigor. The ethnographer enters the field with an open mind, not an

8 Bruce Hanington, "Generative Research in Design Education," *Proceedings of the International Association of Societies of Design Research IASDR Conference* (2007).

9 JoAnn T. Hackos and Janice C. Redish, *User and Task Analysis for Interface Design* (New York: John Wiley & Sons, 1998).

10 Margaret D. LeCompte and Jean J. Schensul, *Designing and Conducting Ethnographic Research, Ethnographer's Toolkit Vol. 1* (Walnut Creek, CA: Altamira Press, 1999).

> empty head. Before asking the first question in the field, the ethnographer begins with a problem, a theory or model, a research design, specific collection techniques, tools for analysis, and a specific writing style.[11]

Designers are equally accountable for the conduct of good quality research and, in particular, for being systematic in their approach to information collection, recording, synthesis, and analysis. As with surveys and questionnaires, the design of journals or other cultural probes must be carefully considered for collecting the necessary information while respecting ethical boundaries, and for reducing bias through carefully constructed prompts.

Furthermore, understanding the context and limits of this type of research is critical. Based on smaller samples and conducted for an appropriate level of design inspiration, results should not be communicated in deceptive forms, nor misconstrued as generalizable or presumed to have replicable findings. For example, exploratory research based on the input of five or six participants should not be presented using percentages or statistical results, and should be clearly identified as sample evidence designed to provide baseline familiarity with a topic area for subsequent phases of design.

Generative Research: Participatory Design

Generative research opportunities are set by the exploratory phase, and may include similar methods. Diaries, with or without a photographic or imaging component, may be favored and often are issued as an advance probe or instrument to sensitize participants to the topic area and prepare them for participatory exercises. Participatory methods may include toolkits such as card sorting with images or text, collages, cognitive mapping or other diagramming exercises, experience drawing, and flexible modeling or "Velcro" modeling. Generative methods may be projective, designed for participants to express feelings and desires, or constructive, providing a configuration of design components for physical concept ideation.[12]

While this phase of research is rightfully perceived as qualitative, elements of rigor and good practices of systematic investigation are no less critical. In fact, sophisticated models of analysis for generative research do exist, such as multidimensional scaling, to reveal patterns in images and words chosen for collages and diagrams.[13] However, analysis more typically involves simple occurrence counts of images or toolkit elements, and content analysis of transcripts recorded during participant presentations of creative exercises.

To ensure that research methods are well-planned and executed, it is necessary to develop a research protocol, and to conduct pilot tests of research sessions. A thorough protocol will detail, among other things, planned activities and samples

11 David M. Fetterman, *Ethnography Step by Step*, 2nd ed. (Thousand Oaks, CA: Sage Publications, 1998).

12 Bruce Hanington, "Generative Research in Design Education," *Proceedings of the International Association of Societies of Design Research IASDR Conference* (2007).

13 P. J. Stappers and Elizabeth B.-N. Sanders, "Generative Tools for Context Mapping: Tuning the Tools" in *Design and Emotion: The Experience of Everyday Things*, eds. Deana McDonagh, Paul Hekkert, Jeroen van Erp, Diane Gyi (London: Taylor & Francis, 2004): 77–81.

of participatory toolkit materials, number and description of participants and how they will be recruited, roles of researchers, how sessions will be documented, and methods of analysis. Pilot testing the protocol will provide a final check of materials and time demands, interpretation of instructions by participants, and possible outcomes. Furthermore, a well-developed protocol will ensure a measure of consistency across research sessions conducted by different designers.

As with much qualitative research conducted with a limited number of participants, generative methods often are criticized for the meaningfulness of information collected, and for the extendibility of results. However, designers well trained in research methodology will be able to present a well-documented systematic approach, appropriately contextualizing the research as guiding information for design inspiration, not generalizable results, in the process of concept development.

Evaluative Research: Testing Design

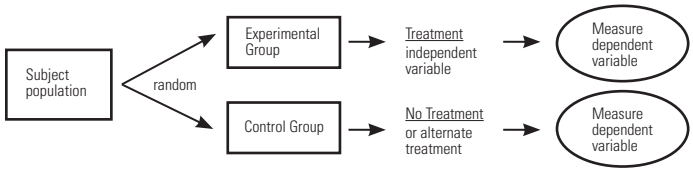
Evaluative research, as one might expect, attempts to gauge human expectations against the designed artifact in question, determining whether something is useful, usable, and desirable.[14] The methodology may be tightly controlled, corresponding to an experimental model of lab testing, or may involve flexible evaluations by people using products or prototypes in context, or some combination thereof.[15] The protocols of science are common here owing to the nature of questions, more specific now that they may be directed at specific, existing design proposals or artifacts, and also because there is a greater history of "testing" established through human factors in design.

Given the predominance of the experiment as a research strategy in evaluation research, this is where designers are most likely to need exposure to some of the critical features of scientific research. First, it is important to understand what it means to conduct an experiment, and to not misuse the term. While it is beyond the scope of this paper to fully detail the elements of an experiment, Figure 2 illustrates the essence of this approach to research, including key terms likely to be encounterd.

14 The phrase "useful, usable, desirable" was first coined by Elizabeth B.-N. Sanders, and has since been in popular usage throughout design research. See Elizabeth B.-N. Sanders, "Converging Perspectives: Product Development Research for the 1990s," *Design Management Journal* 3:4 (Fall 1992): 49–54.

15 Bruce Hanington, "Generative Research in Design Education," *Proceedings of the International Association of Societies of Design Research IASDR Conference* (2007).

Figure 2
The Experiment as Research Strategy



Regardless of whether or not the designer is conducting a true experiment, there are features of this established model that translate to all good practices of research. For example, an operational definition is necessary to define exactly what is being measured. Is a "better" input device, for example, defined by performance speed on a particular task, or ergonomic comfort? Threats to validity are merely anything that can affect the ability to state conclusively that outcomes (dependent variables) are the result of the manipulated (independent) variable, or the particular item under study (for example, a specific design element). Validity, therefore, argues for consistency in research design—for example, if testing a digital interface, the researcher must keep the computer platform and operating system the same in every test. Similarly, research protocol must be explicitly spelled out so that each test is conducted in a similar manner, whether by the same researcher each time (intra-rater reliability), or by several different researchers (inter-rater reliability). In comparison tests, understanding how exposure can affect outcomes may require that some participants experience design "A" then "B", while others have the reverse presentation (AB | BA) to counteract a potential "order effect."

While these conditions may not be applicable in every design evaluation, once again, adherence to or departure from established principles of research should be well understood so that selected methods and procedures are conducted without sacrificing research integrity, and are appropriately portrayed with convincing authority. This not only lends credibility to the evaluation research (testing) of the design at hand, but ultimately to the discipline of human-centered research and design.

Conclusions

It is not necessary for designers to become scientists, but they ignore the tenets of good science at their peril. Designers engaged in research need a comprehensive understanding of research encompassing the range of qualitative, ethnographic methods, as well as those of science and the experiment. This understanding is necessary to conduct good, credible research, to enhance the reputation of research in the design disciplines, to argue the merits of design research even in the context of critics from other disciplines versed in scientific pursuits, and to persuade others of the usefulness of design methods for their own use.

To reach this goal, designers need explicit, quality education and experience in research methods. Ultimately, this argues for the qualification of key design faculty to teach methods and guide projects in human-centered research and design, and for specific courses to be integral to design curriculums. While research education currently is more common at the graduate level, undergraduate students also should have required courses and project work in research methods. Various models promoting

an integrated approach to research methods education within the creative design process should be explored and evaluated for effective translation to successful design practices. One such model has been presented here in an effort to reinforce the need for a comprehensive understanding of research in design, and ultimately to advance the credibility and outcomes of responsible human-centered design.

Shared Conversations Across Design

C. M. Eckert, A. F. Blackwell,
L. L. Bucciarelli, and C. F. Earl

Introduction

Design is an ubiquitous part of human life, from mundane, day-to-day activities to the most sophisticated concerns of society. Yet it is generally studied from specific disciplinary viewpoints, where a field develops strongly focused academic traditions to meet the needs of that field. For example, engineering design research places significant emphasis on prescribing how complex design processes should be carried out;[1, 2] architectural research is greatly concerned with the creation of design ideas;[3, 4] product designers are concerned with generating and meeting customer needs;[5] fashion designers are interested in the cultural context of their products.[6] This characterization of different interests in different fields is neither rigid nor exclusive—there is significant overlap between the interests of particular fields. Nevertheless, it draws attention to a fragmented picture of design as a whole.

This paper is concerned with the experience of being a designer and doing design, regardless of the discipline in which the designer works. We want to draw a rich picture of what it means to be a designer by comparing design practices across projects and design domains. Previous researchers have more often aimed to establish general criteria by which core concepts in design research and theory-making can be related to designing and designs.[7, 8] They have compared design activities in order to define the general principles across all of design. Other work does not always set out explicitly to be generic but does so by implication when careful analysis of design instances leads to general principles of design, as in the general paradigm of the reflective practitioner, which was derived from a detailed study of conceptual design in architecture.[9]

By contrast, our aim is to consider the patterns of behavior that designers display across a variety of fields. Here we may find that while professional concerns, such as the need to meet customer requirements or general market trends, are often the same, their manifestations can be very different. Thus, we have developed a research method that brings to design research the benefits of phenomenological analysis, emphasizing comparison of personal experience rather than trying to describe truths that are independent of any person. As described in a previous paper,[10] we ran a series of

1 G. Pahl and W. Beitz. (1996), *Engineering Design: A Systematic Approach*, ed. Wallace, K. (London: Springer).

2 K.T. Ullrich and S.D. Eppinger (1995), *Product Design and Development* (New York: McGraw-Hill).

3 D.Schoen (1983), *The Reflective Practitioner: How Professionals Think in Action* (New York: Basic Books).

4 B. R. Lawson (2006), *How Designers Think*, 4th ed. (Oxford: Architectural Press).

5 D. Norman (2002), *Design of Everyday Things* (New York: Basic Books).

6 G. B.Sproles and L. D. Burns (1994), *Changing Appearances* (New York: Fairchild Publications).

7 T. Love (2002), "Constructing a coherent Cross-disciplinary Body of Theory about Designing and Designs: Some Philosophical Issues," *Design Studies,* 23:3, (2002): 345–361.

8 I.M.M.J. Reymen (2001) *Improving Design Processes Through Structured Reflection: A Domain-Independent Approach*, Ph.D. thesis, Technische Universiteit Eindhoven, Eindhoven, The Netherlands.

9 D.A. Schön (1983). *The Reflective Practitioner.*

10 A.F. Blackwell, C.M. Eckert, L.L. Bucciarelli, and C.F. Earl (2009), "Witnesses to Design: A Phenomenology of Comparative Design," *Design Issues,* 25:1 (Winter 2009): 36–47.

research workshops, at which small groups of expert practitioners from very different design disciplines were asked to present, discuss, and compare project case studies typical of their various types of design.

Being exposed to this variety of experience allows designers to better understand their own behavior through comparison, reflecting on strengths and weaknesses, as well as gaining new understanding of their design practice as reflected by the mirror of others' professional work. None of the disciplines is seen as normative, and none is used as a benchmark. The goal is not to describe what design "is" in a definitive and generic sense, or indeed to prescribe how design "should be," but rather to understand how it manifests itself from the perspective of those who take part in it. In the remainder of this paper we report on key themes that emerged from these workshops, illustrating the diversity of responses that can occur to the many common issues and challenges. This is not an exhaustive comparison between design domains or even an exhaustive list of potential design behavior, but an illustration of how the professional experience of design can vary.

Preparation

The Across Design project was established under the auspices of the Cambridge-MIT Institute, with additional collaboration from design researchers and educators elsewhere. It consisted of a series of six research workshops between 2002 and 2004, each including between three and five professional designers, who were invited to report on a particular project of their choice. Each informant had at least ten years of design experience (in one case of a new technology, only five), although the majority had twenty or more years of professional experience. Rather than well-known "stars," we sought to invite experts who were well respected by their peers without being affected by media attention. The theoretical motivation, facilitation procedure, and analytic approach are described in our previous paper, "Witnesses to Design."[11]

Although our research team started from research backgrounds in clothing, architecture, typography, engineering, and software, we recruited designers from as many fields as

11 A.F. Blackwell, C.M. Eckert, L.L. Bucciarelli, and C.F. Earl (2009), "Witnesses to Design: A Phenomenology of Comparative Design," *Design Issues,* 25:1 (Winter 2009): 36–47.

Table 1 (below)
Participant Domains

Oct 2002 (UK)	Automotive engineering[e], software[s], health, transport, and consumer products[a], architecture/urban planning[aa]
April 2003 (UK)	Civil engineering (structures)[e], websites[mm,] automotive styling and consumer products[a,] drugs/pharmacuticals[ss]
July 2003 (UK)	Graphic media[mm], aerospace engineering and senior management[e], documentary filmmaker[a]
Nov 2003 (UK)	Artistic fashion[a], medical devices[s], food[ss], packaging[a], architecture[aa]
Jan 2004 (USA)	Architecture[aa], technical fashion[a], automotive engineering and senior management[e]
July 2004 (UK)	Electronic products[e], furniture designer[a], software[s], course design[mm]

possible. Each workshop tried to provide a balance between disciplines, in particular between artistic and technical designers. We also tried to stretch the boundaries of what might typically be considered design—for example, by recruiting a drug designer and a documentary filmmaker. Table 1 shows an overview of the workshops and their range of participants.

At the outset of the project, research team members created their own framework for comparison, drawing on individual research interests and experiences. This framework formed the basis for agreeing on important research topics among ourselves, as well as serving a wider role through its potential to help negotiate common terminology among researchers coming from different countries and communities. This common understanding among the research team members was communicated to participants through illustrative open questions that were topically grouped (as in Figure 1) and a graphical overview of the areas of concern (Figure 2). However, the workshop briefing material emphasized that these were not to

Figure 1 (right)
Example Question in the Design Framework

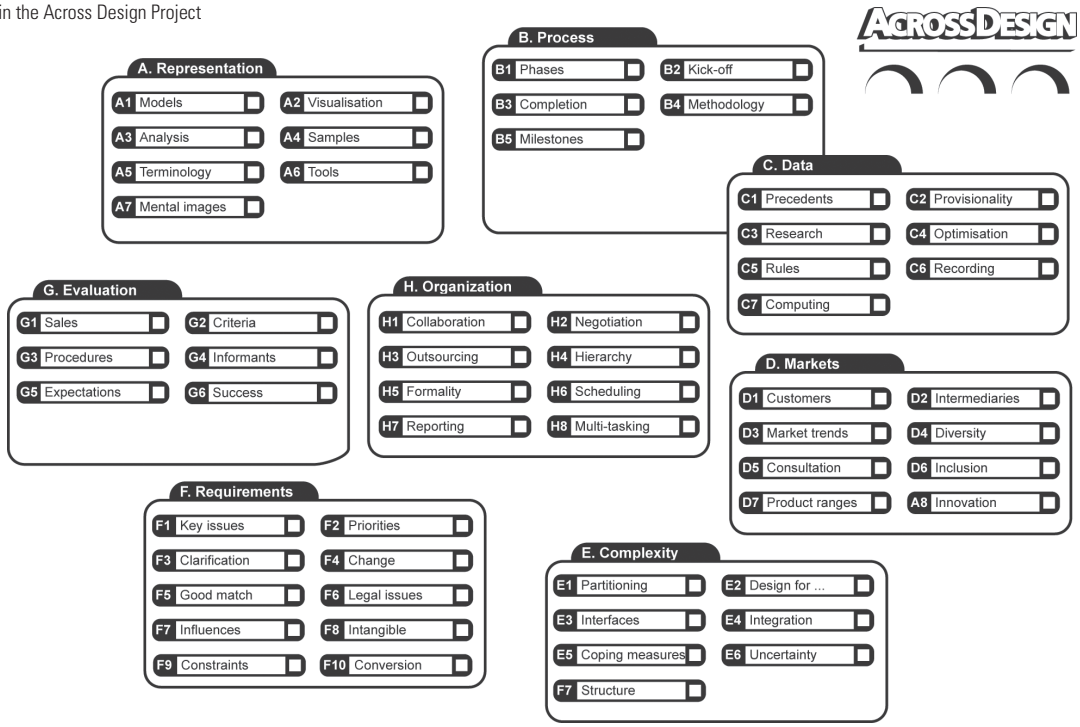
A1 Models

What kind of temporary or evolving products (e.g. sketches, models, or functional prototypes) get created in the course of your design?

What do you call these intermediate representations?

Why do you use a particular representation at a certain stage in the design process?

Figure 2 (below)
Categories of Features of Design Used in the Across Design Project



be taken as constraints or as questionnaires to be completed in an exhaustive manner but as a guide to identifying what we might be interested in. As a result, participants structured their contribution according to the case studies they chose, in the style of their own particular discipline.

The findings from this reflective process by participants, followed by transcript analysis and further interviews with the research team, have been rich and diverse. In the remainder of this paper we present a number of recurring issues, illustrating them by considering ways in which the same, sometimes surprising, phenomenon is played out in different fields. We highlight the importance of these particular issues to designers from a wide range of different domains, while illustrating the range of different ways in which design processes can be expressed.[12]

Shared Understanding of Practice

The most striking finding through all six of our research workshops was the recognition by our participants of the commonality in their own experience. This uniformity was not previously expected (and therefore preconceived), arising from the treatment of all design as a generic abstract endeavour. On the contrary, we observed appreciative surprise among our informants as they recognized the degree to which the experience of other professionals, who they might not have considered as natural peers, did in fact extend across design. They all saw themselves as designers and recognized the others as designers. For example, in one workshop we brought together the chief engineer for conceptual design of a jet engine, a documentary maker for the BBC, and a graphic designer. The jet engine designer has a wholly technical background, managing a large team of engineers working on many different engines in parallel and interacting with several engine projects comprising hundreds of experts having very specific knowledge. The documentary maker pulls his team together for each film, and he works on a variety of different topics in very varied environments, including both filming on location and working with rich archive material. The graphic designer works on her own, carrying out short projects for return clients. On the surface they have different tasks and different lives, but they all recognized the common challenges they faced in getting a project out on time: getting the right brief from the clients, coming up with good ideas when you need them, coordinating the input of the people they worked with, etc. They were inspired by the way each of the others worked, the structure of the engineering processes, the strong personal links of filmmaking, and the exhaustive solution searches of the graphic designer. They could easily abstract the experience of others to a level that was useful for their own reflective practices.

It was striking that none of the designers seemed to have a problem understanding their colleagues' presentations. Terminology

12 This article does not offer a fully comprehensive description of the project findings. Further and complementary material will appear in a forthcoming book, to be published by MIT Press. The book describes in greater detail the Across Design project and focuses more specifically on the drivers that result in differences of behavior between industry sectors.

was rarely a problem, and meaning was clarified easily when questioned. Even if they were unfamiliar with the domains and thus the terminology, the context disambiguated the details, and participants at least had a subjective and expressed comprehension of each other's major concerns. For example, the graphic designer talked about generating "thumbnails"—small, quite rough sketches—to explore her solution space. The meaning of the term was fairly clear from context, somebody asked a clarifying question, and the workshop moved on.

Agreeing on the Criteria of Good Design

We were surprised at the criteria by which designers evaluated their work and motivated their professional activities. For many, recognition by their community of design peers is what motivated them. Some acknowledged that they were fortunate to work in a field where it was possible to make a living while maintaining this professional integrity. The television documentary maker was accustomed to working for the publicly funded BBC, where projects were traditionally funded by a process of patronage. Viewing numbers for first screening, peer recognition, and in the case of controversial work, influence over opinion-formers appeared to be a far more significant concern than the market concern of whether his work was viewed by a large audience on repeat screenings. One of the architects referred to recognition from professional lobbying groups, such as the influential Commission for Architecture in the Built Environment (CABE) in the UK. Although he took personal pride from seeing people living happily in his projects, this quality aspiration was difficult to measure or quantify. Architects are often accused of creating award winning but uncomfortable buildings. For them making a statement through their buildings and being recognized by their peer group is extremely important. A furniture designer at our workshop took this to extremes and told us not about a chair that you could sit in, but about a series of chairs created for the Milan furniture fair that were witty commentaries on classic chairs—but not pieces that could be sat on. This exhibition was a personal and public exploration of the notion of a chair.

Conversations with Materials and Tools

For many of our participants, design was a physical interaction with the materials and tools they worked with. They enjoyed the direct interaction and were in many ways inspired and guided by the properties of the material and tools, both of which provided opportunity as well as constraints. All participants wanted to use their materials to the best advantage and the greatest potential, but they also wanted access to those materials that provided freedom to realize design concepts or requirements. This desire was expressed by designers in all domains, even though more artistic designers had more freedom in exploring what their materials afforded.

For example, the participant who is a lighting and furniture designer works in a very hands-on way. For her, designing is a genuine conversation with the material, a back-and-forth exploration of what she wants from the material and what the material "wants" to give her. In her early career she made little paper models of lampshades, just by folding up pieces of paper. Now she makes chairs out of different materials to explore what the material can give her and how people respond to the material.

Fashion designers often model garments on a stand. They physically drape fabric of the right weight over a dress dummy and pin it into shape. They can endlessly change it until they have reached a shape that they are happy with, inspired by or responding to the fabric. In the case of the fashion designer at our workshop, she used this method to make an evening gown out of black plastic rubbish sacks as a commentary on the wasteful nature of our society.

The graphic designer's materials are fonts and pictures. She uses a structured process of selecting them to provide herself with the constraints that she needs to be creative in her process.

