Chapter 2

Does Design Equal Research?

2.1 INTRODUCTION

In the first edition of this book, we addressed several facets of the relationship between design and research. It is enough here to stake our position on the matter—namely, that there are indeed key differences between the two, which we will elaborate shortly, but then only so we can demonstrate the many similarities and connections between them. In other words, we argue that design and research constitute neither polar opposites nor equivalent domains of activity. Rather, the relationship between the two is far more nuanced, complementary, and robust.

Over the past decade, there has been a particularly lively debate in architecture and allied fields about the extent to which "design" is or should be a template, or more broadly perhaps, a new "paradigm" for research in creative or professional domains. Just within the confines of the peer-reviewed journal, JAE (Journal of Architectural Education), architectural academicians have taken a notably diverse set of positions on the matter. For instance, in discussing the essential role of research in architecture, Stephen Kieran explicitly describes the relationship between design and research as essentially divergent, but complementary: "Research brings science to our art…. To move the art of architecture forward, however, we need to supplement intuition with science."1 Kieran's discussion of the design research laboratory at the University of Pennsylvania in some ways harkens back to some of the earliest efforts to promote architectural research as voiced in the initial issue of JAE in 1947 and as represented, for example, by the heyday of the Architectural Research Laboratory at University of Michigan, from its establishment in 1949 through the mid-1970s.3
In a second example, author Matt Powers shares with Kieran the assumption that design and research represent essentially distinct domains of activity, but comes to quite a different conclusion about how, or if, the two can be integrated. He argues that design disciplines work toward the development of a "disciplinary general knowledge" that moves "away from the shadow of science and toward its appropriate place within academia." Similarly, author D. W. Worsham argues against research that is "narrowly defined under a scientific rubric," but veers in a slightly different direction by arguing that studio teaching can be research in the sense that it makes multiple contributions—to the academy, to education, and to the serving and reshaping of society. This view of research as an active contribution to communities, Worsham claims, presents a more appropriate model of "discipline-based research." 

In a critique of Howard Gardner's theory of multiple intelligences, David Wang and Amber Joplin have proposed yet another way to relate design with research. In designing Wang and explaining why design, curiously, is not one of Gardner's "intelligences," Wang and Joplin proposed that all of Gardner's intelligences share implicit traits that are explicit vis-à-vis design. This is because at its most fundamental level, design is related to the innate human ability to plan and pattern any disparate set of inputs toward a specific end. In other words, design is a phenomenological "substrate" that underlies all of Gardner's intelligence categories and thus contributes to the "end state" manifestations of them. This is why design cannot be neatly subdivided into discrete categories, it should be clear that research, as itself an activity that plans and patterns inputs toward desired ends, is intimately related to the human capacity to design.

2.2 DEFINING DESIGN AND RESEARCH

As is evident from the preceding chapter, the debate about the equivalence—or lack thereof—between design and research is often contentious and complicated. Moreover, whether explicitly stated or not, many authors (e.g., Worsham, Powers) conflate two issues that are best considered separately: (1) the similarities and/or differences between research and design, and (2) their relative or potential credibility as standards for tenure and promotion in the university context. Both are important issues to address in this context, and for that very reason we aim to disentangle them by discussing them in sequence, moving to the second issue in the later sections of this chapter.

To reprise our introduction to this chapter, we take the stand that design and research are most appropriately and usefully understood as relatively distinct kinds of activity, but they indeed embody many important similarities, including many complementary and overlapping qualities. We will begin by identifying what we believe are the most important distinctions between the two and then describe many robust similarities they share.

In a somewhat ironic twist, we find ourselves agreeing with some authors whose eventual conclusions we would also dispute. For instance, we very much appreciate Powers's argument that "well meaning [sic] designers and faculty members diminish the value of design by arguing, counterproductively, that design is something it is not, indeed should not aspire to become: research." Yet Powers goes on...
to argue that there is an underlying epistemological difference between design and research. In contrast, we would argue that both design and research can, and do, occur across a range of epistemological assumptions. Design can be conducted within a postpositivist understanding of knowledge (i.e., usually assumed to reflect the "scientific" method), and research can and does occur within non-scientific epistemologies, including what is often referred to as constructivist or subjectivist perspectives.