The engineers, working in large teams, reported maybe the least direct interaction with material, although they were intimately concerned with designing for and within the capabilities of available materials. The jet engine designer brought a very sophisticated fan blade to his workshop. This blade had been produced in a novel way and was both unusually light and exceptionally strong. He was no less intrigued and challenged by the material than the furniture designer.

The TV documentary film director works with found materials. He looks in archives for the right footage and tries to film people engaged in activities that express his story idea. However, he is also responsive to what he sees, and he develops his emerging story around new material.

The food designer reported on her team's spending a few days in the kitchen experimenting with different ingredients to get the right texture for ice cream, and the laborious process that followed to work out how to produce this texture on a commercial scale and in a way that is safe throughout the product life cycle through production, distribution, and consumption. For this food designer, cooking is a way of sketching out ideas, of externalizing and sharing vague concepts that could not be expressed in any other way.

Many of the other designers sketch on paper or a computer. Architects generate sketches to capture and develop their own ideas through the entire process but are very well aware of the personal nature of many sketches. They produce different sketches, often more detailed or computer rendered for interactions with customers who might be misled by the ambiguous nature of sketches. Sketching is not limited to those domains that generate visual or physical

products; software designers, for example, also sketch very frequently. They express the structure of their programs and their processes through sketches and share them with each other through these visual depictions. The participant who designs jet engines told us that he encourages engineering staff to work quickly with a pencil, to help address the challenge of turning an analytic problem statement into a mechanical solution. These engineering sketches are depictions of relationships and functions, as much as of physical embodiments.[13]

Relationships with the "Customer"

The professional designers we met in Across Design have surprisingly little contact with the end users of products they design. The design brief might be founded on market research, including surveys of the eventual end users or customers, but among our participants the designer rarely had a chance to meet those users. Exceptions occurred and seemed to be most likely in the large consumer, food, or domestic product manufacturers, where designers have the opportunity to join focus group sessions. In the case of packaging for detergents, for example, formal user trials of the designs were an integral part of the design process. In the case of a "skunkworks" undertaken outside normal rules and processes of the company for the conceptual design of a car re-launch , the unusual enthusiasm of the designers made it especially appropriate to initiate contact with other enthusiasts outside the company, inviting participation from members of the product owners' club. However, in the reports of most of our participants, it appeared more common for fashion, design trends, or conceptual visions to drive design than direct acquaintance with user needs. The graphic designer described how, when commissioned to create a brochure with an "edgy" aesthetic for a teenage audience, she consulted her graphic design students as more informed representatives of youth culture, but they did not formally evaluate her design. Other designers projected their own vision onto anticipated markets.

If the designer works on behalf of the same client over the course of multiple product cycles (perhaps as a permanent employee of a manufacturing company), then a closer working relationship is likely to develop between design and marketing departments as products are refined in response to market evolution. These relationships generally bear fruit in industries where product designs are repeatedly revised over periods of many years. A diesel engine designer was able to report a highly developed organizational structure of this kind. His market data included feedback on product reliability and lifetime operating costs, allowing his team to make incremental improvements that would benefit future users. However, the end users of his products are still once removed. Diesel engines are sold to vehicle manufacturers, who gather performance and maintenance data from their customers. This statistical data,

13 A longer discussion of sketching in different design domains will be available in the article, "Sketching Across Design Domains" by C.M. Eckert, A.F. Blackwell, M.K. Stacey, and C.F. Earl, accepted for publication in *Visual Communication.*

rather than contact with users, is what drives the design process. This particular designer spends much of his time dedicated to the collection, organization, and distribution of this data to direct the design process and inform the inevitable trade-offs that take place as design progresses.

Customer relationships are presently changing for some complex products, such as aircraft engines. Rather than the product being owned and maintained by the customer after sale, it is now owned throughout its lifetime by the manufacturer, who leases performance capability to the customer at a negotiated rate. The risk of ownership is thus shifted from the customer to the manufacturer, and the manufacturer takes over many of the concerns that were formerly the customer's. This shift from product to service has triggered a new way of thinking among manufacturers and designers.

The working relationship between designer and design client can become even more complex in fields that combine large-scale financial or legal processes with substantial demand for creative innovation or an individual response to specific requirements and conditions of use. In the field of architecture, these factors, which can conflict, are segregated into separate project phases. Our participants described how large projects often start with a design competition, where several design firms submit preliminary plans to be judged by a client or the client's representatives on a competition panel, but none of the designers have much direct interaction with the client. The winner of this creative competition is then expected to form a relationship with a construction or development company, after which the two work together to develop detailed plans and cost estimates. As the construction phase of the project approaches, the client is transferred from the architect to the construction firm. In a reversal of roles, the architect becomes the contractor of the construction company.

Another of our participants, a civil engineer with close links to a famous architectural practice, described a visionary design for a city train station, conceived to express the creative and innovative image the city wanted to express, with dramatic sweeping curves spanning a huge area of ground. This grand concept had captured the imagination of the clients, who proceeded in confidence that the vision could be achieved. However, only some time later was the engineering question of how this building would be structurally attached to the ground resolved. The tensions between creativity and practicality, or between form and function, are a constant factor in design work. Helping to resolve these tensions is a fundamental role of the designer.

Representations as Communication Tools

In designers' interactions within their teams and with their clients, one of the key success factors is the use of appropriate represen-

tations, which enable both groups to understand each other's intentions and provide each with the means to express themselves. In many different types of interaction, the representations that are used have a significant effect on the interactions themselves.

One of the car designers, working as an independent design consultant, described the work of a specialist clay modeller, whose role in the project was specifically to create a 1/8-scale clay concept model that would sell the idea to a client and fund the detailed work of mechanical and production design. The clay model provided a prop for communication with clients, but it also provided a communicative tool among the members of the design team. The central collaborative relationship was between the car designer and the model maker, and their communication took place around the model as it took shape between them. Because the subtleties of visual and physical form are not always expressible in words, the representational tools of the designer form a language among members of the design community. These representations and the conventions to interpret them enable colleagues to engage in a dialogue with each other. Further, they allow designers to explore design possibilities in a metaphorical "dialogue" with their material.

The introduction of computer representations has produced a "generation gap" among the staff of design offices. Several participants complained that young designers no longer use a pencil but work directly on the computer. The computer, in addition to representing, clearly brings both new technical opportunities and new ways of relating to the object of design, so this phenomenon may be a transient one. However, we did observe that senior designers often preferred to work rapidly with a pencil, exploring options, before committing an idea to the computer. Even designers who already make full use of computer technologies might, when they present their ideas to the public, return to paper sketches and traditional drawing tools. An architect who regularly presents preliminary design work to members of the public told us that he would take computer renderings of the design in its built environment, and trace over them with colored pens because he found that more handcrafted-seeming representations facilitated direct dialogue and a more immediate response. The evidence of craft skill in these drawings helps to establish a relationship based on recognition of professional training.

The ways in which visual and physical representations provide points of external reference for conversation is an essential feature in the management of complexity. In many design activities, the users of the product may be unaware of internal complexities that have been resolved using specialized representations during the design process. Examples range from highly technical analysis, such as the software visualization of predicted wind tunnel performance for jet engine components, to straightforward organization of design elements. In the latter category, the TV documentary

director described the central organizational tool for his team: It is a whiteboard divided into two columns—a column of concepts to be communicated to the viewer and a column of the filmed images that will be used to convey each of them. These representations often provide shared vocabularies for coordination and cooperation. Members of an electronic product design team all recognize the circuit schematic of the product and use it as a central meeting place. A software team has a "master diagram" describing the overall structure of the system. Drug designers all recognize the chemical structures of standard compounds they combine. In the absence of suitable conventions, designers improvise.

Uncertainty in Collaborative Processes

Almost all of the design projects that were described to us involved collaboration between teams of technical specialists, and they extended over periods of months or years. Even those who produced comparatively simple products, such as the graphic designer, the furniture designer, and the fashion designer, often worked over many years with the same people in stable teams. The uncertainties inherent in creating a novel product mean that any aspect of the process may take longer than expected, or that required interfaces and parameters may change in the course of the project. In these circumstances, a great deal of design work is, in fact, project management.

In fields where the required functionality of the product is flexible, especially the software industry, many management strategies are intended to minimize the risk of change. A developer of large software systems described the way that multiple versions of the product are delivered: Each cycle of refinement is short enough that any necessary change can be discovered early, so that managers can plan around them and not compromise final deadlines. His process followed detailed and well-established software methodologies, developed to mitigate these risks, but they had been adapted to address his particular problems. An architect who specialized in community-managed projects, such as churches and schools, had to take special precautions to allow for the fact that her clients were often inexperienced and might not be aware of the importance of maintaining an agreed-on design brief. She therefore took care to educate them regarding the stages of the design process, and used "sign-off" design phases so that committees of (often voluntary) client representatives would recognize and acknowledge the points at which they were fully committed to prior decisions.

Engaging with Public Policy

We found many situations in which the designers' role appeared to be largely to implement public policy. Designers in the transport industries are highly constrained by environmental regulations on noise and emissions, for example. Public policies on emissions of

particulate exhaust or greenhouse gases often set industry targets over a five- or ten-year horizon.

Both diesel and aircraft engine designers reported that their work has become dominated by the demands of continuous improvement arising from environmental legislation, and that a particular client's requirements regarding cost and functionality must be accommodated as much as possible only after regulatory targets have been achieved. In addition to environmental regulation, safety constraints and testing regimes are also central to the processes of aircraft engine design. Appropriate safety processes are both negotiated among major manufacturers and either ratified or imposed by national and international regulatory authorities. Reliability of the product has also been key to the brand image of both engine companies.

When the public is at risk from the product, stringent tests are required by legislators to protect the user of the product. Meeting these requirements is an important issue in the validation of complex engineering products, such as aircraft. Its significance was illustrated rather graphically by our aero-engine designers, who showed us footage from their bird strike testing rig. Whole defrosted turkeys are shot at a running engine with a big gun because the certification authorities require physical damage testing after the company has already used computer simulations. However, testing is an even greater part of the entire process in medical and pharmaceutical products. The testing of drugs is highly regulated as a sequence of both lab tests and clinical tests. Our participant from the pharmaceutical industry reported that the necessary clinical tests to develop a promising drug compound into a publicly available medicine costs $800 million, after which only one in ten becomes commercially successful. In comparison to such high testing costs, the cost of designing the original compound is almost negligible.

Publicly sanctioned or sponsored design work can also be seen as a direct tool of public policy, rather than simply a social constraint on production of goods for the free market. Public housing schemes are one example of a situation in which the designer may be perceived by end-users as an instrument or representative of the state. For example, large housing developments in the UK are required to provide a certain proportion of "affordable dwellings" that may be managed by a housing association established alongside privately owned housing; however, developers are often motivated to construct such schemes to a minimum cost standard. Here, the designer can be an advocate of product quality on behalf of end-users who are only indirectly represented within formal review processes. The strong voices in public debate are often entrenched interest groups seeking to maintain privileges, such as access rights to public land (e.g., for car parking). Our participant talked at length about his engagement in local politics, attending public meetings and establishing a relationship of trust by listening to the initially

extreme opposition of local residents who feared that their concerns would be ignored by municipal bodies.

Education Within a Profession

Our design participants were deeply concerned with the structure of their profession and with recognition by their professional peers. Many of the most experienced designers were also concerned with the future continuity of their own professional community. This concern was particularly apparent in fields where international competition was devaluing traditional design values, or where technological change resulted in the loss of traditional skills. For example, a garment pattern designer, who had run her own business and designed make-to-measure garments, was particularly concerned with developing skills and understanding process, arguing that as production is moved offshore, designers lose the link to manufacturing and do not understand anymore how to optimize a design for production.

Several of the designers stressed the shortcoming in design education, in that it does not prepare designers for the practical aspects of running projects or businesses. One of the architects stressed that the difference between a successful project and a failure often lies in the customer/client relationship. She has gathered much useful experience in the projects she runs but felt that these skills were largely absent from design education. Similarly, the engineers commented that they were not trained to manage and lead people but were promoted for technical excellence. This point was echoed by a furniture designer, who commented on the importance of learning how to interact with all people in design teams. For her it was critical for design students to learn to interact with the materials they use and the technicians who help them, rather than to rely solely on computer simulation. The fashion designer had really struggled when she set up her own business as a young practitioner. Although she became very well known very quickly, she did not achieve a sound financial footing because she was poorly prepared for the commercial side of the business.

Conclusions

Designers are engaged in many of the same activities and concerns, but in very different guises according to their particular technical domains and social or business contexts. Looking across different domains shows the rich manifestation of these activities. This understanding can help to foster respect between designers from different disciplines, who might otherwise see the differences rather than the commonalities in their collaboration.

A better understanding of design processes is also required to develop more effective methods to support designers and to provide them with better tools. As design researchers, we must be able to define the scope of descriptive theories across a range of professional

activities as experienced by designers themselves. It is important to recognize that, although design domains are certainly similar, they are also different, in ways that become more apparent when we address the reluctance of designers to abstract the nature of their work from any specific context. To properly understand the common features that emerge across particular processes, techniques, and contexts, it is necessary for us to adopt a research perspective that arises from the details of each of them.

Acknowledgments

The Across Design project was funded by the Cambridge-MIT Institute. We are extremely grateful to those who participated as expert participants in the workshops, many of whom also carried out extensive preparation in advance of the workshop itself, and also submitted to subsequent interviews. We would like to thank our students, research assistants, and other collaborators who assisted with logistics, recruitment, recording, and transcription.

The Sword of Data: Does Human-Centered Design Fulfill Its Rhetorical Responsibility?

Erin Friess

For more than two decades, user-centered design (UCD) has been the guiding philosophy and process in the field of design from both practice and pedagogy perspectives. Although there is no singular agreement on just what constitutes UCD and many different names for and "flavors" of UCD have emerged—human-centered design, participatory design, activity-centered design, and contextual design, just to name a few—nearly every version relies on an early and continual interaction with people who will actually use the product.[1] Designers then use findings from the interactions (e.g., surveys, focus groups, card sorting exercises, document reviews, scenario-based testing, and plus-minus testing) to guide the design solutions.

User-centered design—or the more popular human-centered design (HCD)—has served the discipline of design well, giving design a purpose, a structure, and, perhaps most importantly, a story to tell. However, HCD, as it is often practiced today, is no longer just human centered but empirically centered. Rather than being guided by interactions with end users, designers are being forced into the role of engineer, making decisions based solely on quantifiable and easily relatable data gathered from the end users. To illustrate, in early 2009, Google's lead visual designer, Douglas Bowman, left the company because of the company's perhaps over-reliance on empirical data.[2] According to the *New York Times*, when a Google team couldn't decide between two shades of blue, a test was ordered on 41 intermediate shades to determine which one "performs better."[3] Bowman himself was asked to empirically defend whether a border should be 3, 4, or 5 pixels wide.[4] Ultimately for Bowman, data became "a crutch for every decision, paralyzing the company and preventing it from making any daring decisions,"[5] and his disdain for a "design philosophy that lives or dies strictly by the sword of data" eventually caused him to leave Google.[6]

Such a reliance on empirical data is, in many ways, human-centered design at its most extreme. While there is nothing inherently "wrong" in such an approach to design, focusing solely on user input to drive output betrays design's rhetorical roots. In what follows, I explore the history and practice of HCD, consider the rhetorical issues that arise with the practice of extreme empirical HCD, and suggest that a move away from empirically driven design and

1 J. Karat, M. E. Atwood, S. M. Dray, M. Rantzar, & D. R. Wixon (1996). *User-Centered Design: Quality or Quackery?* Paper presented at the CHI 96. J. Karat, "Evolving the Scope of User-Centered Design." *Communications of the ACM,* 40:7 (1997): 33–38.

2 Douglas Bowman, "Goodbye, Google." Stopdesign blog. http://stopdesign.com. Posted March 20, 2009 (accessed July 7, 2009).

3 Laura M. Holson, "Putting a Bolder Face on Google." *The New York Times* (March 1, 2009): BU1.

4 Bowman, "Goodnight Google."

5 Interestingly, number 5 on Google's list of "commands" for User Experience is "Dare to innovate."

6 Bowman, "Goodnight Google."

toward a more holistic, harmonic, and rhetorical approach to design is warranted.

A Look at Modern Human-Centered Design

Modern human-centered design is generally recognized to have begun at IBM in the 1980s.[7] At IBM's Thomas J. Watson Research Center, Gould and Boises first produced an unnamed methodology in 1983 that emphasized four "critical steps": 1) "Early focus upon the characteristics and needs of the intended user population," 2) users as part of the design team, 3) empirical and experimental measurement, and 4) iterative practices. They stated that their "design philosophy… is a principled approach which is necessary if progress toward significantly easier to learn and more useful systems is to be achieved."[8] This methodology was refined by Gould and Lewis in 1985 by omitting the step of including users as part of the design team.[9] Although the methodology still went unnamed, Gould and Lewis termed the three remaining steps "three principles of system design." Norman and Draper re-envisioned the three principles not as a methodology, but as a philosophy, and they named this philosophy "user-centered systems design," which was described as "a philosophy based on the needs and interests of the user, with an emphasis on making products usable and understandable."[10]

These early incarnations of HCD were important because they established user experience as a credible concern for designers and determined that the way to improve user experiences is to involve actual end users in the design process. Prior to these statements advocating HCD, design processes generally fell into one of two camps. The first camp was technology-centered design,[11] which focused on the capabilities of technology to drive innovation.[12] In this approach (often practiced by software developers and those in other engineering-oriented fields), the end product was often intolerant of minor user errors, was unable to give users what they wanted, and forced users to perform tasks in inelegant ways.[13] The second camp was designer-centered design, which focused on product creation based on designer intuition. However, according to Landauer, designers' "intuitions about what will make a system useful and useable for the people who will use it are, on average, poor."[14] And according to Norman (1988): "Even the best trained and best motivated designers can go wrong when they listen to their instincts instead of testing their ideas on actual users. Designers know too much about their products to be objective judges: the feature they have come to love and prefer may not be understood or preferred by future customers."[15]

Since these early incarnations, definitions of HCD have continued to proliferate. Some have highlighted incorporating end users into the actual design team (participatory design); some have highlighted ethnographic methods in user research (contextual

7 More broadly speaking, HCD's roots may very well lie in the late nineteenth century's Arts and Crafts movement (see A. Crawford, "Ideas and Object: The Arts and Crafts Movement in Britain." *Design Issues* 13:1 (1997): 15–26 and the ergonomics movements (M. G. Helander, "Forty Years of IEA: Some Reflections on the Evolution of Ergonomics." *Ergonomics* 40:10 (1997): 952–961; and N. Marmaras, G. Poulakakis, and V. Papakostopoulos, "Ergonomic Design in Ancient Greece." *Applied Ergonomics* 30 (1999): 361–368. In addition, returning to modern HCD, some posit HCD's modern origins within composition studies (K. A. Schriver, "Plain Language Through Protocol-aided Revision" in E.R. Steinberg (ed.), *Plain Language: Principles and Practice* (Detroit, MI: Wayne State University Press; and J.H. Swaney, C.J. Janik, S.J. Bond, and J.R. Hayes (1981). *Editing for Comprehension: Improving the Process Through Reading Protocols (Technical Report 14)* . Pittsburgh, PA: Carnegie Mellon University, Document Design Project,1991): 148–72, or earlier at IBM (M. Ominsky, K. R. Stern, and R. J. Rudd, "User-Centered Design at IBM-Consulting. *International Journal of Human-Computer Interaction* 14:3 & 14:4 (2002): 349–368.

8 J. D. Gould, and S. J. Boies, "Human Factors Challenges in Creating a Principal Support Office System: The Speech Filing System Approach." *ACM Transactions on Office Information Systems* 1:4 (1983): 273–298, 296–297.

9 J. D. Gould, and C. Lewis. "Designing for Usability: Key Principles and What Designers Think." *Communications of the ACM* 28:3 (1985): 300–311.

10 D. A. Norman & S. W. Draper, *User Centered System Design: New Perspectives on Human-Computer Interaction.* (Hillsdale, N.J.: L. Erlbaum Associates, 1986); D. A. Norman, *The Psychology of Everyday Things* (New York: Basic Books, 1988): 188.

design); some have highlighted the iterative aspect of HCD; and some have highlighted the tasks an end-user performs (activity-centered design). Although it appears on the surface that no two definitions of HCD are exactly the same, sometimes, differentiating between two supposedly distinctive definitions of HCD is highly difficult. Despite the multitude of names, there appear to be two common themes in all versions of HCD: 1) conduct research with real people who are likely to use the product, and 2) use that research to drive the design solution.

These themes are good ones, even critical to the relatively new field of design. It is important that designers conduct research with actual end users and that they use these research findings for design purposes. However, user data, I argue, should not be the only driving factor of design. I anticipate that in practice other mitigating issues do come into play. For example, a group that I observed had a brief discussion about the color of the text in a document.

Nate: So, yeah, after we finished the scenarios, we asked her just what she liked and what she didn't like. And she said that she thought that the black text was, ya know, typical, and that she would have liked something different. I think she said something more exciting, like pink.
Jenny: Pink?
Nate: Yeah, pink.
(Group laughs)
Laura: She actually said pink?
Nate: Yes, she actually said pink.
Laura: Okay, uh, yeah, that's not happening. Anything else of use from the session?

In this example, we see these designers deal with an unexpected finding from an actual user interview. These designers have written on their statement of work that they "consistently consult with users on an ongoing basis, to assist [them] in both the generation and evaluation of concepts and solutions," and they routinely tell their clients that they will test proposed solutions with end-users to determine the solutions' viability. Yet in this exchange, we see the group rejecting the finding without any subsequent interactions with users to justify the rejection of the user-derived data.[16] If data gathered from HCD processes is, as Beyer and Holzblatt claim, "the base criteria for what the system should do and how it should be structured,"[17] then does this rejection of a user-derived finding indicate that this group is not conducting a human-centered design process?

I posed this question to two usability professionals. I gave them the transcript of the conversation, and their responses (from their emails to me) were thus:

Professional #1:

This group isn't doing user-centered design. A user made a

11 "Technology-centered design" was also often called "system-centered design," which should not be confused with Buchanan's system design or Golsby-Smith's fourth order design. This early "system-centered design" focused narrowly on the artifact or the object being created. For definitions of "technology-centered design" and "system-centered design," see: R. R. Johnson, "User-centeredness, situatedness, and designing the media of computer documentation." *ACM SigDoc Asterisk Journal of Computer Documentation,* 14:4 (1990): 55–61; T. K. Landauer, *The trouble with computers: usefulness, usability, and productivity*. (Cambrige, MA: MIT Press, 1995), M. R. Endsley, B. Bolté, and D. G. Jones, *Designing for situation awareness: an approach to user-centered design*. (London; New York: Taylor & Francis, 2003).

12 As has been pointed out previously (notably, R. R. Johnson, *User-centered technology: a rhetorical theory for computers and other mundane artifacts*. (Albany: SUNY Press, 1998) and, C. Spinuzzi, "Toward integrating our research scope: a sociocultural field methodology." *Journal of Business and Technical Communication, 16*:1 (2002): 3–32, "technology-centered design" has been something of a strawman for advocates of HCD as users have, to some degree, always been a concern for designers.

13 A. Mital, and A. Pennathur, (2000). Perspectives on designing human interfaces for automated systems. In R. L. Shell & E. L. Hall (Eds.), *Handbook of industrial automation* (New York: Marcel Dekker, Inc, 2000): 749–792.

14 Mital, *Perspectives*, 218.

15 Mital, *Perspectives*, ix.

clear statement that she wanted pink. I'm assuming that she didn't have trouble actually reading the text, but this group should've conducted further usability testing to see if other users would've also preferred a different color of text (from the transcript it doesn't look like the question was part of a standard protocol). Perhaps shades of gray . . . I would feel very uncomfortable getting this [as a data result] and leaving it alone . . . Laura shutting it down was premature.

Professional #2:
I hate it when I get results like this! If I did the test and had someone say they wanted the text to be pink, I would have probably ignored it . . . [and] wouldn't have told anyone or included it in a report because it is so far out there. I know that the designers I work with would never in a million years use pink as the body text, so I wouldn't even put it out there to bother them with it. It would be an outlier unless I get a bunch of people saying they wanted text to be pink or a different color or something. But are they practicing [human-centered design]? I guess I would have to say no, but I couldn't fault them for that. I would say… they were being sane.

Therefore, according to these two usability professionals, the comments by the designers suggest that they aren't doing HCD because they ignored a statement of concern by a potential user. For professional #1, this is problematic because it violates the underlying philosophy of design, in which design is based on user input. Professional #2, however, doesn't fault the designers for using their own intuitions to reject something that, in her realm of experience, would likely be rejected by other users or the client. Given the interpretations of the designers' discussion, it appears that HCD may indeed be, as Douglas Bowman found at Google, empirically driven. In empirically centered design, data that is gathered from users drives the design, while intuitions by human designers that are unsubstantiated by user data go unexplored or unmentioned. In other words, in empirically driven HCD, the only humans that have a voice are the end users.

Rhetorical Problems of Empirically Driven HCD

This empirically centered design is problematic in that it denies critical aspects of rhetoric, which, as Richard Buchanan and others have pointed out, shares a complex and intertwined history with design. Let me be clear that in what follows I am by no means suggesting that we eradicate human-centered research practice from design. What I am suggesting is that a re-evaluation of this version of HCD, in which empirical user data is weighted above all else, is warranted because of the rhetorical implications of such a model. In

16 It is interesting that the designers cling to the idea of pink text, when Nate actually says, "she would have liked something different. I think she said something more exciting, like pink." The suggestion by the usability participant is actually much broader than pink text—she wants something "different" and "exciting." Perhaps more experienced designers who were not days away from a deadline would have focused more on the acceptable abstract concerns (which might have suggested testing on layout, line length, leading, or other similar other issues) rather than the easily discarded concrete concern.

17 H. Beyer and K. Holtzblatt, *Contextual Design: Defining Customer-Centered Systems* (San Francisco: Morgan Kaufmann, 1998).

the following, I outline three ways this perhaps extreme over-reliance on user data—a reliance that some have claimed to be the very thing that makes design rhetorical—may actually make the HCD process arhetorical.

Rhetoric, according to Aristotle, is the "faculty of observing in any given case the available means of persuasion."[18] For Aristotle, all spoken communication is inherently rhetorical and makes use of the three means of persuasion (also known as the rhetorical appeals): *ethos* (the character of the speaker), *pathos* (the emotional state of the hearer), and *logos* (the argument within the communication itself). Buchanan has linked the discipline of design to rhetoric[19] and has suggested that products created by designers are rhetorical in that they can present *logos* (the "technological reasoning or the intelligent structure of the subject of their design"), *pathos* ("the 'suitability' or 'fit' of a product to the intended user or community of users"), and *ethos* ("the implied character or personality of the manufacturer as it is represented in a product") as persuasive means between the designer and the end user.[20] According to Buchanan, "the designer, instead of simply making an object or a thing, is actually creating a persuasive argument that comes to life whenever a user considers or uses a product as a means to an end."[21] The way a final product makes an argument to the end user is through its *ethos*, *logos*, and *pathos*.

I agree with Buchanan's assessment of the rhetoricity of products, but I wish to extend rhetoric beyond the end products of design and to the actual process of design itself. In other words, in addition to their use of rhetorical appeals to create an argument *within* a product (as Buchanan suggests), designers also create a rhetorical argument *for* a product or a version of a product during their design process. Indeed, while designers create for end users, they must also be able to argue for and explain their design choices to their colleagues, their employers, and their clients. In addition, just like the products themselves, designers can argue for their design choices using *ethos*, *pathos,* and *logos. Ethically*, designers can consider their own intuition and conscience when defending a design decision. *Pathetically*, designers can contemplate empathic appeals based on their own (and perhaps anticipated) user experience. *Logically*, designers can contemplate rational appeals derived from user-centered research and usability studies. Taken together, these appeals allow designers to avail themselves of all accessible means of persuasion during the process of design. However, an emphasis on empirical data can lead to an arhetorical design process because of its *logos*-centrism, its denial of agency, and its exigence-ignored rhetorical situation.

Logos-Centered Process

Empirically centered design, which requires the designer to create products based on outcomes from user research, is essentially *logos*-

18 Aristotle, "Rhetoric." In J. Barnes (Ed.), *The Complete Works of Aristotle: The Revised Oxford Translation*, Vol. 2, (Princeton, NJ: Princeton University Press, 1984): 2152–2269.

19 R. Buchanan, "Declaration by Design: rhetoric, Argument, and Demonstration In Design Practice." *Design Issues* 2:1 (1985): 4–22.

20 R. Buchanan, "Design and the New rhetoric: Productive Arts in the Philosophy of Culture." *Philosophy and Rhetoric* 34:3 (2001): 195–96.

21 Buchanan, 1985, pp. 8–9.

centric design. If designers only use *logos* to drive design, they may be practicing design as a dialectic, rather than a rhetorical, art. Dialectic is a sister discipline to rhetoric, and, like rhetoric, it is concerned with persuasion.[22] However, in dialectic argumentation, only the rational and the logical are considered; an appeal to emotion is considered a fallacy, and concern for the audience is considered irrelevant. According to Michael Leff, dialectic "need consider only the *logos* of argument and can bracket matters of character (*ethos*) and emotion (*pathos*)."[23] In dialectic argumentation, the rational and the logical are valued above all else. In rhetorical argumentation, the rational and logical have a place within the argument, but concerns for character and emotion are of equal import. Therefore, if designers are making design decisions based solely on user data (*logos*), then their design process is dialectical and arhetorical. This is not to suggest that the subsequent products are also arhetorical, as they may contain arguments based on *ethos*, *logos*, and *pathos* as established by Buchanan.[24]

Loss of Rhetorical Agency

In addition to a *logos*-centric design process, designers who are faced with empirically driven design processes can also find themselves without rhetorical agency. Rhetorical agency, according to Karlyn Kohrs Campbell, is "the capacity to act . . . to have the competence to speak or write in a way that will be recognized or heeded by others.[25]" For designers, rhetorical agency resides in their ability to select from the full range of the available means of persuasion the particular combination of means that would most likely satisfy and persuade the intended audience. In a rhetorical design process, the designers would have the power to contemplate the persuasiveness of their own intuitions, the anticipated user experience, and the user data to inform their product design. However, in the arhetorical design process of empirically driven design, designers can only use one available means of persuasion: user data. By only having *logos* at their disposal, designers are stripped of their agency—they do not have the capacity to act in a way that will necessarily be heeded by others. With the loss of agency, designers lose the ability to sort through some of the available means of persuasion in their process. If the only means of persuasion is *logos*, then the designers are reduced to automatons that have no choice—decisions must be made in line with user data.

An Unbalanced Rhetorical Situation: Absence of Exigence

According to Lloyd Bitzer, a rhetorical act (be it a product, a discourse, or a process) occurs in response to a rhetorical situation.[26] The rhetorical situation is made up of three components: *exigence*, *audience*, and *constraints*. In brief, the *exigence* is "an imperfection marked by urgency; it is a defect, an obstacle, something waiting to be done, a thing which is other than it should be." For designers,

22 See *Argumentation* 14:3 (2000) for a special issue dedicated to dialectic and rhetoric theories.

23 M. Leff, "Rhetoric and Dialectic in the Twenty-first Century." *Argumentation,* 14 (2000): 244.

24 However, we might need to question just how rhetorical a product can be if the process that creates it isn't itself rhetorical.

25 K. K. Campbell, "Agency: Promiscuous and Protean." *Communication and Critical Cultural Studies* 2:1 (2005): 1–19.

26 L. Bitzer, "The Rhetorical Situation." *Philosophy and Rhetoric* 1 (1968): 1–14.

the *exigence* may very well be the design problem. The *audience* consists "of those persons who are capable of being influenced by [the rhetorical act]." The *audience* often consists of the end users of the product. The *constraints* are "made up of persons, events, objects, and relations which are parts of the situation because they have the power to constrain decision and action needed to modify the exigence." Many different *constraints* may exist, such as monetary, technological, cultural, or demographic constraints. For example, I once asked students to create a map for me to give to other people to help them find my secluded office. I presented them with the *exigence* (visitors had trouble finding my office) and the *audience* (people in search of my office). However, I did not make explicit the *constraints* of the map[27]—namely, I needed it to be something that I could respectfully show to potential visitors, and I needed it to be something that could be reproduced cheaply for these visitors. Thus, I found myself with two maps that were very unique, appropriately directed people to my office, and were unusable: One was titled, "Where the #*&% is Erin Friess' Office?" and the other was an ingenious map printed upside down on a T-shirt so that the wearer could look down at the shirt he or she was wearing to find his or her way to my office. Unfortunately, the former violated the cultural constraint of appropriate language for the map, and the latter violated the budgetary constraint for the map.

Every product for a designer stems from a rhetorical situation that has an *exigence*, an *audience*, and *constraints*. Designers must ponder these three elements before producing or refining their rhetorical act or product. However, empirically centered HCD appears to focus strongly on the audience (the end users who can be affected by the rhetorical product) and, to some extent, the constraints derived from the audience. Other constraints (such as the cultural and budgetary constraints of creating a manual with pink text) are not considered in the design process. Furthermore, the exigence, the cause for the need for design, doesn't appear to be a reason for design outcomes. Although the audience and constraints carry much weight, the history of the need for the design, past versions, and institutional memory are of no import. According to Bitzer, a rhetorician/designer must carefully consider all three elements before making the product. If only audience and constraints are considered, then the situation, from the view of the designer, is not rhetorical, and therefore a rhetorical act cannot take place. Once again, relying solely on audience input makes the design process arhetorical.

Therefore, because of an emphasis on designing based on *logos*, the loss of rhetorical agency, and the unbalanced rhetorical situation, designing from a strictly empirical perspective may dislodge design from its rhetorical roots.

An Ethnographic Look at the Design Process

I have suggested that the empirically centered design process is

27 And it appears the students didn't think about the potential constraints of the situation.

essentially arhetorical. In the early days of design, the pendulum of the design process had swung to an apex of technological and designer concerns. Since that time, the pendulum has swung down and away from those concerns and toward the concerns of the people who will actually use the product. I believe that the pendulum has reached or is quickly reaching the opposing apex, that of a design process based entirely on end-user concerns. To this day, there are some designers, such as those at Google, who rely heavily on user data, and other designers who prefer a more designer-intuitive approach to the process. However, I believe that most design projects fall somewhere in the middle on this continuum.

To better grasp how designers defend their design decisions, I attended and observed the meetings of a group of designers for more than a year and listened to how they defended their design decisions to one another. For example:

Don: Let me put it another way: Do we need a, a more robust numbering in the, in the book itself?

Nate: I think so, I mean Carol and, umm, Amy's tests show some confusion going on there.

In this example Don makes the claim that more robust numbering is needed, and Nate then supports that claim with results from usability tests (*logos*) that showed "some confusion going on there."

This group consisted of relatively novice designers associated with a particular school of design that places a high emphasis on HCD practice. The vast majority of these designers were students pursuing their MA or PhD, but their work on a very real project with a very real client was done outside of their respective degree programs, and they were paid for their work. In addition to being associated with a school of design that emphasized HCD, this group internally placed a high value on HCD. A significant portion of the designers' time consisted of conducting initial user research, plus-minus testing, card-sorting, and various other user research and usability tests. I anticipated that, with their apparent dedication to HCD, the designers would use appeals to user data (*logos*) to defend their design decisions. However, over the course of the year, only 12.1 percent of their appeals referred to user data. Approximately 7 percent referred to another *logical* category, that of expert authorities. Storytelling of hypothetical outcomes (*pathos*) made up 19 percent of the appeals, while appeals to individual designer opinion (*ethos*) made up approximately 20 percent of the total appeals intended to defend design claims.[28] In this initial study, *ethos*, *logos*, and *pathos* were used approximately equally over the course of the year.[29]

This study can be viewed in two ways. Originally, from the view of traditional HCD, this study seemed to show that these designers are not conducting HCD at all. Although they are doing research, they are not, apparently, using that research to fuel their design. By ignoring the user data when they ostensibly need it the

28 Another 22 percent of the appeals referenced multiple kinds of appeals. The remaining 19 percent of the appeals consisted of appeals that individually made up less than 5 percent of the appeals. These included appeals to humor, appeals through flattery, appeals to client expectation, among others. For a more detailed description of this study and its implications for HCD, see Friess, *Designing from Data: Rhetorical Appeals in Support of Design Decisions* (forthcoming in *Journal of Business and Technical Communication*).

most, these designers instead are pursuing a designer-centric design in which they base decisions solely on their intuitions without regard for user research.

Subsequently, upon further reflection, it became apparent that although these designers aren't pursuing empirically centered HCD, they are practicing a rhetorical design process. Indeed, these designers are not relying solely on user data (*logos*) to support their design decisions, but on a combination of *logos*, *ethos*, and *pathos*, which means their design process is *not* empirically driven HCD. They are drawing upon all the available means of persuasion to create an argument for their product, and it is this broad look beyond user-derived means that makes the process rhetorical. Furthermore, this particular group created well-received and award-winning documents based on their work, and it is clear that their process was not solely empirically driven.

These observations of the linguistic practices of an individual group and the group's invocation of data may be idiosyncratic; nevertheless, the results of this year-long ethnographic study suggest that more research is needed to determine how designers do and do not use data to reach their design decisions.

Rethinking the Design Process

Design based entirely on user data is not necessarily, in and of itself, rhetorical. I believe that relying solely on user data is indeed a way to create products, and sometimes a very successful way to create products (as Google and others have shown). But bracketing emotion and character for the sake of user data does not make a design process "more" human centered. As Buchanan has stated, "usability plays an important role in human-centered design, but the principles that guide our work are not exhausted when we have finished our ergonomic, psychological, sociological and anthropological studies of what fits the human body."[30] Indeed, to truly create human-centered products, we must use those attributes that make us human—the ability to understand emotion and the ability to assess character.[31] According to Bill Moggridge, design needs "people with a subjective, empathetic approach to design."[32] While an automaton may be able to assess the cold data established during research, only designers can assess the *pathos* and the *ethos* of that data to contextualize it and to make both an argument and a product that more appropriately responds to the design problem.

Therefore, I suggest that the HCD process needs to be re-envisioned. Rather than seeing the end users as the humans at the center of the design process, we need to see the designers as the humans at the center of the design process. This suggestion is potentially scandalous; recognize, however, that I am positioning the designer at the center of the design *process*. The product should result in an appropriate user experience by enabling the user to accomplish a task in an emotionally desirable way. To do that, part (but not all) of

29 However, individual meetings often had highly lopsided uses.

30 R. Buchanan, "Human Dignity and Human Rights: Thoughts on the Principles of Human-Centered Design." *Design Issues* 17:3 (2001): 37.

31 The debate of rational *logos* versus emotion and character is in no way limited to the sphere of design. In President Barack Obama's nomination of Sonia Sotomayor to the bench of the U.S. Supreme Court, he quoted Justice Oliver Wendell Holmes: "The life of the law has not been logic, it has been experience… it is experience that can give a person a common touch and sense of compassion, an understanding of how the world works and how ordinary people live." Subsequently, much debate began on the role of judges and justices—are they solely to be rational interpreters of the law that practice judicial restraint or are they to show empathy for the situation at hand?

32 This was taken from Bill Moggridge's opening plenary at CHI '07.

the design process should stem from usability studies, user research, and other traditional HCD tasks. However, in considering the data collected from such work, the designer still stands at the center of the process, contemplating other issues of implication. In addition to user data, designers must contemplate their own knowledge, experience, and anticipations along with client desires and commands.

This is not to suggest removing user-based research in any way. Indeed, to do so would be tantamount to sending the pendulum back to the system- and designer-centered models from the early years of design. However, by returning the designer to the crux of the rhetorical situation, designers will be allowed to design while contemplating the many facets that make a process and product rhetorical. A designer-centered rhetorical model coupled with a human-centered (though not empirically-centered) concern for the product allows for a design system that empowers both the designers who make the product and the users who incorporate the product into their lives.

Conclusions and Questions

I have suggested that empirically centered design is an arhetorical design practice and that, by returning the designer to the crux of the rhetorical situation, we may achieve a process of human-centered design that is both rhetorical and empowering for the users and the designers. This exploration, while offering a change to current processes, has also brought to light two questions worthy of further discussion:

What is wrong with empirically centered design? Nothing is inherently wrong with arhetorical, empirically centered design. Indeed, it appears from many accounts that empirically centered design is the driving force of Google, a company few would call anything other than successful. Making products based solely on user data is possible and can produce, in certain circumstances, outstanding work, as it has done for Google. For some entities, such a process might even be ideal. However, this process should not necessarily be called design, nor should the people creating objects from user data alone be called designers. "Design" invokes aspects of planning, and "designer" invokes someone contemplating various situations and putting forth the plan. An empirically centered process negates the planning aspect, as there are not multiple choices to be had, but only one choice: the choice dictated by the users.

What are the implications for design pedagogy? Design pedagogy, like HCD, has various facets and theories. The group that I observed for one year matriculated in an institution that was extremely dedicated to HCD, and yet in practice, their process was less than empirically centered. Is this

considered HCD, or is it something else? At the very least, students of design need to understand that their own intuitions may clash with user-derived data, and they should be prepared to negotiate their own responses to the conflicting information. Like the discussion of the pink text, the designers had little trouble discarding the user data in favor of their own intuition; however, in what instances should designers discard their own intuition in favor of the user data?

HCD was originally devised to provide a more rhetorical process for design than that offered by technological- or designer-centered design. However, this empirically driven HCD isn't itself rhetorical because, I have argued, it abandons *ethos* and *pathos*; it strips the designer/rhetor of agency; and it only partially addresses the rhetorical situation. Design, as we have been told, is a rhetorical endeavor that involves bringing a persuasive argument to life. Designers must value their end users, but, to provide a truly rhetorically persuasive process, they must also consider their own intuitions and experiences. Therefore, I believe that a more harmonic model of the design process is warranted—a model that places designers—not technology and not users—at the center of the design process and that focuses on designers' unique understanding of the *ethos* and *pathos* of the art of design. A designer-centered model of the design process that includes an end-user–centered focus on the outcome of the product could provide a more accurate reflection of design as a truly rhetorical endeavor.

White and Fitted: Perpetuating Modernisms

Kathleen Connellan

"Freedom is not a white surface. . . ."[1]

Introduction

White is everywhere and nowhere because of its ubiquitous association with space and light and its non-color status. Domestic design and particularly its wet areas are confined to white in modernist design; those whites are accompanied by straight lines and snugly rationalized fittings. Modernism as white and fitted is something that Mark Wigley addresses comprehensively in his book, *White Walls: Designer Dresses*.[2] This article probes further the connections between white, modernism, and rationalism in design, placing an emphasis upon power relations in a designed society. Consequently, "white" in this article is philosophically related to social privilege, and "fitted" not only means immovable furnishings but also a lack of flexibility in society and living. These issues are teased out against the background of an apparent return to color and flexibility in a postmodern era, when there has been a move away from totalitarianism toward inclusivity in society. Therefore, the thrust of this article is not just about color and design in the décor/decorative sense but also about how personal politics, subjectivities, and design are connected.