Throughout this book, we will describe and review many exemplar studies that demonstrate the robust range of architectural and design research across multiple epistemological positions, theoretical schools of thought, and strategies. A detailed discussion of these issues will follow in Chapter 3.

The design (or practice) versus research debate is hardly unique to architecture, and indeed some of the very same discursive positions are found in many other creative or professional fields, including the visual arts, product design, business and consultancy, planning, landscape architecture, and urban design, among others. One side of this debate, Mullan et al. take a position regarding research in landscape architecture that mirrors Power's position in architecture: that landscape design and research is a discourse to the unique qualities of each, although equating design and research to a discourse to the unique qualities of each, although equating design and research processes have much in common. However, in urban design, Ann Forsyth takes a more integrative approach in looking at both research and design practice have contributed to innovation in the field. She envisions the potential for urban designers to become "exemplars of interdisciplinary research, serving as the human face of the research turn while expanding and deepening their own body of knowledge".

2.2.1 Design Defined

Over many recent decades, scholars of design theory, researchers, and practitioners have proposed a broad array of definitions to describe the essence of design activity. Two of the most well recognized scholars on the subject are Herbert Simon and Donald Schön. One of Simon's most frequently quoted observations on the nature of design is that designers devise "courses of action aimed at changing existing situations into preferred ones." Schön, however, maintains that Simon's characterization is too focused on instrumental problem solving with an emphasis on "optimization." Instead, Schön's argument, broadly speaking, is that design thinking is fundamental to the exercise of "reflective practice" in all professions. Following the philosopher Dewey, Schön argues that a designer is one who "converges in indeterminate situations to determine ones." In the more specific instance of the physical design professions (architects, landscape architects, interior designers, etc.), however, Schön conceptualizes their role as making "physical objects that occupy space and have plastic or visual form. In a more general sense, a designer makes an image—a representation—of something to be brought to reality, whether conceived primarily in visual, spatial terms or not."

Several established scholars on design thinking and practice echo Schön's characterization of what physical designers do. Nigel Cross, for instance, argues that "The most essential thing that any designer does is to provide, for those who will make the new artefact, a description of what that artefact should be like. When a client asks a designer for a design, that is what they want— the description. The focus of all design activity is that endpoint." Similarly, Bryan Lawson and Ken Doreti, in their book Design Expertise, conclude that the "most obvious set of skills employed by all designers are those to do with making design propositions [emphasis ours]."

In a similar vein, a characterization that is frequently used to describe design is embodied in one word—generative. So, for instance, Cross notes that more experienced designers tend to employ "generative reasoning," rather than simply finding solutions, designers tend instead to create a "generative concept." Likewise, Graeme Sullivan (a scholar of research in art) observes that the artist/scholar John Baldacchino contrasts research and art in the following epigrammatic way: research entails the "search for stuff," while the arts "generate it." Finally, although both design and research are activities that are typically initiated for a contextually situated purpose, the specific impetus for each is slightly different. In the case of design, the impetus is commonly referred to as a "problem" (e.g., an unmet need for a new building or product) that prompts the development of a designed artifact as a solution that can be achieved in the future. In research, the impetus is typically framed in terms of a "question" to be answered at least in part by examining current or past evidence.

The several themes woven through the commentaries quoted above are highlighted in Figure 2.1 as the primary distinguishing features of design, with the contrasting, but complementary, features of research indicated as well. By "complementary" we mean to emphasize the necessarily reciprocal nature of the design-research relationship. Research can inform design in many ways and at many times in the design process; and the design process and the eventual designed artifact can yield an abundance of questions that lend themselves to many forms of inquiry.