Michel Foucault's lectures at the Collège de France inspire a political reading of white and fitted design. This article is particularly concerned with modernism in the form of a power structure that never really went away, and with how this modernism affected and perhaps still affects the "ordinary" person in the sense that Michel de Certeau writes about the ordinary man: "To the ordinary man. To a common hero, an ubiquitous character, walking in countless thousands of streets."[3] For this article, ordinariness is located in the home and specifically in the many unremarkable kitchens in stretches of suburbia. De Certeau's thinking on the everyday and the habitual is used in this article to complement/support Foucault's ideas on capillaries of power.[4] So there are at least two basic positions within "white and fitted"; crudely, this is the position person/user/consumer/individual, and the position of the design decision maker/producer/retailer/supplier. In a more complex breakdown, these positions are held by people within mechanisms and systems of power operations.

Consequently, the personal kitchen appliance and furniture or fittings that accompany the appliance(s) offer an "interior" view, and

1 Michel Foucault, *The Birth of Biopolitics: Lectures at the Collège de France 1978–1979* (New York: Palgrave Macmillan, 2008), 63.

2 Mark Wigley, *White Walls, Designer Dresses: The Fashioning of Modern Architecture* (Cambridge, MA: MIT Press, 1995).

3 Michel de Certeau, *The Practice of Everyday Life* (Berkeley: University of California Press, 1984), v.

4 Michel Foucault, *Society Must Be Defended: Lectures at the Collège de France 1975–1976* (London: Penguin, 2004), 27.

the social, political, and economic reality of the time that contributes to their production offers an "exterior" view. Both views are problematized in terms of arriving at some answers as to whether the people discussed in the case study and other examples reflect a politics of "white and fitted." In other words, this article hypothesizes that the designed or manufactured spaces, appliances, and fittings that continue to have modernist standardized simplicity are indicative of a pervasive conservativism in society and a manifestation of power relations in the form of neutral design. The South African case study is used as a point of departure for a broader discussion of design and social theory in a global and late postmodern context.

The Case Study

Two separate but connected surveys (consumer and retail) on home appliances and furniture were conducted in Cape Town, South Africa in 2000.[5] First, the consumer survey respondents represent a relatively broad social spectrum: 118 consumers from a non-probability sample were randomly interviewed in shopping centers containing domestic appliance stores in areas spread across greater Cape Town. None of the 118 were tourists. The Cape Flats area was included in the survey, which represents 35 percent of the responses; this area is a sprawling expanse of suburbs, as well as informal settlements that incorporate a previously "non-white" segregated residential area. The average age of respondents was late thirties, and the gender balance was almost 50/50. The interviews were conducted using a random, "on the spot" method in the centers. Second, the retail survey used a systematic sample of managers of appliance/furniture retail outlets, and this survey took place in 18 stores across Cape Town and its outlying districts.

5 These surveys were conducted by the author and final year industrial design students at the then School of Built Environment and Design, Cape Technikon.

Table 1: Design and Use of Color in Appliances and Cupboards in the Kitchen

Factor	%
Built in cupboards	79.3
Built in cupboards (white only)	43.9
Oak / Wood finish	32.3
Beige / Cream	10.7
Green	4.6
Orange	4.6
'Other' color	13.8
Color detail on domestic appliances	26.0
Decoration on appliance by respondent	85.5
Open-plan kitchen	58.6
Adjacent room space matched	34.4
Loose items of furniture	41.3

The consumer survey reveals that the majority of the kitchen walls were painted white, and 94.5 percent of the 118 respondents regarded electrical domestic appliances (white goods) as essential. With this in mind, Table 1 reveals additional information about how the interiors were configured and colored.

The retail survey data reveals that all the participating stores sell many more standardized and modular units than loose furniture items for the kitchen and dining area. It may be an expected result, but it is nonetheless interesting that both surveys show a continued affinity for fitted kitchen spaces. The large country kitchen or even the small kitchen with a movable table in the centre that serves as eating, working, and preparation space is replaced by countertops and islands. Respondents in the consumer survey combined their purchase of d.i.y. kitchen units with the purchase of second-hand or inexpensive new modular units. These are the decisions of people who did not hire interior designers or otherwise plan kitchen makeovers. They may have gotten their ideas from glossy magazines or home improvement television programs, but the reality is that of make-do. Despite this, 44 percent of all kitchen cupboards in the consumer survey are *both* white *and* fitted.

Modernisms Past and Present

White and fitted might just be the cheap, obvious, and workable option. It was then and it is now. But this article suggests that there is something more to it. White rationalized interior designs became entrenched in a western iteration of modernism; but the existence of different types of modernisms across the globe is still not completely resolved.[6] My own fascination with the appliance revolution, white goods and white people, prompted the question (in an earlier study) of whether white goods had brought about the same kind of modernism in apartheid South Africa as that which took place in the trans-Atlantic west at the height of post-war reconstruction. Social conditions were different in South Africa, given that there was inevitably "a black maid" for every "white madam," and therefore white goods were not incorporated into the white home at the same rate as in the developed West.[7] Jacklyn Cock's *Maids and Madams*: *a study of the politics of exploitation*, a brave piece of resistance research conducted in the late 1970s, uncovered and published the pre-modern domestic regimes in apartheid South Africa that were part of both a slave and a colonial era.[8] Consequently, there were different but simultaneous social time zones in the kitchens of apartheid South Africa. Cock wrote that African maids were not regarded as adults even if they were grandmothers: "The child analogy involves a fundamental denial of equality and is often a component of racist, sexist and classist ideologies."[9] These divisive ideologies manifested in various ways; one was to curtail the movements of the African maids.[10]

6 In relation to the idea of "other" modernisms, see particularly: Tabish Kahir, "Modernism and Modernity: The Patented Fragments," *Third Text* 55 (Summer 2001): 3–13; Geeta Kapur, "Globalisation and Culture" *Third Text* 39 (Summer 1997): 21–38; Clifford Geertz, *After the Fact: Two Countries, Four Decades, One Anthropologist* (Cambridge, MA: Harvard University Press,) 1995; Stuart Hall, "Whose Heritage? Un-settling 'the Heritage,' Re-imagining the Post-nation," *Third Text* 49 (Winter 1999/2000): 3–13; Sabine Marshall, "The Integration Of Art and Architecture And Its Relevance in the New South Africa." *de Arte* 59 (1999): 3–15; Wendy Kaplan, (ed.) *Designing Modernity: The Arts of Reform and Persuasion 1885–1945: Selections from the Wolfsonian* (London: Thames and Hudson, 1995); and Duanfang Lu, "Third World Modernism: Utopia, Modernity, and the People's Commune in China," *Journal of Architectural Education* (2007): 40–48.

7 "White Skins, White Surfaces: The Politics of Domesticity in South African Homes from 1920–1950" in *Taking Up the Challenge: Critical Race and Whiteness Studies in a Postcolonising Nation*, ed. Damien Riggs (Adelaide: Crawford House, 2007): 248–259.

8 Jacklyn Cock, *Maids and Madams: a Study in the Politics of Exploitation* (Johannesburg: Ravan, 1980): 123.

9 Jacklyn Cock, "Domestic Service and Education for Domesticity" in *Women and Gender in Southern Africa to 1945*, edited by Cherryl Walker (Cape Town: David Phillip), 82. Eleanor Preston-Whyte, "'Invisible Workers': Domestic Service and the Informal Economy" in *South Africa's Informal Economy*, edited by Christian Myles Rogerson and Eleanor Preston-Whyte (Cape Town: Oxford University Press, 1991), 34–53.

10 Cock, *Maids and Madams*,110.

The physical boundaries of control echoed the imposition of an order that extended to a pervasive social surveillance. Robert Thornton writes that Apartheid was an example of "rampant modernism." He points out that Apartheid was "a special form of modernism and modernization" and stresses the sheer might and effectiveness of its bureaucratic administration.[11] This architectonic planning of modernism, which dealt with the calculated order of the grid, was taken up selectively in different parts of the globe and was most welcome in places ruled with repressive ideologies, such as Apartheid, Fascism, Nazism, and Communism. "In this respect, the Chinese people's commune movement can be looked at as a concrete manifestation of high modernist vision."[12] However, the freedom and experimentation often associated with the modern world was and is not welcome in such regimes of power. Therefore, modernization was fractured in places where the divide between rich and poor was more extreme, and this situation was usually outside of the nominal "West." This meant that modernism was a drawn-out process, making itself felt in different places in different stages. The case study used in this article arises two decades after Cock's research and 50 years after the height of modernism in the developed West.[13]

Today, flat pack kitchens, and similar d.i.y. assemblages in large retail furniture warehouses and stores like IKEA are white, modular, standardized units. There has been the trend to include stainless steel in appliances and finishes, but the background canvas that is presented to consumers remains predominantly white, and the rule is that of efficiency in both spatial and financial economy. Economy means rationing, keeping tally, ordering, conserving, and spending sparingly. The economic use of space is a spatial arrangement that makes maximum use of what is available. Economy is not about excess; it is about a balanced budget. Consequently, reading space as an accountant might, it is easier to have straight lines and simple digits than complex ones. Frederick Winslow Taylor worked this all out more than a century ago; rationalization and standardization became the raison d'être of modernism.[14]

Economy is a term that originated in domestic management, and Foucault throws more light on its meaning when it is translated across personal and political politics. In the Foucauldian sense, economy and the management of resources is one of the many mechanisms of power. Foucault suggests that power can be commoditized when it "is regarded as a right which can be possessed in the way one possesses a commodity. . . ."[15] The economic rationale of modernism encouraged people to think, act, and live efficiently in order to become individually empowered and therefore to be "worth" more.

The binaries (e.g., straight and curved; white and colored; flexible and fixed) that upheld the totalizing narrative of modernism have lingered, despite beliefs that postmodernism had dismantled

11 Robert Thornton, "The Potential of Boundaries in South Africa: Steps Towards a Theory of the Social Edge" in Richard Werbner and Terence Ranger, *Postcolonial Identities in Africa* (London: Zed, 1996), 137–138.

12 Lu, Third World Modernism, 47.

13 Rebekah Lee, "Hearth and Home in Cape Town: African Women, Energy Resourcing, and Consumption in an Urban Environment," *Journal of Women's History* 18:4 (2006): 55–78.

14 Frederick Winslow Taylor's early twentieth-century experiments in time and motion studies provided much of the rationale for "efficiency" in the workplace, and his 1911 publication, *The Early Sociology of Management and Organizations* (New York: Harper Brothers), influenced production and management in the capitalist economy.

15 Michel Foucault, *Society Must* Be *Defended: Lectures at the Collège de France 1975–1976* (London: Penguin, 2003), 13.

and democratized the structure. Foucault writes that "There is no such thing as a neutral subject. . . . A binary structure runs through society."[16] And Michael Dutton in a recent presentation at a conference celebrating "Foucault: 25 years on," said "the binary never ever disappears . . . logics are held in place by the notion of a cure."[17] This "notion of a cure" can be applied to modernism, which in the name of progress attempted to solve the crises of expansion with systems of control.[18] Modular furnishings, smooth straight finishes, and labor-saving domestic appliances remain a factor in a late postmodern context across the globe. The rise of a new modernism or a neo-modernist conservatism (even if these are not necessarily the names attributed) is apparent in both design and political thought, and it is this particular perpetuation of modernism that prompted this article.[19]

Normativity and Identities in Design

"White and fitted" presumes a conformity and an anonymity associated with modernist standardization and rationalization in design. This type of design brought about a sameness that became the norm and consequently instituted a system whereby identities were built on neutrality. That neutrality, I argue, is not neutral at all but what Foucault might call a "planned spatial distribution."[20] The considered modularization of space and form combined with the planned limitation of the interior palette made it easier for the mass production of an identity in kitchens of suburbia. In other words, rationalized spaces encourage rationalization of behavior and the neutralization of identity.

> Disciplinary normalization consists first of all in positing a model, an optimal model that is constructed in terms of a certain result, and the operation of disciplinary normalization consists in trying to get people, movements, and actions to conform to this model, the normal being precisely that which can conform to this norm.[21]

Adopting and adapting Foucault's point, the normativity encouraged by modernism is entrenched and has not been easily erased by the advent of postmodern philosophy (or design and architecture). In terms of the consumer survey referred to in the case study, there was a flatness to the answers; I had hoped for more color and expression—the kind that is visible on the streets and in the cafes of post-apartheid Cape Town. The blandness of cream beige surfaces could represent apathy or oblivion to changing times, or a sad backdrop to the ongoing struggle to make ends meet, but it might also be that the neutrality of modernism was so pervasive that it cast a pall across attempts to be different and inculcated a conservative pallor. And, perhaps there was something in the regularity and predictability of a white and fitted space that offered feelings of both security and anonymity simultaneously.

16 Foucault, *Society Must* Be *Defended*, 51

17 Michael Dutton, "911 and the Afterlives of Colonial Governmentality," keynote address, *Foucault: 25 Years On.* Centre for Post-Colonial and Globalisation Studies, University of South Australia, June 25, 2009. Dutton was speaking of Colonialism and post-Colonialism, and when I asked him how modernism fit into his argument about the reassertion of the binary, he said that the binary is the political reality and it cannot be ignored. Colonialism predates modernism, and I was hoping that Dutton would position modernism for me in the context of his talk. He admitted to a slide but emphasized that colonial governmentality has become the working norm of all forms of power.

18 Theodore Adorno grappled with the "dual" problem of progress in much of his work, questioning why "progress" did not bring about "progress" and asserting that progress could only really ever work if it benefitted humanity. It is this crisis of modernity that troubled Adorno who, when considering how and why freedom can easily turn into domination, reasoned that "Justice is subsumed in law." See Adorno, "The Concept of Enlightenment" in Max Horkheimer and Theodor Adorno, *Dialectic of Enlightenment* (London: Allen Lane, 1973), 16.

19 David Ley, "Styles of the Times: Liberal and Neo-Conservative Landscapes in Inner Vancouver, 1968–1986," *Journal of Historical Geography* 13:1 (1987): 40–56. Steven Heller and Ann Fink, *Less Is More: The New Simplicity in Graphic Design* (Cincinnati: North Light Books, 1999).

20 Michel Foucault, *Security, Territory, Population: Lectures at the Collège de France, 1977–78*, translated by Graham Burchell (Basingstoke, UK: Palgrave Macmillan, 2007), 56.

21 Ibid., 57.

Kitchen surfaces are hard and rigid. In addition to the functional necessity of durable stable surfaces, this is also a consequence of mass manufactured materials, such as laminates, metals, and baked on enamel, as well as a number of different composites. These materials are also cold. In modernism the warmth of the human element is always already absent.[22] And, in the contemporary advertised interior, white is a particularly shiny and gleaming type of whiteness, one that creates a haze and conceals as much as it reveals.[23] The person in this scenario is depersonalized into an unreal construction of "sophisticated" clean linearity, she or he is the model in the photographed white kitchen interior in the ubiquitous home-style magazine, not the tired woman or man at home after work trying to prepare a meal for the family. The aesthetic interiors are devoid of messy functionality. To reclaim the subjectivities of the users will mean acknowledging both the ordinariness and the uniqueness of individual people who feel, eat, sleep, and work. "Being is measured by doing" is de Certeau's take on the loss of identities as a result of the normalizing "capitalist and conquering society."[24] For Foucault the problem of lost subjectivity can be solved by taking time to "care for oneself" so that the extraneous world does not impinge on subjectivity in a negative or destructive manner.[25]

Whether the ordinary person can choose not be conscripted into normation (white and fitted) is partly what this paper questions. The tension between dominant and "subjugated" knowledge is not entirely predictable.[26] The push and pull between conformity to the white cube or nonconformity to a vibrant exterior of an urban kaleidoscope (i.e., spaces, smells, noise, and cultural complexity) is an aspect of contemporary life. There is a tension between what the market and overriding aspects of ideology serve to people in the shape of "design" and the personal needs or longings of real human beings in relationships and families. On the one hand, there is white in the form of new or maintained whites, and on the other hand, there are the old, tired whites, such as the white goods in second hand appliance shops and the smudged, scratched whites in the homes of suburbia. White, in whatever form or shape, is ubiquitous and easy to overlook. To what extent is this whiteness, which is inherited from modernism, an imposed order, an imposed whiteness? Could it be that, like the "scriptural economy" of which de Certeau writes, the script or text *becomes* society in the end? Is it the imposed law that writes itself upon society?

> . . . the idea of producing a society by a "scriptural" system has continued to have as its corollary the conviction that although the public is more or less resistant, it is moulded by (verbal or iconic) writing, that it becomes similar to what it receives, and that it is *imprinted* by and like the text which is imposed on it. . . . Today the text is society itself. It takes urbanistic, industrial, commercial, or televised forms.[27]

22 Michael K. Hays, *Modernism and the Posthumanist Subject: The Architecture of Hannes Meyer and Ludwig Hilbersheimer* (Cambridge, MA: MIT Press, 1992), 4.

23 "White Spaces," *Australian Critical Race and Whiteness Studies* e journal 2:1 (2006).

24 Michel de Certeau, *The Practice of Everyday Life* (Berkeley: University of California Press, 1984), 136, 137.

25 Michel Foucault, *The Hermeneutics of the Subject: Lectures at the Collège de France 1981–1982*, edited by Frédéric Gros, translated by Graham Bruchell (New York: Picador, 2005), 3.

26 Michel Foucault, *Society Must Be Defended: Lectures at the Collège de France 1975–1976.* (London: Penguin, 2003), 7.

27 de Certeau, *The Practice of Everyday Life*, 167.

In saying this de Certeau does not support the idea that consumers are passive or that they are not creative. He contests the idea that the populace is left "grazing on the ration of simulacra the system distributes to each individual," but he does emphasize the might of that system.[28] To be creatively different, to avoid being part of a system (of white and fitted kitchens or other interiors, for example) may mean that you are in receipt of an education that reaps alterity and ingenuity. It takes time and energy to defy normative trends, which could also indicate a privileged status, even if it is the privilege to have time to be different. The blandness apparent in the answers to questions in the consumer survey may be indicative of an imposed economic order. This is an order represented as white and middleclass in terms of society, and in South Africa, merely having appliances means that you are middle class, which in the year 2000 was still mostly white. In a country that had been ruled by an exclusive white order of government, the possessions that went with that white order became part of the previously disadvantaged people's sense of right in a post-apartheid scenario.

The imposition of an order is something that Foucault spent most of his life investigating and that de Certeau engages with in terms of consumerism, saying: "It is in any case impossible to reduce the functioning of a society to a dominant type of procedures."[29] The idea of an overriding ideology that dominates and dictates how people should or should not live is, according to de Certeau, at variance with the "innumerable other practices that remain 'minor,' always there but not organizing discourses…."[30] Therefore, the question needs to be asked: How do the 23 percent of green, orange, and other colored kitchen cupboards in the case study fit into the hypothetically dominant color of kitchen interiors? And how do the people who inhabit these colored spaces live and act? Are they any different from those who accept or even choose the white and fitted scenario?[31] It is a fact of late capitalist society that people are often no longer referred to as people but as consumers, market sectors, and generational categories. This terminology has infiltrated many areas of communication, and people often become delineated according to material acquisitions and associated aspirations.

Material acquisitions are acquired in a variety of ways, and choices often depend on complex relationships between the family or household. Pierre Bourdieu writes that "educational capital" is an important distinguishing factor when making purchasing decisions. However, in terms of furniture and home decoration, he says, social class is usually more important than education.[32]

> The adjectives respondents have chosen to describe an interior, and the source of their furniture, are more closely linked to their social origin than to their educational qualifications….[33]

28 Ibid., 166.

29 Ibid., 49.

30 Ibid., 48.

31 Ibid., 45 and 49.

32 Pierre Bourdieu, *Distinction: A Social Critique of the Judgement of Taste*, translated by Richard Nice (Cambridge, MA: Harvard University Press, 1984), 79.

33 Ibid., 78.

Bourdieu's position is that lived experience and learned habits through class inheritance and the type of education afforded to it determine the kinds of "taste" decisions people make. Such a perspective presents one way of reading the idea of "white and fitted" as possessions worth having.[34] In the Bourdieu sense, the "social origin" of people in particular economic categories fixes their purchasing decisions unless they move out of that class through education. Daniel Miller's more recent ethnographic investigation examined the way in which tenants of flats with fitted kitchens in North London individualized their spaces and resisted the standardized installation-style lifestyle handed down to them or prescribed to them by the blandness of modern design.[35] Alison Clarke notes that immigrants from a wide array of countries in North London tend to either "perpetuate" or "reinvent" their material culture; these are not the same stories as those of architectural or interior design magazines or (as Clarke notes) the many home decorating shows on television that set the trends for decorating.[36] Glossy advertising and the promotion of furnishings and appliances present a distorted reality of an idealized social setting. This idealization is not a simple consumerist dream construction, but rather a distorted mirror, a "*zerrspiegel*,"[37] reflecting the avoidance of complex and different realities and governed by differing purchasing potential and social status.[38]

Some marginal living practice(s) resulting from immigration, refugee, and unsettled diasporic identities are overlooked identities that have the power to revise and unseat dominant ideologies by a natural resistance to the institutionalization of normativity.[39] This does not mean that architecture and interior design disciplines are not sensitive to the unusual and the peripheral—far from it; but the mainstream visual communication of most interiors does not do justice to the many mixtures of humanity and their spaces.

White becomes the (non) color of many spaces, so that the neutral space does not have the mark of anyone's individuality. D.J.B. Young's survey of real estate agents in London reinforces the ubiquity of white or cream neutrality:

> Evidently there is some widely understood social consensus about neutrality. It does not mean grey, which is the color that Western color science would term neutral. Here it constitutes lightness, a feeling of space and is impersonal, 'a blank canvas' is the recurring description agents give …. Anything that is not neutral, i.e. is colored, is by implication, a personal idiosyncrasy that other people cannot relate to. Nonetheless neutrality is culturally constructed….[40]

The cultural construction of neutrality is the permeating ideology of western similitude, but neutral is not the color that one would use to describe Cape Town in South Africa or, for that matter, any large

34 Ibid.

35 Daniel Miller (ed.), *Home Possessions: Material Culture Behind Closed Doors* (London: Berg, 2001).

36 Alison Clarke, "The Aesthetics of Social Aspiration" in Ibid., 26.

37 Roland Marchand, *Advertising the American Dream: Making Way for Modernity 1920–1940* (Berkeley: University of California, 1985), xvi.

38 See also Colin Campbell, *The Romantic Ethic of Modern Consumption* (Oxford: Blackwood, 1989); "Consumption and the Rhetorics of Need and Want," *Journal of Design History* 11:3 (1998): 236; and Daniel Miller, *Material Culture and Mass Consumption* (Oxford: Blackwell, 1987).

39 Alison Clarke (2001, p. 29) notes this point with particular reference to ethnic immigrants who live in state-designed, standardized housing; but see also Matthew Barac, "Transit Spaces: Thinking Urban Change in South Africa" in *Home Cultures* 4:2 (2007). Theodore Adorno, "Refuge for the Homeless," in *Minima Moralia: Reflections from Damaged Life* (London: New Left, 1974), 38–40; Sebastian Ureta, "Domesticating Homes: Material Transformation and Decoration among Low-Income Families in Santiago, Chile," *Home Cultures* 4:3 (2007): 311–336.

40 D.J.B. Young, "The Material Value of Colour: The Estate Agent's Tale," *Home Cultures* 1:1 (2004): 9.

city with a significant multi-cultural component—when the focus is on the details. That detailed visual culture includes the people, bright lights, signs, banners, markets, and hawkers, all animating the environment with energy and change. When and if this detail is merged into the superstructure, sameness is the residue. It is a case of people and power; the populace and especially the crowd always pose a threat to systems of control and governments.[41] The contradictions between the clean, neutral surfaces of modernisms (old and new) and the vibrancy of color conflate with the dialectic in power relations and governmentality. In this way white and its equivalents in the post-industrial world compete with voices of constituted colors. Stephen Eskilson traces the entry of color into consumption, describing the 1920s and 1930s environment as if it were a symphony and theatre of color, both day and night. He writes that color became the dominant code for retail in a "rainbow arsenal of products."[42] This era was a period of high modernism, with the vitality of synthesized color relegated to retail, shopping, and consuming. While the stories and reality of color in visual culture cannot be ignored, not then and not now, this article argues that there is also a resistance to the varieties of color that is easier to overlook. Whites in their apparent neutrality can permeate backgrounds without their advancement's being particularly noticeable. It is this seemingly stealthy movement of whites and neutrals across culture and thinking that is of particular interest to me.

David Batchelor, in his book *Chromophobia*, begins his first chapter entitled "Whitescapes" with a personal visit to the home of a renowned Anglo-American art collector. Batchelor notes the appearance of empty whiteness:

> . . . seamless, continuous, empty, uninterrupted. Or rather: uninterruptable. There is a difference. Uninterrupted might mean overlooked, passed by, inconspicuous, insignificant. Uninterruptable passes by *you*, renders *you* inconspicuous and insignificant. The uninterruptable, endless emptiness of this house was impressive, elegant and glamorous in a spare and reductive kind of way, but it was also assertive, emphatic and ostentatious. This was assertive silence, emphatic blankness, the kind of ostentatious emptiness that only the very wealthy and the utterly sophisticated can afford. It was a strategic emptiness, but it was also *accusatory*.[43]

One may ask, then, to what extent the idea of a neutral, smooth, uncluttered, monochromatic and built-in kitchen is evidence of an identity that differs from the normative institution of modernism (the bland bank building; the grid-formed office block of an insurance company; the modular mass housing estates)? Is not such an identity still the tenacious modernist and Taylorist gauge of time and motion? Easy to clean and saves time? However, white, as Wigley tells us, is

41 James M. Mayo, "Propaganda with design: Environmental Dramaturgy in the Political Rally," *Journal of Architectural Education* 32:2 (1978).

42 Stephen Eskilson, "Color and Consumption," *Design Issues* 118:2 (2002): 27.

43 David Batchelor, *Chromophobia* (London: Reaktion, 2000): 9, 10.

only as clean as its surface layer, one that is thin and impermanent.[44] This point is the subject of another paper[45] on the relationship between washing and whiteness, but it can suffice to say here that the continued and increasing pressures of work and life are not so easily washed or boxed away.

Conclusion

Post-apartheid society and the fêted rainbow nation have been generally romanticized as a colorful ideal of multi-lingual ethnicities making efforts to share cultures and bury hatchets. But that is an exterior, trendy street view and constitutes a quintessential postmodernism, one that is vibrant and edgy. Certainly the "post" in this sense is nonconformist—it does not fit to size; it is a "post" that constantly plays with its rainbow reflections. Against the backdrop of such color, pristine white kitchens photographed in glassed interiors are the marketing face of a design that capitalizes on the contrast such romantic color offers to the neo-modernist visage of whiteness. However, the reality is more mundane and filled with the dulled whites of overuse. Old whites are a continuation of a faded modernism that failed to be redeemed by the promise of a post future. In this sense the ordinary person is a tired individual. Late capitalist production continues to serve up the leftovers of an unrevised type of modernism because it is the easier and cheaper option for consumers.

At certain times in their lives and in certain places of their domicile, people construct a type of identity according to their circumstances. Such an identity results from an external collective association and does not necessarily include the formulation of subjectivities that are internal and personal. Identity (as in design identity) incorporates color, form, and shape and is directly aligned with the material world. To be white and fitted, then, is an identity that suits certain strata of society that, for economic, social, or other reasons, is unable *or* unwilling to move out of that mold for a certain period of time. The mold or structure offers a safety net, a secure status that is part and parcel of institutionalized normativity. Such is the strength of uniform design and color distribution; a leveling out and neutralizing of form and color is precisely the ideology of whiteness as an institution.

People, possessions, and power are calibrated upon the surface structure of whiteness. White in domestic design in this way is a type of imposed order that emanates from the dominant text of a western capitalist society. To succumb to the prescription of being white and fitted as a human being is less easy to describe than to be white and fitted as an interior, and it is the interiors as an extension of the human being with which this article has concerned itself. In so doing, the identity of the person and the kitchen area of their home conflate interior architectural space with subjectivity (interior psychological space). To be white and fitted as an

44 Mark Wigley, *White Walls, Designer Dresses,* xviii.

45 "Washing White" in *The Racial Politics of Bodies, Nations and Knowledges*, edited by Barbara Baird and Damien Riggs (Cambridge: Cambridge Scholars Press, 2009).

individual person and not a collective (e.g., an institution, as stated above), could indicate either a denied and confused identity or a latent search for subjectivity. The ordinary person living, working, cooking, and cleaning in a white and fitted space is not necessarily there out of choice in a world so filled with choices. Perhaps then, the questions surrounding "white and fitted, perpetuating modernisms," constitute the ironies and tensions that are part of democracy and freedom—something much deeper than the color and form.

Theories of Technical Functions: Function Ascriptions Versus Function Assignments, Part 1

Peter Kroes[1]

Introduction

The notion of function plays a central role in the engineer's way of thinking. It is hard to imagine how engineers could do without function talk.[2] They assume that the technical artifacts they design, make, and maintain and their components all have technical functions. But what does it mean to say that a technical artifact "has" a technical function (or a functional property or feature)? This question has been troubling engineers as well as philosophers. Engineers address this problem mainly for pragmatic reasons; they are interested in knowing how to represent formally or computationally the functional properties of technical artifacts in software tools intended to support engineers in their daily work. One of the main reasons why philosophers have been interested in the notion of function is its connection with the notion of teleology, which itself raises all kinds of conceptual, metaphysical, and epistemological problems.

A problem that both engineers and philosophers run into when analyzing the notion of technical function is its relation to physical structures and human intentions. They run into this problem from, so to speak, opposite directions. From an engineering point of view, that the function of a technical artifact, such as a television set, is closely related to its physical structure is obvious, because it is the physical structure that realizes or performs the function. One of the main tasks of engineers is to design, develop, and produce physical structures that can perform all kinds of technical functions. Nevertheless, the function of a television appears to be related also to what people use it for—that is, to the intentions of human beings. A television is a means to a certain end, and that end is an end of human beings. It is in relation to human ends only that the television appears to be a means, and to have a function. In engineering practice this close relation of technical functions to human ends comes to the fore in, for instance, the early stages of design projects, in which human needs and desires have to be translated into functions and functional requirements.

Within philosophical circles the dominant starting point for analyzing technical functions is the idea that these functions are mind dependent; technical artifacts are taken to have their functions only in

1 Department of Philosophy, Faculty of Technology, Policy and Management, Delft University of Technology, The Netherlands; email address: p.a.kroes@tudelft.nl. I would like to thank the members of the Department of Philosophy, particularly Bjorn Jespersen, for their valuable comments on earlier versions of this paper.

2 I am not claiming that the term "function" itself is indispensable in engineering practice. (Its use among engineers appears to be of relatively recent date; for instance, it does not figure in descriptions of the early steam engines.) The term "function" may be eliminated from engineering practice, but the notions of purpose or for-ness ("What is this for?"), to which it is closely related, cannot.

relation to human intentions.[3] The reason for this perspective is that in this way it is possible to avoid the rather problematic conclusion that technical artifacts by themselves are teleological objects (i.e., are objects that by themselves have ends). In these mind-dependent views, any teleological aspect of technical functions may be traced back to teleological aspects of intentional human action (which is considered to be unproblematic); insofar as technical artifacts are *for* doing certain things, they have this "for-ness" only in relation to human ends. This, however, cannot be the whole story about technical functions because it ignores their close relation to physical structures, and it is not obvious how this aspect may be accounted for within these mind-dependent views.[4]

So engineers and philosophers, each in their own way, struggle with the role of physical structures and human intentions in explicating what it means for a technical artifact to have a function. My aim is to contribute to a clarification of these roles. I focus on the role of human intentions in mind-dependent theories of technical functions. These theories are usually presented as function *ascription* theories, because technical artifacts are considered not to have functions by themselves but only in relation to the intentions of human beings. However, as pointed out by Hansson,[5] the notion of function ascription is ambiguous; it may be taken in a descriptive and in a performative sense. I argue that care must be taken not to confuse descriptive and performative function ascriptions in mind-dependent theories of technical function. More particularly, I intend to show that only performative function ascriptions can ground the mind dependency of technical functions. To do so it is necessary to make a distinction between epistemic and ontological theories of technical functions. Part 1 of this paper introduces this distinction and analyzes the general form of epistemic and ontological theories of technical functions. On the basis of this preparatory work, I analyze in part 2 the role of descriptive and performative function ascriptions in epistemic and ontological theories of technical functions. To illustrate their different roles, I present the outline of a theory (epistemic and ontological) of function ascriptions that is based on the way engineers conceive of and describe technical artifacts. According to this theory, functional properties of technical artifacts have a hybrid (dual) nature: They are mind dependent in the sense that they depend on performative function ascriptions, but they also depend on the physical properties of technical artifacts. According to this function ascription theory, both human intentions (involved in performative function ascriptions) and physical structures have to play a crucial role in answering the question of what it means for a technical artifact to have a function.

Epistemic Theories of Function

My focus is on technical artifacts whose functions are realized by

3 See, for instance, Mark Perlman, "The Modern Philosophical Resurrection of Teleology," *The Monist* 97:1 (2004): 3–51, and Beth Preston, "Philosophical Theories of Artifact Function," in *Handbook of Philosophy of Technology and Engineering Sciences*, ed. Anthonie Meijers Elsevier, 2009): 213–234.

4 Peter Kroes and Anthony Meijers, "The Dual Nature of Technical Artefacts," *Studies in History and Philosophy of Science* 37 (2006): 1–4.

5 Sven Ove Hansson, "Defining Technical Function," *Studies in History and Philosophy of Science* 37 (2006): 19–22.

material/physical objects or systems (so I am not considering the functions of processes). Any such technical artifact may roughly be characterized as a physical object or construction (X) that in addition to its physical properties has one or more functional properties, namely to do something with (to φ, ψ with etc.). I distinguish between two different kinds of functional properties that may be attributed to an object X, namely

"X is for φ-ing" and

"X is a φ-er."

An object with the property of being a φ-er is an instance of the functional artifact kind φ-er.[6] An object may be for φ-ing without being a φ-er. Think of a coin that in a particular situation is being used as a screwdriver. In that context, the coin may be said to be for driving screws (for φ-ing), without being a screwdriver (a φ-er).[7] I assume that "X is a φ-er" implies "X is for φ-ing."[8]

Our next step is to explicate the meaning of an object "having" the property of being for φ-ing or being a φ-er. This explication may be done from an epistemic and an ontological point of view. An epistemic explication focuses on what it means for an agent A to justifiably believe (or even know) that X has the functional properties of being for φ-ing or being a φ-er. Its aim is to define justified beliefs about functional properties of X in justified beliefs about other kinds of properties of X. This aim makes sense only if justified beliefs about functional properties are not considered to be some kind of basic or primitive beliefs themselves. Ontological explications aim at defining functional properties in terms of (what are considered to be) more basic ontological properties.[9]

Epistemic theories of function have the following general form:

> Agent A justifiably believes that X has the functional property of being for φ-ing (being a φ-er) if A justifiably believes that X has properties P1, . . . Pn (P1', . . . Pn').

Going through the technical function literature, epistemic function theories of this form are seldom encountered. Epistemic function theories usually take the form of function *ascription* theories (i.e., theories that specify necessary and sufficient epistemic conditions for an agent A to be justified in *ascribing* a certain functional property to a technical artifact). This appears to result from the widespread idea that ontologically technical artifacts have no intrinsic functional properties, no functional properties by themselves; they are taken to be mind-dependent (or ontologically subjective) properties.[10] Functions are generally taken to be ascribed, attributed, or assigned to objects by intentional agents.

Taking over the terminology of function ascriptions and taking into account the distinction between two different kinds of functional properties, we end up with two general types of epistemic function ascription theories. The first type, to be called *theories of*

6 For a discussion of treating kinds and types as properties (universals), see Linda Wetzel, "Types and Tokens," in *The Stanford Encyclopedia of Philosophy (Summer 2006 Edition)* , ed. Edward N. Zalta (http://plato.stanford.edu/archives/sum2006/entries/types-tokens/).

7 This, of course, is related to the distinction between proper and accidental functions.

8 This assumption may be questioned. Consider, for instance, a model boat; it is a boat, but it is not for transporting people or goods over water (see Paul Bloom, "Intention, History, and Artifact Concepts," *Cognition* 60:1 (1996): 1–29, and Amie L. Thomasson, "Artifacts and Human Concepts," in *Creations of the Mind: Essays on Artifacts and Their Representations*, ed. Stephen Laurence and Eric Margolis (Oxford: Oxford University Press, 2007): 52–73. Whether a model boat is a real boat, however, is a controversial claim; after all, the model boat is a model of a real boat (so we have to distinguish between different senses of what it means to be a real boat). I will leave these instances out of consideration.

9 See also Pieter Vermaas, "On Unification: Taking Technical Functions as Objective (and Biological Functions as Subjective)," in *Functions in Biological and Artificial Worlds: Comparative Philosophical Perspectives*, ed. Ulrich Krohs and Peter Kroes (Cambridge, MA: MIT Press, 2008): 69–87.

10 John Searle, *The Construction of Social Reality* (London: Penguin Books, 1995).

function ascription, concerns the ascription of the functional property of being for φ-ing; the second, to be called *theories of function kind ascription*, concerns the functional property of being a φ-er. Ideally, epistemic theories of ascribing functional properties should state a set of conditions, each of which is necessary and jointly sufficient for an agent A to justifiably ascribe the properties of being for φ-ing and being a φ-er to an object X:

> *Epistemic theory of function ascription*:
> Agent A is justified in ascribing the property of being for φ-ing to object X (that is, in ascribing the function of to φ to X) if agent A has justified beliefs that C1, C2, . . . , and Cn.
>
> *Epistemic theory of function kind ascription*:
> Agent A is justified in ascribing the property of being a φ-er to object X if agent A has justified beliefs that K1, K2, . . . , Kn.

The set of conditions K1 . . . Kn has to include the set of conditions C1 . . . Cn because, as I remarked above, function kind ascription implies the corresponding function ascription, but not the other way around.

That the notion of ascription in these epistemic theories of function ascription is interpreted in the right way is crucial. As Hansson remarks, the notion of function ascription is ambiguous between two meanings, namely a descriptive and a performative one:

> A person makes a *descriptive* function ascription if she holds or expresses a belief (or similar propositional attitude) that an object has a certain function. Hence, when I tell a friend that a particular object in my violin case is a shoulder rest, I make a descriptive function ascription. A *performative* function ascription is an utterance or other action by which a person assigns or tries to assign a function to an object that the object did not have before. A decision to start using a particular cushion as a shoulder rest constitutes a performative function ascription in this sense.[11]

In discussions about function theories, whether epistemic or ontological, this distinction is seldom taken into account. However, descriptive and performative function (kind) ascriptions are not to be confused. They are different kinds of activities. Making a descriptive function (kind) ascription is making an epistemic claim that may be true or false (justified or unjustified), whereas making a performative function (kind) ascription is not. Performative function (kind) ascriptions may be successful or not. They may play an important role in epistemic theories of function (kind) ascriptions. For instance, a person A may make a descriptive function ascription to an object X partly on the basis of her belief (or knowledge) of a performative

11 Hansson, "Defining Technical Function," 20–21.

function ascription to X by another person B (or a social group). This type of ascription is exactly, as we will see in detail in part 2, what is at issue in mind-dependent theories of function. To avoid confusion, in the following paragraphs I refer to performative function (kind) ascriptions as function (kind) *assignments;*[12] for the descriptive case, I use the expression function (kind) *ascriptions* or *attributions*.

Epistemic theories of function (kind) ascriptions are intended to explicate function (kind) ascriptions in the descriptive sense. In other words, an agent A who is justified in ascribing the property of being for φ-ing (being a φ-er) to X justifiably believes that X has the property of being for φ-ing (being a φ-er) and vice versa. So A's belief that X has the function to φ (or that the function of X is to φ) amounts to the same as A's being justified to ascribe (in the descriptive sense) the property of being for φ-ing to X. Note that in general A may be justified in holding that X has a certain functional property independent of A or anybody else assigning that functional property to X. Epistemic function ascription theories are therefore not committed to the idea that functional properties are mind dependent.

The general form of the above epistemic function (kind) ascription theories allows for the possibility that the functional properties ascribed are relational in character. This relationality is the case when the justified beliefs C1 . . . Cn (K1 . . . Kn) not only are about the object X itself, but also refer to other items. For instance, in the ICE-theory of function proposed by Vermaas and Houkes, function ascription by an agent to an object X is defined relative to a use plan *p* for X and relative to an account *A* of the behavior of X.[13] Thus, for an object X to have the function to φ is a *relational* property. The possibility that functional properties are relational may be made explicit by modifying the general form of epistemic theories of function (kind) ascriptions in the following way:

> *Epistemic theory of relational function ascription:*
> Agent A is justified in ascribing the property of being for φ-ing to object X relative to R (which is equivalent to ascribing the function to φ to X relative to R) if A has justified (or even true) beliefs that C1, C2, . . . , and Cn.
>
> *Epistemic theory of relational function kKind ascription:*
> Agent A is justified in ascribing the property of being a φ-er to object X relative to R' if A has justified (or even true) beliefs that that K1, K2, . . . , Kn.

Here, it is assumed that the items in R and R' are the object of some of the beliefs C1 . . . Cn and K1 . . . Kn, respectively. If not, there would be no point in relativizing the ascription of function (kind) to R (respectively R'). R (R') may contain various kinds of items; apart from use plans and an account as in the ICE-theory, it may contain items such as social groups (e.g., users, designers), social practices, or a system of which X is a part.

12 See also Searle, *The Construction of Social Reality.*

13 Pieter Vermaas and Wybo Houkes, "Ascribing Functions to Technical Artefacts: A Challenge to Etiological Accounts of Functions," *British Journal for the Philosophy of Science* 54: 2 (2003): 261–289.

Ontological Theories of Function

Ontological theories of function are intended to explicate what it means for an object to have a function in the ontological sense of "have." Again I concentrate on the properties of being for φ-ing and being a φ-er and on the general form that ontological theories of these functional properties may take. I assume that functional properties are not among the most basic ontological properties of the world (i.e., that they can be further ontologically explicated). Most ontological theories of functions explicitly or implicitly make assumptions about a (more) basic ontology of the world and then analyze the ontological status of functional properties against the background of this (more) basic ontology. Taking into account that functional properties may be construed as ontologically relational properties, I propose the following general form for ontological theories:

> *Ontological theory of function:*
> Object X has the functional property of being for φ-ing relative to S if X satisfies the conditions O1, . . . ,Oj.
>
> *Ontological theory of function kind:*
> Object X has the functional property of being a φ-er relative to S′ if X satisfies the conditions P1, . . . ,Pk.

If we assume, as before, that "X is a φ-er" implies that X is for φ-ing, then the set of conditions O1, . . . ,Ok is a (proper) subset of the set of conditions P1, . . . ,Pk. The conditions O1, . . . ,Oj (P1, . . . ,Pk) are to be stated in terms of the basic ontological properties of X, and some of them have to refer to S (S′).