2.2.2 Defining Research

In Chapter 1, we briefly discussed some of the primary features of research. Quoting architectural educator James Snyder, who edited one of the first compendiums on
Table 2.1 Matrix of the primary differences between design and research.

<table>
<thead>
<tr>
<th>Facets of Difference</th>
<th>Design</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution</td>
<td>Proposal for Artifact (from small-scale to large-scale interventions)</td>
<td>Knowledge and/or Application that is Generalizable (in diverse epistemological terms)</td>
</tr>
<tr>
<td>Dominant Processes</td>
<td>Generative</td>
<td>Analytical &amp; Systematic</td>
</tr>
<tr>
<td>Temporal Focus</td>
<td>Future</td>
<td>Past and/or Present</td>
</tr>
<tr>
<td>Impact</td>
<td>Problem</td>
<td>Question</td>
</tr>
</tbody>
</table>

Architectural research, we defined research as a “systematic inquiry directed toward the creation of knowledge.”39 Remarkably enough, this brief definition remains entirely consistent with characterizations of research in contemporary architectural discourse and academic parlance more generally.

In architecture, for example, Kazys Varnas points that “a shared idea of what scholarship is in the university... would be in terms of systematic research that produces a contribution to knowledge.”40 He then uses this definition as a foundation for proposing research studies that would generate “radical results” and help us “rethink the world anew.”41 Although Varnas’s primary purpose is to apply this definition to the ongoing discourse on research studies, the essence of his definition nevertheless echoes that of Snyder almost 30 years ago.

In the broader academic realm, the definition that the University of Michigan currently provides on its online educational website for “Responsible Research and Scholarship” also reflects the same two components of both Snyder’s and Varnas’s definitions: “systematic investigation” that “contributes to generalizable knowledge.” Of significance for our discussion in this book, the university explicitly notes that the term “generalizable knowledge” should not be understood as meaning only that the term “systematic and generalizable knowledge are more broadly construed to include both the approach to research conducted to multiple epistemological frameworks, or systems of inquiry.” This wider range of frameworks can be seen later in this chapter, as well as in other chapters of this book.

Similarly, in the architectural context, Solomon’s previously cited analysis of research makes the case that research can be understood “as any systematic inquiry” that research makes the case that research can be understood “as any systematic inquiry.”34 Just as design “can alternatively be understood as both a rational problem-solving technique or [sic] intuitive aesthetic act,” research can be embodied in “multiple modes of inquiry.”

2.3 THE COMPARABLE AND SHARED QUALITIES OF DESIGN AND RESEARCH

Having made the case that there are important, necessary, and valuable distinctions to be made between design and research, we now aim to demonstrate the many ways in which they embody comparable and/or shared qualities. By using the term “comparable,” we emphasize features of the two activities that serve similar roles but are not necessarily equivalent. And in using the term “shared,” we highlight facets of design and research that maybe are more essentially equivalent but often differ in prominence or emphasis. Figure 2.2 summarizes this comparison, and we will highlight them in sequence through this chapter section.

2.3.1 The Reconstructed Logics of Design and Research

Over recent decades, both design and research have been the subject of comparable attempts to characterize an idealized model of the sequence and qualities of the
processes involved. To clarify the nature of these models, we adopt the term reconstructed logic initially proposed by Abraham Kaplan in his classic book, The Conduct of Inquiry. Kaplan's purpose was to argue that the idealized notion of the scientific method was an often inaccurate reconstruction of what actually happens in research. Given that Kaplan was writing in the early 1960s, at a time when the positivist epistemological framework was predominant in the sciences and social sciences, his insights are all the more remarkable.

For our purposes in this book, Kaplan's general point is also relevant to comparably idealized notions of the design process that were proposed in the 1960s and 1970s. At that time, there was a broad-based advocacy in academia for a more comprehensive design process that would incorporate computing technology, with at least some design theorists anticipating the possibility of essentially automating the entire design process. A related goal behind the proposed systematic model was to ensure that a more fine-grained analytical process would inform design and thereby respond to the increasingly complex nature of architectural projects in a postindustrial society.