As an illustration of an ontological theory of function that comes close to interpreting a function as a physical property, consider the following Cummins-style theory:[14]

> Object X has the functional property of being for φ-ing relative to a system S with capacity ψ (i.e., has the function to φ relative to system S with capacity ψ) if:
> X is part of system S, and
> X has the capacity to φ, and
> X's capacity to φ contributes causally to S's capacity to ψ

Given such an ontological theory of functions, it must be assumed that capacities belong to the basic ontological structure of the world. Moreover, the relation "being part of" in (i) and the causal relation in (iii) are taken to be ontological relations.

This Cummins-style theory strongly assimilates functions into the ontology of the physical world. In contrast to this approach, consider McLaughlin's ontological theory of functions.[15] McLaughlin sets out to present an ontological analysis of what it means to be a technical artifact and how an artifact acquires its function. He claims that artifact functions are ontologically conferred, attributed, or

14 I call it a "Cummins-style theory" because the analytical account A is suppressed; see Robert Cummins, "Functional Analysis," *Journal of Philosophy* 72:20 (1975): 741–765.

15 Peter McLaughlin, *What Functions Explain: Functional Explanation and Self-Reproducing Systems* (Cambridge: Cambridge University Press, 2001).

ascribed to objects by agents.[16] According to McLaughlin, the function of an object is conferred onto the object through the beliefs and desires of an agent. When there are no agents, there are no purposes and therefore no functions. Thus, without agents there are no artifactual functions or artifactual categories. McLaughlin claims that "Screwdrivers, tractors, pruning knives are culturally determined functional kinds, not natural kinds."[17] Insofar as functions and function kinds exist, they exist, according to McLaughlin, relative to the mental states of human agents. Now suppose that these mental states are part of the basic ontology of the world. Then the following McLaughlin-style ontological interpretation of functions may be proposed:

> Object X has the functional property of being for φ-ing (being a φ-er) relative to the mental states of agent *A* if Agent *A* has mental states in which the functional property of being for φ-ing (being a φ-er) is conferred on (attributed, ascribed to) X.

Note that in this ontological theory of functions (function kinds), the physical capacities of X play no role at all. The reason is that, according to McLaughlin, criteria for successful use in principle play no role in conferring functions upon objects.

With the help of these general forms of epistemic and ontological theories of technical functions I analyze in part 2 the role of human intentions (and of physical features) in theories of functions of technical artifacts. I end this part with some general remarks on the relations between epistemic and ontological theories of function.

The Relation Between Epistemic and Ontological Theories of Function

Given these two kinds of theories of functions, a necessary question is how they are related. Leaving aside fundamental issues about how epistemology and ontology in general are (to be) related to each other, I restrict myself to a few remarks that concern this specific case of function theories. With regard to ontological theories of function, it seems important to take into account some form of epistemic access to the ontologically defined functions. What point could there be, in particular from a pragmatic engineering point of view, in introducing an ontological definition of functions such that it would in principle be impossible to have knowledge of these functions? Assuming that we may have knowledge of part-whole relations, physical capacities, and causal relations, the Cummins-style theory satisfies this demand for knowledge. The demand of epistemic access does not imply that, in each and every case where some object X ontologically has a function, it will be possible to gain knowledge of that function. Suppose that the ontological definition of functions refers to events in the history of X (e.g., to the intentions of the

16 Note that McLaughlin uses the notion of function ascription in an ontological sense (as opposed to the epistemological sense defined above).

17 Peter McLaughlin, *What Functions Explain: Functional Explanation and Self-Reproducing Systems*, 44.

designer of X), and suppose further that we may have knowledge of the intentions of other people. Situations may occur in which all information about the relevant historic events is lost forever.[18] Then, it may occur that object X has ontologically a function, knowledge of which has become impossible. In principle, however, it would have been possible to have knowledge of this function on the basis of knowledge about the relevant historic events. So, depending on general assumptions about what kind of knowledge human agents may have, ontological theories of functions should be such that they allow inprinciple knowledge of those functions. One way to ensure this possibility is to construe ontological theories of functions on the basis of the "ontological commitments" of the most viable epistemic theories of functions.[19]

In part 2 of this paper, I put to work the distinction between function ascriptions and function assignments, on the one hand, and between epistemic and ontological theories of functions on the other. There I show that the mind dependency of functions of technical artifacts, whether it is intended in an epistemic or ontological sense, finds its origin in function assignments. I also present an outline of an epistemic and ontological theory of functions according to which technical functions have a dual nature: they are intimately related to physical features as well as to human intentions.

18 See also Dipert's discussion of what it means for an object to be artifactual; Randall R. Dipert, *Artifacts, Art Works, and Agency* (Philadelphia: Temple University Press, 1993).

19 I put ontological commitments between quotation marks because this notion was originally developed by Quine for formalized theories, whereas here it is used in the context of informal theories; see Quine W. V. Quine, *From a Logical Point of View: 9 Logico-Philosophical Essays*, 2d ed. (Cambridge, MA.: Harvard University Press, 1980).

Doctoral Education in Design: Problems and Prospects

Victor Margolin

This article appeared in a slightly different version in *Elisava TdD 26* (November 2009).

The Nature of Design Research

In October 1998, the first conference on doctoral education in design was held at Ohio State University. Sponsored by *Design Issues*, The School of Design at Carnegie Mellon University, and the Department of Industrial, Interior, and Visual Communication Design at Ohio State University, it brought together participants from a number of countries and resulted in a published set of papers.[1] In his keynote address to the conference, Richard Buchanan, then Director of The School of Design at Carnegie Mellon University and a co-editor of *Design Issues* made a distinction between paleoteric thinking, which he said was "based on the identification of *discrete subject matters* such as we find throughout the university today," and neoteric thinking, which was "based on *new problems* encountered in practical life and in serious theoretical reflection." The goal of paleoteric education, he continued, was to "expand the knowledge of a particular subject matter, often in greater and greater detail," while the goal of neoteric education was to "gather resources from any area of previous learning in order to find new ways of addressing the new problems, thereby creating a new body of learning and knowledge."[2] Buchanan envisioned doctoral education in design as a neoteric enterprise that could become "a model of what the new learning may be in our universities and in our culture as a whole."[3]

Since that conference and several others that followed in La Clusaz, France (2000), Tsukuba, Japan (2003), and Tempe, Arizona (2005), interest in doctoral education in design has increased considerably, and a large number of new programs have been established.[4] Today they exist in many countries and more are on the way, despite the fact that the fundamental questions about what constitutes doctoral education and what it is for remain unresolved. Most new programs appear to be devised locally without reference to others elsewhere.

What then are we to make of this cacophony of doctorates, each claiming that its recipients possess a body of knowledge that both signifies a mastery of the design field and qualifies them to contribute to it by producing research of their own? To raise questions about the state and status of doctoral education, we also need to consider the state of design research, a field that itself remains equally cacophonous and without a set of shared problematics. Of most concern, at least to this writer, is a lack of

1 See Richard Buchanan, Dennis Doordan, Lorraine Justice, and Victor Margolin, eds. *Doctoral Education in Design 1998: Proceedings of the Ohio Conference, October 8–11, 1998* (Pittsburgh: The School of Design, Carnegie Mellon University, 1999).

2 Richard Buchanan, "The Study of Design: Doctoral Education and Research in a New Field of Inquiry," in *Doctoral Education in Design 1998: Proceedings of the Ohio Conference, October 8–11, 1998*, 6–7.

3 Ibid., 7.

4 See David Durling and Ken Friedman, eds. Doctoral Education in Design: Foundations for the Future. Proceedings of the Conference held at La Clusaz, France, 8–12 July 2000 (Staffordshire: Staffordshire University Press, 2000) and David Durling and Kazuo Sugiyama, eds. Proceedings of the 3rd Doctoral Education in Design Conference, Tsukuba International Congress Center, Tsukuba, Japan. 14–17 October 2003.

consensus as to how we identify the subject matter of design and, of equal importance, what design research is for and how different communities of researchers contribute to its purpose.

The first question may be easier to answer than the second. Richard Buchanan was correct when he stated in his Ohio State address "design does not have a subject matter in the traditional sense of other disciplines and fields of learning."[5] Elsewhere he broadly characterized the subject matter of design thus: "Design is the human power of conceiving, planning, and making products that serve human beings in the accomplishment of their individual and collective purposes."[6] Buchanan's broad definition is one that I share. A related definition had been put forth twenty years earlier by Bruce Archer, director of the Design Research Department at the Royal College of Art in London. In a seminal conference paper on design research, Archer stated that design was "the combined embodiment of configuration, composition, structure, purpose, value, and meaning in man-made things and systems."[7] What the definitions of Buchanan and Archer have in common is that they conceive design broadly and do not limit it to a set of given taxonomic categories. As Buchanan noted, designers are continually inventing new subject matter; thus, it is not possible to limit the investigation of design to a fixed set of material or immaterial products.

Given the fact that design is not fixed but is continually developing, we need to distinguish between how it is constituted as a subject for design researchers and those who educate them and how subject matter is constituted for scientists and scholars in the humanities. When we study design, we study a form of human action that arises from a social situation. Design is thus part of the study of society rather than nature. According to the social constructivists, society itself is a contingent phenomenon whose structure and organization, like design products, is human made rather than decreed by nature. Like design research, social research may be concerned with what has been done, what currently is, and what might be.

However, I do not wish to draw too close a comparison between the social world as a constructed entity and the world of products, which is only one part of it.[8] The social world is far more complex and requires many more disciplines to study its diverse aspects. Nonetheless, the realm of design does partake of this complexity in that the production, distribution, and use of products are part of a larger social process.

I now want to distinguish the study of design from two other subjects that are rooted in the natural, rather than the social, world. I am not going to draw a reductive comparison between the two worlds, claiming that the natural world is completely a product of nature and the social world is completely a product of human construction. In fact, humans have intervened in nature throughout history and what appears to us as the natural world

5 Buchanan, The Study of Design, 7.

6 Richard Buchanan, "Design Research and the New Learning," *Design Issues* 17:4 (Autumn 2001): 9.

7 Bruce Archer, "A View of the Nature of Design Research," in Robin Jacques and James A. Powell, eds. Design, Science, Method (Guilford, UK: Westbury House/ IPC Science and Technology Press, 1981), 30.

8 See my essay, "The Product Milieu" in Richard Buchanan and Victor Margolin, eds. *Discovering Design: Explorations in Design Studies* (Chicago and London: The University of Chicago Press, 1995).

today is a world that has absorbed these interventions. Nonetheless, what differentiates today's natural world from the social world is the degree of cause and effect that arises as a result of human intervention. To clarify this difference, let us look at the history of research on the human body that has lead to our current understanding of health and its absence.

For centuries, researchers have mapped the human body, identifying its anatomy, its organs, and more recently its genetic code. On the basis of this mapping, theories of medicine arose that today are the basis for maintaining a given level of health. As a result of medical knowledge, a host of interventions that range from medical procedures and drugs to artificial limbs and organs has evolved. There is much that we still do not understand about the human body and the factors that cause its illness, but many problems have been identified and researchers continue to work on them.

The reason for mentioning the human body here is to present a research paradigm that I will then compare with a related paradigm for design research. To make my point, I will not make reference to the research on the human mind, which is considerably less developed than that on the body in that we can explain less about how and why humans behave as they do than we can about how the body functions. The paradigm of research on the body is based on the following premises:

- There is a discrete phenomenon—the human body—to be investigated. That phenomenon is essentially stable.
- Research on the human body is cumulative. What researchers in the past have discovered contributes to our current knowledge.
- There is a consensus on the criteria that the different methods for studying the human body must meet to be accepted as valuable.
- Applications of the accumulated knowledge about the body result in productive interventions.
- There is a broad consensus on what constitutes a healthy body and agreement on what impedes health.
- Accumulated knowledge of the body has led to the identification of research problems that will advance that knowledge.

In sum, the history of research on the body has resulted in a community of medical investigators who work within a relatively well-defined set of problems. Their investigation is supported by a system of pedagogy, journals, conferences, and funding from government and private sources. The funds allocated by the Bill and Melinda Gates Foundation or the World Health Organization, for example, are based on the confidence that money well spent will help to eliminate certain diseases.

We can also consider another research paradigm based on the study of the earth and the natural forces that affect it. Over centuries geographers and other scientists have mapped the physical structure of the earth and learned to understand the delicate balance of its surrounding environment and its ecosystems that also include living beings from insects to humans. As with the human body, we have seen that absent the conditions for healthy living, the earth becomes unhealthy. This, in turn affects the quality of human life.

Given the vast complexity of the earth compared to the human body, it is easier for skeptics to doubt the claims that the earth's health depends on particular conditions that are partly created by human behavior. Too much carbon dioxide in the atmosphere, many scientists argue, contributes to global warming. Evidence is to be seen in the melting of the polar ice cap and in severe climate change. Many types of researchers—biologists, geophysicists, botanists, chemists, and lots of others—study the earth. Although they work in different fields, their research methods are compatible and the findings of researchers in one field can be related to those in another. As with the study of the human body, there is a general consensus on research methods and on how to assess the validity of research results.

By contrast with the natural world, the constitution of the social world as a field of study entails a far higher degree of constructivism than the study of the human body or the earth; that is to say, there is no point of origin where the social world was given to humans as a prior phenomenon. It was and continues to be created by us. Over the years, many social scientists have sought to explain social processes in terms of laws, but these explanations have always been tentative and only a few have resulted in satisfactory predictions of social behavior that can be counted on.

The fact that design is a contingent practice makes its study significantly different from the study of a given phenomenon like the human body or the earth. On the one hand design is evident in what has already been done—the products that have been created in the past along with the conditions of their production and use. On the other hand, design is an activity that produces new products; hence, its study needs to focus in part on how that is done, what new products might be produced, and how.

The history of design education is rather short. Design for industry and mass communication arose from craft practices and techniques. Although the Industrial Revolution began in the eighteenth century, the practices that we today call product design and graphic design had their roots in the 1920s and 1930s, and educational programs to train designers began in those years. Master's degrees in design that qualified designers to teach others are a post–World War II phenomenon. Bruce Archer writes that the Design Research Department at the Royal College of Art was

9 Archer, "A View of the Nature of Design Research," 32. Archer does not indicate in his article, however, when the first PhD in design was awarded at the RCA.

converted in 1976 to a postgraduate teaching department where Master's and PhD degrees were awarded.[9]

Although it is clear that the principal purpose of the Master's degree was to prepare teachers of design by offering more advanced design courses and the opportunity to engage in a modest research project, the purpose of a general doctorate in design has never been well articulated. In several countries, the doctorate has become a symbol for research and has been made a requirement for teachers of design. Thus, the degree is more symbolic than pragmatic and the need to do research is not driven by a shared research problem or set of problems but instead by the need to maintain the status of the degree.

Problems with Design Doctorates

We can cite a number of reasons why the purpose of design doctorates remains unclear or questionable. First is the dissociation of design research from the design professions. Even though design within the broad definitions of Buchanan, Archer, and others can embrace engineering, architecture, and computer science, as well as product design, interior design, and communication design, these communities of practitioners are sharply divided, and the fields of engineering, architecture, and computer science have their own doctorates. The communities of product and communication designers have not been engaged in discussions about doctoral education in design, and consequently the international design associations, such as ICOGRADA (International Council of Graphic Design Associations), ICSID (International Council of Societies of Industrial Design), and IFI (International Federation of Interior Designers/Architects) have little or no connection to the world of design research as it is represented by IASDR (International Association of Societies of Design Research).[10] Consequently the general field of practice is not calling for a higher degree to meet a specific purpose. The result of this is that the general field of practice is not calling for a higher degree to meet a specific purpose. The consequence is that there is no formal relation between the design research community and those who design.

A second reason is that a great deal of interesting work that might well be called design research is being carried out by experts who were not trained in the field. Large corporations like Google, Microsoft, IBM, Hewlett-Packard, Intel, and many others hire PhDs for their research teams in fields ranging from electrical and software engineering to anthropology and psychology. Deutsche Telekom, for example, has a large research center, Deutsche Telekom Laboratories, that does research on future products and services. Intel also hires academics to conduct fieldwork on how consumers use mobile phones and other products. One can assume that extensive research on new products continues in all large corporations that produce consumer goods. These range from Samsung in Korea to Nokia in

10 Members of the IASDR are the China Institute of Design, the Design Research Society, the Design Society, the Japanese Society for the Science of Design, and the Korean Society for Design Science.

Finland. In general, there is no clear connection between the needs of these companies for experts in the design of complex objects and systems and the universities that should be producing such experts. One explanation for this lack of connection is the Media Lab at MIT, where doctorates are awarded to students who work on a range of projects that involve design, although such projects are not necessarily called by the name. Graduates of the Media Lab are well prepared to undertake design-related tasks of an advanced nature, and some find their way to positions in large corporations. The newly-formed Aalto University in Helsinki, which resulted from a merger between the University of Art and Design, the Helsinki School of Economics, and the Helsinki University of Technology, also plans to offer advanced studies in design-related fields to meet the government's call for more innovation. Unfortunately, the research done by industry is proprietary and does not form part of the achievements with which the international design research community is publicly identified.[11] Consequently, a survey of research topics as indicated by various conference proceedings does not yield a strong sense of consensual problems for which researchers are finding solutions.

An additional reason why the purpose of design doctorates remains unclear or questionable is the lack of communication between the different design research communities that exist in fields like engineering, interaction design, software design, and so forth. Although much research in these communities is technical and therefore not easily accessible to those outside the immediate circle of researchers, there is little discussion in the general design literature about how relations between these research fields might be improved.

One conclusion to draw from this analysis is that doctorates in design need to have some focus, just as they do in the related field of engineering. There is no single doctorate in engineering nor is there a single engineering research community. Generally, a university has a College of Engineering with separate departments for electrical engineering, mechanical engineering, civil engineering, bioengineering, aeronautical engineering, and other specialties, all of which were created to address specific sets of practical problems. In the future, we may see something similar in design as doctorates are offered in interaction design, transportation design, organization design, social network design, service design, sustainable design, and many other potential fields.[12] Such doctorates ought to arise as problem areas are identified, thus lending assurance to students in those programs that they will be entering a job market that has a need for their expertise.

To complement these doctorates in design, there is a need for advanced degrees in design history and design studies. Design history is already a distinct field with various opportunities for doctoral study. As a research field it is well developed with several

11 There are occasional exceptions to this situation of proprietary research. See the article by Genevieve Bell, a staff anthropologist at Intel, "*Satu Keluarga, Satu Komputer* (One Home, One Computer), Cultural Accounts of ICTs in South and Southeast Asia," *Design Issues* 22:2 (Spring 2006): 35–55.

12 See, for example, the special number of *Design Issues* dedicated to Design and Organizational Change, *Design Issues* 24: 1 (Winter 2008).

academic journals, regular conferences, and a stream of high-quality research that comes not only from trained design historians but also from historians in diverse fields who find design compelling as a subject of research. The one problem in the field is that it is defined too narrowly. Most design historians tend to concentrate on the paleoteric taxonomies of objects rather than embracing the neoteric manifestations of design practice.[13]

Design studies is also an aspect of design research whose territory has yet to be clarified. I would argue, as I have done in the past, that design history can be seen as one strand of a broader field of design studies.[14] Together they investigate design as it was and currently is, concentrating on the production and use of products. Design history, however, focuses on design in the past, while design studies embraces the present as well. There are good reasons to create doctoral programs in design studies, since the graduates of such programs would not be expected to be designers as well unless they had prior training as practitioners. By contrast, the expectation for someone with a PhD in design should be that he or she is capable of designing something. Therefore, specialization is required to gain knowledge that will prepare graduates for specific tasks.

Moving Forward

To sort out the confusion that exists in the fields of design research and doctoral design education, the following issues need to be addressed:

- The difference between research in design and design studies needs to be made clearer so that doctoral degrees in one or the other can more accurately indicate what expertise the degree holder has. Design studies researchers can engage a broad range of topics that may lead to a better understanding of design as a phenomenon rather than to a transformation or amelioration of practice, although that is not precluded. Design researchers, on the other hand, should be contributing to a transformation of practice, either by critiquing something current that seems deficient or proposing something new.
- Distinctions need to be made between the different kinds of design practice so that degree programs geared to one or another practice can be developed.
- Some discussion is called for on core curricula for all doctoral programs in design. As the situation exists, there is no guarantee that two doctors of design will have read any of the same literature or have been exposed to any of the same research methodologies
- More attention needs to be paid to design's relation to other practices and disciplines that might be drawn upon in doctoral education.

13 I address this issue in my essay "Design in History," *Design Issues* 24:2 (Spring 2009): 94–105.

14 See my essay, "Design History and Design Studies," in Victor Margolin, *The Politics of the Artificial: Essays on Design and Design Studies* (Chicago and London: The University of Chicago Press, 2002).

To envision how the field of design research might develop further, we can return to the distinction that Bruce Archer makes between the way a lexicographer and a mathematician think about language. "The lexicographer," says Archer, "attempts to discover the meaning of words and phrases on the basis of the ways in which the words and phrases are actually used and meant by the community concerned. The mathematician, by contrast, is careful to define his terms, either for the occasion or in reference to some previous worker's definition."[15] Archer's preference is for the lexicographer's approach, which he admires for its flexibility. His distinction between deriving meaning from usage or prior definitions can also hold for design researchers. Rather than define research objectives too strictly, it is more productive, as Archer suggests, to build on what other researchers are actually doing. Research nodes, which represent accumulations of related research activities, need to attract interest through their potential for significance and value. When the researchers in a field are clear about what they do, such nodes appear readily. When the research agenda is murky, they do not appear at all.

Conclusion

Despite the fact that the subject matter of design research is not as clearly defined as the human body or the earth, much valuable work has been done. Design research is international, although the communication of results between researchers in different countries is hampered by the lack of a common language. Although English is the most prevalent language among researchers, there are many scholars in Brazil, Japan, Korea, China, and other countries whose work is not known outside their own language group.[16] This is particularly evident in design history, where much research has been published in non-Anglophone languages and is unknown to most English-language design historians. Consequently, a lot of what is already known is absent from the design history surveys, which leave out design in large parts of the world.

There is a need to review the history of design research and identify a group of texts that are still seminal to researchers, whether they are historical documents or more recent books and articles. Such texts should form a pool of possibilities for core curricula whose contents can be shared by researchers in different doctoral programs.[17] The purpose of such texts within a research community is to constitute a common heritage to reinforce the idea that design researchers are engaged in a shared enterprise, no matter how diverse their interests. I am not advocating a single core curriculum but rather consideration of a large pool of texts from which individual core curricula can be drawn. This pool would certainly include the hundreds of articles that have been published in the major academic design journals since the 1970s. It would include as well the writings

15 Bruce Archer, "A View of the Nature of Design Research," 30.

16 There are regular design and design studies research congresses that are held in Japan, Korea, Brazil, and elsewhere in languages other than English. The proceedings of these congresses, if not bilingual as they rarely are, remain unknown to researchers in Europe and the United States, who occupy a major position in the international design and design studies research fields.

17 See my bibliographic essay, "Postwar Design Literature: A Preliminary Mapping," in Victor Margolin, ed. *Design Discourse: History, Theory, Criticism* (Chicago and London: The University of Chicago Press, 1989), 265–288.

of scholars and theorists ranging from the nineteenth century to the present. Texts by John Ruskin, William Morris, Thomas Carlyle, Adolf Loos, Walter Gropius, László Moholy-Nagy, George Nelson, Tomás Maldonado, Gui Bonsiepe, Gert Selle, Donald Schön, Lucy Suchman, Albert Borgmann, Langdon Winner, Ivan Illich, Victor Papanek, Richard Buchanan, Victor Margolin, Dennis Doordan, Erik Stolterman, Gillo Dorfles, Ken Friedman, Terry Love, Clive Dilnot, Herbert Simon, Alain Findeli, and many others provide rich material for courses in doctoral programs. There should also be more reference to such texts in what we might call the meta-literature of the field—the body of research that reinterprets and reevaluates key documents—just as is done by scholars in sociology, anthropology, literature, and art history.

As the artificial world continues to expand in its relation to nature, design is too important a subject to be ignored. We humans are the stewards of this artificial world just as we are responsible for the natural one. Only by preparing ourselves to manage an increasingly complex natural and social environment in which design plays an ever more important role will we be able to fulfill our duty as good stewards. Well-conceived and highly focused doctoral programs in design are central to this task.

The Idea of Socialist Design: Iskra Show Review

Fedja Vukic

"Iskra: Non-Aligned Design 1946–1990," exhibition in the Architecture Museum of Ljubljana, Slovenia, November 12, 2009–February 28, 2010

When I was growing up in socialist Yugoslavia, Iskra's telephones and radios were a part of everyday life. Today these are the elements of the historical horizon of the socialist culture, which is in detail presented and reconsidered by the exhibition, "Iskra: Non-Aligned Design 1946–1990," set up from November 12, 2009, to February 28, 2010 in the Architecture Museum of Ljubljana, in Slovenia. The Exhibition is accompanied by the separate editions of catalogs in Slovenian (title: Neuvrščeno oblikovanje) and English (title: Non-Aligned Design). Iskra was one of the leading companies in Yugoslavia, a maker of technological equipment and electronic consumer goods, and in the ideological jargon of that period, it was known also as "the factory" to emphasize the primary task of the period's modernization. As were all the other major production companies, Iskra was founded in the period of the planned economy, when the government itself was the main corporation, and particularly developed after new elements of the market economy had been introduced in accordance with the economic reform of 1964. Until the late 1980s, Iskra was often set as an example of a company that in the context of the socialist ideology could implement all the elements taken from liberal capitalism. In this way, the management methods, industrial design as a part of the development strategy, perception of corporate identity, and the advertising strategy became part of a distinguished national and international presence.

The exhibition of Iskra products in Ljubljana, organized by the Architectural Museum of Slovenia and Association Pekinpah,

whose curators are Barbara Predan and Cvetka Požar, starts with the thesis that Iskra's creation of a competitive product resulted from the favorable business climate in Slovenia, where the public promotion of industrial design, along with systematic advertising, became the standard of everyday life at an early point. The exhibition design follows that idea with a retrospective display of products, including photographic documentation and reproductions of advertising campaigns and original posters. Of good use for any interested visitor is a chronological comparative timeline, explaining the Iskra case within its social and political context. Not just for the nostalgic visitor, the exhibition also gives scholars the inspiration and content for further research of the material culture of the contemporary past. The informal approach to exhibition design stresses this aspect, moreover. The curators have had a hard time finding objects to exhibit, because in Slovenia, no institution collects industrial products comprehensively; therefore, even citizens were called to contribute from their homes and cellars.

Iskra was one of the most innovative technology companies, which at the same time invested in research and development, design, and advertising. The company made sophisticated hardware, such as automated traffic control devices, and was complemented by production of mass scale objects, such as telephones, television sets, and radios.

Jonathan M. Woodham, one of the writers for the exhibit's perfectly illustrated accompanying catalog, describes the social and cultural environment of Iskra's founding. The emphasis is on the favorable development that the ruling political party had in Slovenia, and these ideas were, to the utmost, focused on industry. Moreover, it is important to mention that rather early, even before the 1950s, industrial design in Slovenia was recognized as an important part of culture. The exhibition catalog follows the concept and display very well, offering theoretical and historical backgrounds, along with the documentary material. It is in full color, and this fact matters because, in spite of a stereotypical view of the black and white socialist years, Iskra was producing objects in vivid colors with a sensitive and intelligent approach to the user. The catalog is published in Slovenian and English as separate editions.

The awareness of the total design, which was in accordance with Ernesto Nathan Rogers's notion, "from the spoon to the city," has marked the Slovenian architecture of the age as well. It was in this context that the first generation of Slovenian industrial designers was trained, and the first attempts were made to create an educational frame of design at the Faculty of Architecture of The University of Ljubljana. The founding of the Biennial of Industrial Design (BIO) in Ljubljana in the mid-1960s was very important in that BIO created favorable conditions for understanding industrial design both in Slovenia and Yugoslavia. Moreover, BIO intiated the formation of the Information and Documentation Center in the

Chamber of Economy, which was supposed to be the primary place for the promotion and sale of industrial products in the national and international market. Most of these efforts were accomplished as part of the "good design" renewal ideas after the Second World War. These ideas were the basis of most of the national strategies for reaching toward and producing quality industrial products, from Great Britain to Japan. In the local context of the socialist Yugoslavia, and especially in Slovenia, this idea was evaluated in the domain of culture. Art historians, architects, and artists were the leading promotors of the idea of high-quality design, arguing that the quality of the industrial product finally contributes to the quality implementation of ideological programs. In the other Yugoslav republic's party, leaders couldn't understand this idea, but in Slovenia, design as a strategy was easily implemented in production and also in society.

Iskra serves as an excellent example of the success of this strategy because, from the mid-1950s to the late 1980s, it managed to produce quality mass market technology products (from telephones to televisions) that won prestigious international design awards. The exhibition emphasizes "non-alignment" as a context for understanding the company's position and its success, and in this case the term points toward the identification of the company's special position, which is somewhere between Western design methodology and Eastern ideological tasks. The fact is that Iskra's history began in the 1940s with tasks that were intended to fullfill the governing party's aim: the first task was producing a 35mm cinema projector, which in those days was an important medium of ideological communication. Iskra succeeded in this task, as it did with many other projects that were initially social tasks: telecommunications hardware, telephone sets, radios, later on the television sets, industrial process management and control equipment, and even computers. All of these products are shown throughout the exhibition.

Production tasks belonged to a context that excluded private ownership, and the bureaucracy created a hybrid transition-model of state ownership as an answer to the hard-line concept of state ownership in the Soviet Union.

During these years, the pursuit for research, technological development, and design perfection at Iskra resulted in exceptional functionality, price, and design. It should be recognized that Iskra wasn't an individual case of a company that surpassed and, at the same time, improved the capacities of the social and ideological environment in the former Yugoslavia. Other examples arose in various industrial sectors. What is especially interesting is that the promotion of investing in industrial design was more present in the culture than it was in the economic sphere. In 1968 in Zagreb a symposium called "Industrial design and the economic and social movements in Yugoslavia" took place. The symposium indicated a high-level understanding of design in industrial modernization.

But by the time of the break-up of Yugoslavia in the 1990s, most of the industrial companies either had failed to make it through the transition toward neoliberal capitalism, or their restructuring was a disaster, as it was at Iskra. Were the industrial companies in socialism really based on an unrealistic economic model? What is the current value of such industrial design, which was undoubtedly systematically developed? Is the purpose of those objects valuable for art historians to interpret in a given period? Many questions regarding design history in socialism need to be asked and answered; the exhibition on Iskra's design provides sufficient factual material for such analysis. Researchers should take note and begin developing these additional questions and answers.

Must They Mean What They Say?

Eduardo Vivanco

I AM A MONUMENT: On Learning from Las Vegas
by Aron Vinegar.
(Cambridge, MA: MIT Press, 2008) ISBN 0262220822, 208 pages;
English $99.95/£50.00 hardcover.

> "Facing the implications of Las Vegas in our work is proving much more difficult than describing Las Vegas."[1]

Traditional readings of *Learning from Las Vegas* have dealt with the implications Denise Scott Brown refers to, not necessarily only in her work with Robert Venturi, but in that of others as well. The interest and polemic of the book relied almost exclusively on how its content was translated into architecture, or why Las Vegas should be the model to follow. As a result, much has been written not on the book, but on those implications alone. This is why Aron Vinegar's book was so needed and welcomed now.

It is true that neither Venturi nor Scott Brown have normally been very keen on criticism—the bad sort at least—of their work, and Venturi's attitude has been closer to arrogant defiance than to modesty: "My favorite thing is when a critic accuses you of not doing such and such when you introduced the idea of such and such in the first place," or "I'm sorry if you understand what I'm writing—please don't hold it against me or it."[2] Scott Brown, on the other hand, seems to have engaged more seriously in discussing criticism.[3] Sometimes one has the feeling that it is easier to agree with them than to have them agree with oneself.[4]

Vinegar's compared reading of the two editions of *Learning from Las Vegas*[5] is an extremely refined inquiry into the nature of the experience of learning, and especially of learning from Las Vegas. His position in the text is both in consonance and dissonance with Venturi, Scott Brown and Izenour (VSBI), thus working a certain harmony that enhances the original work's strength. He writes: "It is up to us to find our own point of departure from that text, and this is predicated on our finding new ways to read and write the first and revised editions together. The criteria for how to do so are up to us, and our claim to speak for *Learning from Las Vegas's* inheritance can begin only with our participation in the conversations it initiated, acknowledged, and avoided."[6]

I AM A MONUMENT is a book about books, but it is much more than that.[7] It reflects on how we read a city, on the ability (or inability) of reading itself, and on writing about that experience. The

1 Denise Scott Brown, "Reply to Frampton," *Casabella* 359–360 (1971): 43.

2 Venturi, Robert, *Iconography and Electronics Upon a Generic Architecture: A View from the Drafting Room* (Cambridge, MA: MIT Press, 1996), 303, 306.

3 She recently wrote an excellent text on their work from a personal perspective, not apologetic, and less manifesto than what they had us used to. Robert Venturi and Denise Scott Brown, *Architecture as Signs and Systems: For a Mannerist Time* (Cambridge, MA: The Belknap Press of Harvard University Press, 2004). She has also followed their work's reception and responded to it. More on that later.

4 Koolhaas is aware of the paradoxical aspect (call it contradiction and complexity) of their oeuvre in this excerpt of an interview: "DSB: What we have done has allowed many people to think differently, therefore to do things differently. Over and over, people have told us that suddenly they could be themselves… / RK: Or they could be yourselves. / DSB: Well, the best ones thought it let them be *themselves*." "Re-learning from Las Vegas. Interview with DSB & RV by Rem Koolhas & Hans Ulrich Obrist" in Koolhaas, Rem, *Content* (Taschen, 2004).

5 Robert Venturi, Denise Scott Brown, and Steven Izenour. *Learning from Las Vegas* (Cambridge, MA: MIT Press, 1972, 1977).

absence of direct references to buildings is deceiving—this book is as much about architecture as it is about language, philosophy, or books. If "Facing the implications of Las Vegas in our work is proving much more difficult than describing Las Vegas," Vinegar here focus on the latter. It is not on how to build after some book, but rather on how to *book* after some buildings. It is a book about translation, both conceptual (into different languages) and literal (moving from one place to another). It is also a book about skepticism and the ordinary, yet it works as a well-crafted clock.[8] One can tell it has been worked over a great deal of times. Vinegar is brilliant and playful, and the way he has paced the book responds to his intention to drive us through the text with the aid of mini-chapters within each chapter, thus accelerating the reading (with the help of extensive footnotes at the end of the book, just as in this review) and provoking the same wonder and ambivalence it talks about. The text is rich in shifts, subtleties, and unconventional yet convincing reading of images, which give us deep insights into the nature of what otherwise would be taking for granted—i.e., the ordinary.

If we are to agree with Walter Benjamin that "Critique seeks the truth content of a work of art; commentary, its material content," this book attempts both. It starts with a critique and moves towards a commentary, since, "More and more, therefore, the interpretation of what is striking and curious—that is, the material content—becomes a prerequisite for any later critic."[9] The inquiry into the material content of *Learning from Las Vegas* led Vinegar into a vast research project that makes *I AM A MONUMENT* a must for designers of architecture as well as books. Even though this book is divided into five chapters plus appendix, I understand it to function in three major moments describing chronologically the "Learning from Las Vegas Studio" experience: in the car, at the studio, and in the books.

In the Car

In the introduction and the chapters "Approaching Las Vegas in Wonder and Ambivalence" and "Our City of Words," Vinegar goes straight to his coupling of *Learning from Las Vegas* with skepticism and the ordinary. "A strict adherence to critical theory-based interpretation," Vinegar writes, "obscures the subtle aversive criticism that *Learning from Las Vegas* demonstrates, and which can easily be misinterpreted as uncritical collusion with the culture industry. Approaching *Learning from Las Vegas* from the implications of its skeptical voice thus radically undermines three dominant and erroneous characterizations of the text: that it is playfully ironic postmodern approach to architecture; that it maintains a straightforward equation of architecture with unproblematic communication; and that it is complicit with the culture industry. In other words, the book is much more *critically* and *ethically* charged than has previously been assumed."[10] After such a statement, one would

6 Aron Vinegar, *I AM A MONUMENT: On Learning from Las Vegas* (Cambridge, MA: MIT Press, 2008), 171. Thus, Vinegar does not claim his as the right reading and writing of these books, hence his decision to include Scully's unpublished introduction as Appendix, which serves him also for introducing questions about the nature of VSBA's partnership, and their aversion to what he calls "the third": "that is, anyone or anything that disrupts the 'internal' cohesion or communication of a system, group, or entity, and in response is given a supplementary status, disavowed, or deemed as 'merely outer.'" op. cit., 123. Scully serves as a "counterpoint on symbolism," a "yardstick." See also the interview with Beatriz Colomina and the latest critique of Scully's relation to Venturi by Scott Brown in Andrew Blauvelt, ed., *Worlds Away: New Suburban Landscape* (Minneapolis: Walker Art Center, 2008).

7 That is at least the impression one gets after merely browsing the book by its illustrations: almost hundred figures of which a quarter are original and/or never published before and the rest are parts of books. We would be looking at covers (the one of this book includes the two original books, showing us instantly their relation in size), complete pages (over twenty-five), and figures from other books. The new material consists mainly of the unpublished mock up, archive photos, posters, layouts, table of contents and annotated pages. The "I AM A MONUMENT" diagram is included twice, and to my surprise, given Vinegar's extreme attention at dedication, nothing is being said about its over-drawing from the first to the second edition.

8 Such was the intended title for this book, the same as a seminal essay on this subject: Aron Vinegar, "SKEPTICISM AND THE ORDINARY: From Burnt Norton To Las Vegas," *Visible Language* 37: 3 (2003): 288–311. That was an special issue he guest co-edited with Michael Golec, entitled *Instruction and Provocation, on Learning from Las Vegas*. They have recently co-edited: *Relearning from Las Vegas* (Minneapolis: University of Minnesota Press, 2008).

expect an entrenchment with the authors of that book, but Vinegar has internalized what Venturi wrote years ago: "Louis Kahn has referred to 'what a thing wants to be,' but implicit in this statement is its opposite: what the architect wants the thing to be."[11] Thus, Vinegar is suspicious of what the architects (VSBI) want the thing (Las Vegas) to be. Here the thing could be its meaning and/or the book.

It is not a coincidence that the first view of Las Vegas we get in Vinegar's book is a photograph of the Strip taken from the back-seat of a car driven by Venturi with Scott Brown as copilot.[12] That's the space Vinegar occupies initially to reconsider the themes and concerns of *Learning from Las Vegas*. He is not alone in that back-seat; Vinegar brings in philosopher Stanley Cavell's interpretation of skepticism and the rich philosophical tradition that Cavell is engaged with. "For Cavell, skepticism is not fundamentally triggered by our perceived lack of knowledge of the world, as it has traditionally been cast. Rather, it is related to how we respond to and take responsibility for that world. Cavell's key term for this thought is 'acknowledgment,' a word that is meant not as an alternative to knowledge but rather as an interpretation of it."[13] Vinegar's pairing of skepticism and the ordinary with Las Vegas gives us also the more plausible explanation of why we were to learn from such a city: "and where better to explore these concepts than in a book about Las Vegas, a city that, according to many, is the scene of sensory overload, illusion, and deception?"[14] Note how "a book about Las Vegas" is key here, since it exposes the position that *I AM A MONUMENT* physically takes and that coincides with the one in the initial photograph—right behind Venturi, Scott Brown, and Izenour, while they are learning from Las Vegas (or to put it in an even more graphic context—as if we were right behind a painter, looking over his shoulder at both the landscape and the canvas being painted.)

I AM A MONUMENT succeeds at rewriting *Learning from Las Vegas*, at re-experiencing the agony of the encounter with Las Vegas in wonder and ambivalence, the "intolerable wrestle with words and meanings."[15] Here, wonder is the first requirement for our "acknowledgment" of the world, and "ambivalence is Venturi and Scott Brown's attempt to prolong their state of wonder through the oscillating rhythms of love and hate."[16] What are we acknowledging? The "ordinary," which "does not refer merely to words that are widely used, to vernacular architecture, or to our everyday consumer culture. It can refer to anything in the world we might take an interest in." Not merely looking at books, but also, for instance, at billboards, in day and night, in wonder, in disorientation. Thus, *I AM A MONUMENT* is also a book about the role of words in books, books that read buildings which speak in signs yet again made of words, about "our city of words." It is ultimately a book about architecture in spite of architects. Vinegar follows Benjamin's advice "never trust what writers say about their own writings,"[17]and pays fair but little attention to the description that architects give of their

9 "Critique (*Kritik*) seeks the truth content (*Warheitsgehalt*) of a work of art; commentary (*Kommentar*), its material content (*Sachgehalt*)." From "Goethe's Elective Affinities" (*Goethes Wahlverwandtschaften*): Benjamin, Walter, *Abhandlungen, Gesammelte Schriften, Band I-1* (Frankfurt: Suhrkamp, 1974), 123.

10 *I AM A MONUMENT*, 6–7.

11 Venturi, Robert, *Complexity and Contradiction* (New York: Museum of Modern Art, 1966), 13.

12 Fig 1.1. *IAAM*, 14.

13 *IAAM*, 3. This book is as much about *Learning from Las Vegas* as it is about Cavell's work. Nonetheless, other thinkers dialogue with Vinegar here, most significantly Jean-Luc Nancy, along with: Derrida, Heidegger, Wittgestein, Freud, Lacan, Benjamin, Horkheimer, Adorno, Elliot, Emerson, and Thoreau.

14 *IAAM*, 3.

own buildings. His interest in *Learning from Las Vegas* "involves questioning why people speak the way they do, and how our investment in words, and architecture, is constitutive of the way we live, mean, and love, or avoid doing so."[18]

Vinegar's readings of passages from *Learning from Las Vegas* form a constellation of remarkable and delightful moments. For example, in his analysis of the dust jacket of the first edition, the metaphor he poses of sentences made from the words in neon signs as a ransom note brilliantly bridges Cavell's "arrogation of voice" with the idea of community based on communication. And this should be the greater project of *Learning from Las Vegas*. Thus, Vinegar sees Venturi and Scott Brown as "modestly ambitious" since "they are calling for new 'readers' of the city, and the reading they are engaged in cannot be reduced to semantics, semiotic decoding, or even isolated to the linguistic realm at all; it is a reading that is achieved by asking a question and going on 'from' that question, not by seeking an answer."[19]

At the Studio

There is yet another excellent photograph on the process of *Learning from Las Vegas* that follows the logic of inquiry explained above.[20] In it, we can see at least nine people in the "Learning from Las Vegas Studio" at work, and there seem to be two simultaneous discussions among the participants, apparently without hierarchy. I imagine Vinegar stepping out of the car and joining the group at this moment in the book, and dealing with "asking a question and going on 'from' that question, not by seeking an answer." The chapters "Of Ducks, Decorated Sheds, and Other Minds," and "A Monument for Everyone and No One" deal with the content of *Learning from Las Vegas*, that is, the content of the studio—i.e., what was learned from Las Vegas.