In his concise chronicle of this remarkable period in design, Nigel Cross traces how tentatively offered proposals for conceptualizing design became an accepted model for design process that held sway for at least two decades or more. What became widely known as the "systematic design process" is still influential in practice, though much less so now in academia. Never mind that the authors of this model explicitly cautioned that it was not intended to replace intuition with logic, but rather incorporate a synthesis of the two. Nevertheless, in the emergent design methods movement that followed, the systematic design process was widely accepted as an appropriate "reconstructed logic" consisting of a three-step, potentially iterative, sequence consisting of analysis-synthesis-evaluation (see Figure 2.3). The overall goal was to externalize the logical activities into charts, diagrams, and the like (especially in step 1) so that the designer would be freed from generating ideas and intuitive hunches during the synthesis step. Finally, in step 3, several alternative design solutions would be evaluated according to an array of performance criteria, and the optimum solution selected.

This model of design also gave rise to the concept of "programming" (associated with the analysis step) as a professional niche in architectural practice, and to the "post-occupancy evaluation" (POE) of recently built projects, typically conducted in-house by the architectural firm that designed the project, or by external consultants/researchers. Both of these professional specialties remain important to contemporary architectural practice, but are not as universally employed as some proponents initially imagined.

**Box 2.1**

**Programming and Evaluation within the Systematic Design Model**

Christopher Jones, one of the earliest and influential proponents of systematic design, employed the term black box to emphasize how the design process itself is often challenging for even a designer to analyze. One way to reduce the mystery of the "black box" is to know as much as we can about the processes involved in the project, and then evaluate the outcomes of the project after completion so that we can be more informed about the next design effort. The utility of programming is that it aims to maximize the amount of information about a project so that the final product generated can optimally respond to those criteria. This can include an almost infinite number of factors, but much of the early work in programming concentrated on "user needs" as well as energy conservation. The idea of programming as an extension to maximize knowledge about the figurative concepts of design may be seen in Donia Duerk's Architectural Programming, a text with the subtitle Information Management for Design. In Figure 2.4, the systematic model of design process with two additional components: the programming and evaluation.


Performance objectives of the eventual design, and concepts "design ideas" that develop from the synthesis activities. The same figure (Figure 2.4) also introduces another adaptation of the systematic mode, in that "the line between analysis and synthesis is not solid. This is to emphasize that good design ideas do not automatically follow analysis." Although in-depth programming is most commonly advocated for complex projects with many key determinants unknown or ill-defined, almost all design projects beyond those that make use of existing prototypes such as the box stories, involve some programming. Across these variations in the scale and intensity of programming activities, there are multiple viewpoints concerning the extent to which programming is integrated with design development. On the one hand, many advocate for an expansive scope for programming insist that it occurs as a separate phase before design activities are initiated. On the other hand, Bjerke suggests that for smaller projects and those for which the architect is conducting the programming activities, there may considerable overlap in the programming and design processes (see Figure 2.5).²


Figure 2.5: Programmer/Designer Involvement in the Design Process. Reprinted with permission of Wiley.

While the end of the design process is post-occupancy evaluation, or POE, after the fact data collection is another way of reducing the unknowns of the black box of the design process, at least for future projects. Three kinds of clients tend to commission POEs: those accustomed to developing a series of buildings; those venturing into a new situation with uncertainty; and organizations characterized by openness to new information. POEs can lead to greater understanding of the existing design, with cost-saving ramifications. For example, a POE found that columns in a Phase I office building prevented optimal allocation of secretarial work stations, a problem alleviated in the Phase II design stage. POEs can even be coupled with simulation research. For example, a major engineering firm directed the architect to design a new facility with open office planning. However, the architect was able to persuade the client to first study this idea in a 30-person mock-up of such a space; the resulting noise levels changed the owner's mind back to enclosed office planning.

In a classic book on the methods and procedures of POE studies, Freiser et al. divide POEs into three levels of complexity. An indicated POE is one that analyzes as-built drawings, indexing them to safety and security records, and employs interviews of building occupants to understand building performance. An investigative POE goes one step further by comparing the existing situation with other comparable facilities and with the...
Prescriptions of the current literature. A diagnostic POE involves multi-
methed tactics (surveys, observations, physical measurements, etc.), all 
conducted with comparison to other "state-of-the-art" facilities. Readers 
are referred to their work for more details of each POE type.

The problem with pre-and post-data collection is obviously that the 
"episodes" of research are limited to the introduction and the epilogue.
The "middle zone," that is, the design process itself, is left unaddressed.

These efforts to promote a more systematic, comprehensive, and clearly 
sequenced process were also seen as providing the design profession 
with a conceptual foundation more comparable to that which supported 
scientific research. Writing in 1973, Hillier et al. characterized the 
universal design model as one that incorporated "as many factors as possible within the domain of the quantifiable" 
with the goal of replacing "intuition and rules of thumb with knowledge 
and methods of measurement." They go on to suggest that the impetus for the problem-
solving focus of the systematic model of design is based on the two outdated 
asumptions about the nature of science; the notion that science can produce 
actual knowledge, which is superior to and independent of theory; and the notion of 
a logic of induction, by which theories may be derived logically from an analysis of facts.

In many ways, Hillier et al.'s criticism of the design methods movement of the 
1960s and early 1970s links this discussion back to Abraham Kaplan's 1964 book, 
The Conduct of Inquiry, mentioned earlier. Kaplan's critique of the dominant "recon-
structed logic" of the social sciences of that era was very much mirroring Hillier et al.'s 
critique of "systematic" design. As Kaplan puts it: "The hypothetico-deductive model reconstruction fails to do justice to some of the logic-in-use, and conversely, 
some of the reconstructed logic has no counterpart to what is actually in use." In 
particular, he argues that in the hypothetico-deductive reconstruction "the most 
important incidents in the drama of science (the formation of hypotheses) are en-
acted somewhere behind the scenes."

Kaplan then goes on to observe that while "everyone" recognizes that "imagi-
nation, inspiration, and the like are of enormous importance in science," the 
formation of hypotheses is treated as "an extralogical matter." Rather, he argues, 
the intuition entailed in generating a hypothesis "has its own logic-in-use, and so 
must find its place in any adequate reconstructed logic." Furthermore, he argues: 
"To ask for a systematic procedure that guarantees the making of discoveries... is 
surely asking too much." Indeed, the "logic of discovery" embodied in invention 
can be "cultivated." In sum, Kaplan's stance—not unlike Hillier et al.'s viewpoint on 
the systematic design model—is challenging the rather limited model of recon-
structed logic in science by arguing for an appreciation of the role of intuition in the 
logic-in-use of scientific discovery.

2.3.2 The Logic-in-Use in Design Research

Significantly, as we have noted in the previous chapter segment, the perspectives of 
both the design and research literature reveal an implicit convergence with respect to 
logic-in-use. Indeed, threads of arguments in both literatures draw on (sometimes 
explicitly, often implicitly) the insights of Charles Sanders Peirce, known as the "father" of the American tradition of philosophical Pragmatism in the late 19th 
century. Peirce was somewhat of a Renaissance man in that he was also a practi-
crioner of multiple scientific disciplines. Subsequent philosophers and scholars of 
philosophical Pragmatism include John Dewey and, more recently, Richard Rorty.