The deadpan and the community dwell in these two chapters, which are possibly the most dense conceptually, and are crowded with fast, penetrating insights. The prose is fast, as Vinegar blinks from buildings to faces, from the "eye" to the "I," from blinking signs to Nietzche's *Last Man*. One is rapt (if not captured) with the sophisticated and intricate web of reflections woven by Vinegar. The writing is contagious and poetic, since polysemy is urgently required by the subject matters—i.e., "the skeptical dilemma in *Learning from Las Vegas*," which "is really brought to the fore through the 'indiscrete' comparison between the Duck and the Decorated Shed."[21] With "The Duck as Melodrama of Expression" and "The Decorated Shed and the Melodrama of Inexpression," Vinegar is picking up were Manfredo Tafuri left off at the end of *The Sphere and The Labyrinth*: "not by accident is the interview granted by Venturi and Denise Scott Brown to Stani[slaus] von Moos in October 1974 titled, *Laughing Not to Cry*, the real problem lies completely in that title: why does the alternative between laughing and crying never get listed?

15 *Learning from Las Vegas*, 60. It is worth noting here that whereas according to Scott Brown, "Frampton misses the agony in our acceptance of pop," Vinegar gets away with the difficult (and at times embarrassing) debate that took place in the pages of *Casabella* 359–360. The texts "Learning from Pop, by Scott Brown," "America 1960–1970. Notes on Urban Images and Theory," by Kenneth Frampton, and "Reply to Frampton," by Scott Brown, are briefly revisited by Vinegar in page 35: "As Venturi and Scott Brown note: 'Manipulation is not the monopoly of crass commercialism'. Any drive to firmly demarcate the 'manipulative city of kitsch' (in Kenneth Frampton's words) from what Socrates in the *Republic* calls 'our city of words'—the ideal rather than the actual city—is a deception in its own right." What Scott Brown denounced in *Casabella*: "modern architects and critics seem to equate analysis of physical properties with lack of social concern. This is a 'non sequitur.'" is completely bypassed by Vinegar. Still, Venturi finds other attributes in Vegas that made it excellent for the studio experience: "A mannerist architecture of communication also involves learning from Tokyo—a city of now, a city of valid chaos rather than minimalist order. So we go from Rome, to Las Vegas, to Tokyo—to a city largely rebuilt in the last half-century, combining both revolutionary grandeur and evolutionary pragmatism." *Architecture as Signs and Systems: for a Mannerist Time*, 93. Was *Learning from Las Vegas* a strong reaction to Peter Blake's *God's Own Junkyard*? Why Las Vegas for VSBI? Was it a generic place for them or specific? They don't seem to like it anymore. Maybe it was as fictitious as Virgil, Texas, the town were David Byrne's deadpan *Trues Stories* happened. I can only think of a better reason for choosing Las Vegas, and that is when Francis F. Coppola decided to set *One from the Heart* there instead of in Chicago. He explains in the DVD commentary that since it was a movie about love, and love involved taking risks, it had to Vegas since that was the place where people went to make the biggest bids.

Why, in other words, identify architecture with an 'object of feeling'? And furthermore, why identify pleasure with a masked ball?"[22] In *I AM A MONUMENT* the "real problem" is solved by Vinegar with the issue of expression and inexpression (the deadpan.)[23] "Venturi and Scott Brown's interest in the 'deadpan' as both a technique and a disposition—exemplified for them in Ed Ruscha's photographs and art books—is directly related to their attempt to disperse attention in order to evoke an equanimity and responsiveness that might point the way to a 'new vision of the very imminent world around us.'"[24]

Using Cavell's take on Buster Keaton, Vinegar engages with the concept of the deadpan, so dear to Scott Brown,[25] but this time Vinegar finds it not only on photographs of facades, but on facades themselves, embracing their literal meaning as the face of a building.[26] The deadpan and the Decorated Shed work here as a node where the diagrams depict faces, and thus "it would seem that, despite their apparent opposition, both the Duck and the Decorated Shed share an overarching proposition: if there is a 'disconnection' between eyes, body, feeling, and voice, then perhaps we need to rethink that condition in order to see how we might reconfigure our *sense* of what architecture is and can be." Despite the seriousness of the claim, Vinegar amuses himself, to the enjoyment of the reader. He plays with facades, comic balloons, and arrives at one of the most critical yet convincing arguments—the question of fantasy and reality in Cavellian terms. "It would appear that the Duck and the Decorated Shed operate as highly mobile, supple, and chiasmatically entwined terms—and at crucial points, each incorporates the other in order to survive."[27] He then moves to Cavell's "melodrama of unknowingness" as "one of splitting the other, as between outside and inside" and to the "fragility of voicing."[28]

In the Books

Vinegar's photograph of the presentation boards for the "Edward Ruscha elevations of the Strip" present us with the problem of bringing studio material into books.[29] How to do this implies not merely matters of size and scale, but mostly of design. Muriel Cooper, who designed the first edition tells us that "What [VSBI] wanted most was a Duck, not a Decorated Shed. I gave them a Duck,"[30] and Scott Brown's reply was "Could this page be revised because its composition is like a duck?"[31] A different sort of struggle was yet to take place. No wonder that *Reducks*, 1972, 1977 is Vinegar's pun to title the last chapter. The edition of 1977 is presented—with more than enough evidence—as *Learning from Las Vegas, the Director's Cut*[32] and, at the same time, as a new sort of Duck.

Vinegar is in this last part with his camera, the scanner, lenses, and his eye (as well as his "I") on the books. The two editions in comparison are contrasted with the mock up of an alternative third one, original layouts, annotations, phone calls, and letter exchanges. We are witnesses to a private investigation to determine who killed

16 *IAAM*, 15. "One must entertain the possibility that philosophical problems might also begin with disorientation."

17 Walter Benjamin, *The Arcades Project* (Cambridge, MA: The Belknap Press of Harvard University Press, 1999), 203.

18 *IAAM*, 6.There is one point in the book where the reader has to acknowledge that Cavell is more than the background or a collection of footnotes in this book. The ordinary here is anchored in ordinary language philosophy, and thus is different from contemporary discourses on the veryday and the vernacular. A great text on that approach is: Deborah Fausch, "Ugly and Ordinary: The Representation of the Everyday," in *Architecture of the Everyday*, ed. Steven Harris and Deborah Berke (New York: Princeton Architectural Press, 1997), 75–106. In its last page: "The question raised by the work of Venturi and Scott Brown—can the public art of architecture succeed in displaying the ordinary, unmarked events of everyday life in its forms, or can it only accommodate and shelter them?- remains unresolved."

19 *IAAM*, 23.

20 Fig 5.28. *IAAM*, 162.

21 *IAAM*, 48.

22 Tafuri, Manfredo, *The Sphere And The Labyrinth: Avant-Gardes and Architecture from Piranesi to the 1970s* (Cambridge, MA: MIT Press, 1987), 302. Vinegar's dismiss of Tafuri is understandable, but its inclusion could have been productive since they both share the awareness but from different perspectives. "Previously, Tafuri on page 294: "If Kahn could have produced a school of mystics without religions to defend, Venturi has in fact created a school of the disenchanted without any values to transgress. Nevertheless, both are part of one and the same ideology of self-reflection. Both, that is, surpass the limits of their own historic situation by embodying an attitude widespread among the fringes of expatriated intellectuals, who have made a country out of their exile. Like Bataille, but in a completely different manner and with other instruments, they have upturned the globe of the eye toward its cavity, in order not to become blinded by a universe in which the glance risks being extinguished."

the Decorated Shed.[33] "The revised paperback edition did not merely replace the first edition of *Learning from Las Vegas*, published five years earlier by the same press; for all practical purposes, it erased the memory of it."[34]

It is in "Total Design and Total Control at the Heart of the Skeptical Dilemma," one of the key chapters, where Vinegar achieves something ultimately unexpected from this book. For the first time in the literature on VSBA we get a better idea of Venturi and Scott Brown's design philosophy. By comparing the two editions, we get more information than with any other comparison of their buildings with their ideas. "That language [mobilized by Venturi and Scott Brown to describe the relationship between the two editions], particularly the phrase 'stripped and newly clothed,' will be closely attended to, as it raises questions about the relationships between inner and outer, acknowledgment and avoidance, violence and the text, that intimately link issues of skepticism with the conflict over the design of *Learning from Las Vegas*. As we shall see in more 'graphic' detail than in previous chapters, the tone of these writers and designers is inseparable from what a page of their book might look like."[35] Vinegar has found gold and keeps digging.[36] The struggle over the relationship between form and content is dramatically exemplified in the conflict between Cooper and Venturi and Scott Brown over the cloth cover and dust jacket of the first edition. The reader is a privileged witness to the process as Scott Brown complains: "The cover as designed is absolutely unacceptable: leaving out questions of good or bad design, it is inappropiate. It is against the philosophy of the book; it is a duck—*heroic and original*—almost fruity in its appearance. This is a serious study with a serious text and deserves a dignified conventional image. The shock must come from the contents inside the book . . . We have shown Muriel what we mean in sketches."[37]

We finally read Vinegar stating his differences with Venturi and Scott Brown who "seemed unable to acknowledge that issues of illegibility and unreadability might be *internal* to issues of communicability as such, and not *external* disruptions of communication and/or the result to a particular design philosophy."[38] Close to the end of the book, it is clear that "[i]n the first edition of *Learning from Las Vegas*, one gets a real sense of experimentation in the literal meaning of that word: an exploration of (shared) experience at the limit of sense" whereas the second edition "distances itself" from that experience, but "most importantly, it distances itself from the studio experience."[39] To this Scott Brown has already responded:[40] "However we were able to reject Muriel's cover (which included bubble wrap as motif) and to design one of our own. Its type face, color, and inset picture (based on cigarrette-card albums of my childhood) and its deadpan axial arrangement, simulating a scholarly tome, were intended to play against its outrageous content, as part of a game of melding pop culture, high culture and high jinx—our kind,

23 *IAAM*, 58. "Although Venturi and Scott Brown's comparison of the Decorated Shed with the Duck is, in a sense, such a critique [of an *architecture parlante*], it does not deny the fact that we are nevertheless still tethered to our words and, more specifically, to our voice in those words. Thus, the issue of expression and inexpression and their relative 'articulations' are at the heart of the comparison between the Duck and the Decorated Shed."

24 *IAAM*, 32.

25 It appears frequently in recent account of *Learning from Las Vegas*. I think the first one was by Denisse Scott Brown "Reply to Frampton": "Ruscha is not nonjudgmental, he is deadpan. You don't have to be expressionistic to prove you have values."

26 *IAAM*, 83 Vinegar's description of Vanna Venturi' house (1962) "The clapboard front and back denoting 'home' is merely a flat appliqué that provides a 'sandwich' for the middle ground of the interior 'lived' space." See also the readings of the diagrams of the Duck and the Decorated Shed with "two window-eyes and door-nose, but no mouth."

27 *IAAM*, 53–54.

28 *IAAM*, 67–70. "In an act of architectural ventriloquism, the 'voice' of architecture is separated from its body in the Decorated Shed."

29 Fig 5.26, photograph by Aron Vinegar, by permission of VSBA, Inc. *IAAM*, 157.

30 Muriel Cooper quoted after Abrams, *IAAM*, 117.

31 Denisse Scott Brown. *IAAM*, 117.

32 *IAAM*, 117. "Although it took until 1975 for the revised edition to begin to move forward, such a book was imagined even while the first edition was advancing toward production. As Roger Conover explained to me, the revised edition "evolved as a kind of settlement of the two disappointed author's reservations about the design of the first editions; rather than compromise Cooper's design, the Press agreed to give the Venturis their own uncompromised design in the second round"

33 This last chapter takes as starting point Golec's essay, and so is acknowledged in the book. Michael Golec, "Doing It Deadpan," *Visible Language* 37:3 (2003): 266–287.

not Muriel's. She tried to hide this host of sins with a Helvetica-bedecked, glassine dust jacket. We hated this H&O ('Heroic and Original') fig leaf but I'm told that, where it survives, it adds to the selling price of the book."[41] Yet, that is not convincing. Not only did we (the readers) lose with the *reduckization* but, as Vinegar so clearly states, it worked against them as well: "Although the revised edition of *Learning from Las Vegas* established Venturi and Scott Brown's reputation and fame, like all important books it contributes to its own misreading. And this was due, in no small part, to the design of the revised edition. The dramatized comparisons and amplified polemic no doubt contributed to the interpretation of *Learning from Las Vegas* as a 'manifesto' of postmodernism, or at the very least its most 'exemplary' text."[42]

Learning from Learning from *Learning from Las Vegas*

A manifesto? The most exemplary text of postmodernism? Thank Vinegar for a farewell to all that, and a welcoming of *Learning from Las Vegas*. He has re-read and re-written a text that had lost its influence on new generations, and as result, is back with a vengeance.

One last note on Vinegar on Venturi and Scott Brown: at first I thought Vinegar was surprisingly generous when crediting the authors of *Learning from Las Vegas* for their "unthought" and for trusting that they "evidence their involvement with skepticism and the threat of nihilism in *Learning from Las Vegas* through the erasure of context and the denial of shared meaning, but also through the possible recoveries of shared meaning and context."[43] Was he not being too modest? I later realized he was reading more into their blindness than their insights. He was thus, to put it in a Venturian way, more for "both-and rather than either-or."[44] I wrote above about this book being both a critique and a commentary. It is also both a private writing and one that aims at public mission in Richard Rorty's terms.[45] Had Vinegar opted for Rorty's *Contingency, Irony, and Solidarity* instead of Cavell's ordinary, skepticism, and the community as the contrasting lens for reading *Learning from Las Vegas*, he would not have come to the perfect marriage that *I AM A MONUMENT* is. Were he to take the "manifesto" aspect literally, or try to develop irony as a key element, would we have missed what is today productive from *Learning from Las Vegas*?[46] Strictly speaking, there is no objective or historical reason for reading Cavell with Venturi or Scott Brown,[47] we have no evidence of any sort of influence in either way, and it is always hard to say whether Venturi is closer to pragmatism or Scott Brown to post-colonial theory. Vinegar wastes no ink on that. Why would he? Why would we want him to? Do we need to know about their philosophical leanings? Must they mean what they say? Are they winking or blinking? How can we ever know what they think? We can merely know what they've done.

If the *Recommendation For a Monument* were to be more than a wink,[48] and if we were to follow the new motto "*Viva* the mitten with

34 *IAAM*, 111.

35 *IAAM*, 112. The traditional explanation to the second edition keeps being repeated. "Our idea was to make a small, cheap, readable book whose graphic layout followed the principles laid down in the cover design: don't upstage your subject, look scholarly in form while being outrageous in content (note, Bob wears Books Bros. clothes) and, for this version, let it seem like a text book—deadpan. The second edition cover is based on the first but is altered for its smaller, cheaper, format." Scott Brown in *Supercrit #2: 'Learning from Las Vegas', Robert Venturi and Denise Scott Brown*, ed. Kester Rattenbury, and Samantha Hardigham (New York: Routledge, Architecture and Architectural Design, 2007), 18.

36 *IAAM*, 146. "At times these interventions involved minute details, literally down to the last millimeter: "Captions, I think are a smidgeon too close to the figures perhaps 1mm. . . I think Mario should try to drop them very slightly if he can."

37 *IAAM*, 121. Letter from VSB to Michael Conelly on the bubble-wrap jacket. On page 167, referring to Fig. 5.33. *Piemonte, attraverso l'Italia*, an old Italian touring book published in 1941, Scott Brown liked its "retardaire aesthetic" which seemed to reflect a "true monograph format" and the "standard textbook design" they were looking for. This is congruent with Venturi's Claim in *Iconography and electronics upon a generic architecture*, 309: "Oh, how we would love to show off architecturally—but we must do it only when and if its appropriate: the majority of our work is for institutions where we make reticent backgrounds, or for museums where we avoid one-upping the art."

38 *IAAM*, 126, 147: "Their *own* investment in total design is clearly something they had difficulty acknowledging. (. . .) there are clearly aspects of their work that simply reconstitute the very positions they are critiquing."

wiggle room over the glove where form follows function!"[49] then we would have something that so far, only happens in fiction. Is it not both great and ironic that a Princeton University building designed by VSBA gets transformed into a hospital by merely changing its external signs? That happens every week in the TV show *House M.D.* Sadly, we are not there yet—that is mere fiction. What did we get from Las Vegas after all? Was it not the logical after-book to *Learning from Las Vegas*, the one Steven Izenour did on the *White Tower* shops? Were we discussing civil rights or commercial strategies? Is that relevant today? What does it mean for an architect to *care*?

Scott Brown does care: "Cogent issues of definition remain: function in architecture is defined by whom, for whom, and when? Who decides what is functional or which functions to fulfill? These ultimately political questions suggest that social and community concerns and values be taken into account when building programs and functions are discussed—especially as we move from the face-to-face client to unknown 'users' represented by statistics and by institutional or agency clients."[50] I think this book has also answered those questions, indicating their complexity, but it has mostly thrown its readers into a skeptical take on the ordinary, in which we can do nothing but wonder. "Philosophy's all but unappeasable yearning for itself is bound to seem comic to those who have not felt it. To those who have felt it, it may next seem frightening, and they may well hate and fear it, for the step after that is to yield to the yearning, and then you are lost."[51]

39 *IAAM*, 160. Vinegar shows agreement with Golec in "Doing it deadpan." On 268: "While it is very difficult to measure whether or not all readers experience the first edition of *Learning form las Vegas* in similar ways, it is fair to say that an experience of the first edition is distinct from an experience of the revised edition. The latter experience pales in comparison." and on 287 "they [VSBI] effectively foiled their initial goal," the second edition is "a book that is far less ambitious in its ability to envision Las Vegas as 'an object lesson in complex relationships.'"

40 Responding to Golec in "Doing it deadpan." In 287 "The apparent incommensurability of subjective judgment and objectivity instantiated in the differences between the dynamic (or subjective) first edition and the deadpan (or objective) revised edition of Learning from Las Vegas are further complicated by the fact that Cooper's design is in keeping with the subject matter of the author's text. In fact, it is my contention that, in spite of Venturi, Scott Brown and Izenour's misgivings and Scott Brown's redesign, Cooper's design fully realizes the author's desire to imagine the city in textual and visual representations that establish identifiable sets of schematic instructions to construct corresponding images of Las Vegas in the mind. It was, in fact, Cooper, not Scott Brown, who represented "the strip as perceived by Mr.A rather than as a piece of geometry." Scott Brown's response: "Some critics have accused us of trying for a 'false objectivity' that has been belied by modern science—as if they were the only ones to have heard of Einstein. But our approach was, of course, subjective: it's just that U&O ('Ugly and Ordinary') turns many categories on their head—not only revolutionary and antirevolutionary, but also objective and subjective." In *Supercrit #2*, 18. Waiting for us in the next page Kester agrees: "It is indeed unanswerable that Robert Venturi and Denise Scott Brown were right."

41 Denise Scott Brown, "Comments on the Design of the First Edition of Learning from Las Vegas." in *Supercrit #2*, 18.

42 *IAAM*,168.

43 *IAAM*,18. Page X, Acknowledgments: "I am not sure if they will like this book (nor I am sure they won't). Whatever the case, it is written in admiration and respect for both their thought and their unthought."

44 Robert Venturi, *Complexity and Contradiction*, 16.

45 "The quarrel about whether Derrida has arguments thus gets linked to a quarrel about whether he is a private writer—writing for the delight of us insiders who share his background, who find the same rather esoteric things as funny or beautiful or moving as he does—or rather a writer with a public mission, someone who gives us weapons with which to subvert "institutionalized knowledge" and thus social institutions. I have urged that Derrida be treated as the first sort of writer, whereas most of his American admirers have treated him as, at least in part, the second. Lumping both quarrels together, one can say that there is a quarrel between those of us who read Derrida on Plato, Hegel and Heidegger in the same way as we read Bloom or Cavell on Emerson or Freud—in order to see these authors transfigured, beaten into fascinating new shapes—and those who read Derrida to get ammunition, and strategy, for the struggle to bring about social change." Rorty, Richard, *Essays on Heidegger and Others. Philosophical Papers Vol. 2* (New York: Cambridge University Press, 1991), 120.

46 *IAAM* 186, note 18: "In any case, I begin to rethink the issue of irony—and the fact that it might not even look or sound like irony anymore—in terms of the two types of humor in play in *Learning From Las Vegas*: the jester and the deadpan." In this way, Vinegar is, yet again, drawing his own conclusions despite Venturi and Scott Brown. Theirs is a different irony. In *Learning from Las Vegas,* page 161. "Irony may be the tool with which to confront and combine divergent values in architecture for a pluralist society and to accommodate the differences in values that arise between architects and client." In "Reply to Frampton": "A sense of paradox and irony will be needed on all sides to bring together social classes understand the content of Pop's messages." Her final advice in that text: "Irony may be the method that allows al these cultures and values to fit together. Ironic (not cynical) comment on the 'status quo' is the artist's gentle subversion."

47 See an excellent text on that. Nigel Whiteley, "LEARNING FROM LAS VEGAS . . . and Los Angeles and Reyner Banham," *Visible Language* 37:3 (2003): 314–331.

48 According to Tom Wolfe, VSBI's entire enterprise as "Venturi's Big Wink", quoted in *IAAM*, 94.

49 Venturi, *Architecture as Signs and Systems,* 37.

50 Scott Brown, *Architecture as Signs and Systems,* 172.

51 Stanley Cavell, "North by Northwest", *Critical Inquiry* 7:4 (1981): 761.