BOX 2.2

The Role of Deduction and Induction

To build up a conceptual framework... to anchor the variety of app-
proaches that designers take... it may be strategic to temporarily 
spend the generation of "rich" descriptions of design and instead take a 
"sparse" account as our starting point... A "sparse" description derived 
from logic will help us to explore whether design is actually very different 
from other fields—and should provide us with some insight into the poten-
tial value of introducing elements of design practice into other fields. 
We will describe the basic reasoning patterns that humans use in problem 
 solving by comparing different "settings" of the knowns and unknowns in the 
equations:

WHAT = HOW leads to RESULT (thing) (working principle) (observed)

- In Deduction, we know the "what" (the "players" in a situation we need 
  to attend to), and we know "how" they will operate together. This allows 
  us to make predictions of the consequences:

- Revised from Design Studies, 23(6), K. Davis, "The Core of Design Thinking 

(Continued)
In more recent years, a number of scholars of design studies have also written extensively about the significance of abductive thinking in design process. For one, Nigel Cross in his book, Design Thinking, observes that “intuition is a convenient, shorthand word for what really happens in design thinking. The more useful concept . . . used by design researchers is abductive: a type of reasoning . . . which is the necessary logic of design. It . . . provides the means to shift and transfer thought between the required purpose and function and appropriate forms for the object to satisfy that purpose.”

**BOX 2.3**

**The Role of Abduction in Design**

**But what if we want to create value for others, as in design and other productive professions? Then the equation changes subtly, in that the end now is not a statement of fact, but the attainment of a certain value.”**

**WHAT + HOW leads to VALUE**

(thing) (working principle) (applied)

The basic reasoning pattern in productive thinking is Abduction. Abduction comes in two forms—what they have in common is that the outcomes of the process is conceived in terms of value.

The first form, Abduction-1, is often associated with conventional problem solving. Here we know both the value we wish to create, and the “how,” a “working principle” that will help achieve the value we aim for. What is missing is a “what” (an object, a service, a system), that will give definition to both the problem and the potential solution space within which an answer can be sought.

**Abduction-1: ?? + HOW leads to VALUE**

This is often what designers and engineers do—create a design that operates with a known working principle, and within a set scenario of value creation. This is a form of “closed” problem solving that organizations in many fields do on a daily basis.

The other form of productive reasoning, Abduction-2, is more complex because at the start of the problem solving process we ONLY know the end...

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designing is essentially consistent with Peirce’s notion of abductive thinking as the creative force in reasoning.

Other design scholars also explicitly recognize the essential equivalence of Peirce’s general categories of inference in both design and research, especially with reference to the significance of abductive logic. For example, Rozenburg concludes: “Innovative abduction is the key mode of reasoning in design and therefore highly characteristic for this activity. But it is not unique to design. In both science and technology, and in daily life, abductive steps are taken in the search for new ideas.” Rozenburg also notes, quoting Peirce, that abductions typically come to us “in a flash,” a point that echoes both Kaplan’s and Croas’s recognition of the role of “intuition” in research and design respectively. Design scholar Panagiotis Loukas takes this line of argument a step further by concluding that “good science is an art...”42

Over the past decade, researchers in various professional fields and/or interdisciplinary areas of inquiry have written as well on the role of abductive reasoning in research. This seems especially true of researchers who identify themselves with either the Pragmatic school of thought (see Chapter 3) and the use of mixed methods in research43 (see Chapter 12). Typically, researchers who seek to illuminate complex phenomena in real-life settings may not be able to rely on well-established research designs (strategies) and tactics to address the research questions of interest. In this relatively uncertain context, designing the most effective research protocol is not unlike the challenge architects and other designers face in approaching a novel project, and therefore the need to generate innovative hunches and conjectures will be greater.

Nevertheless, as Figure 2.2 suggests, the relative predominance of abductive thinking in physical design is likely to be greater than in the development of a research design or hypothesis generation. Although designers must incorporate deductive and inductive thinking throughout the design process, at least through schematic or design development, abductive thinking is likely to predominate; whereas in research there is likely to be a relatively higher proportion of deductive and inductive thinking throughout the several phases of a study.

One way to understand the relative predominance of these reasoning types in design versus research is to consider the “episodic” nature of each activity. In his 1987 book, *Design Thinking*, Peter Rowe uses the term episode to analyze the segments of time and thought employed by the designers he observed as they generated their design schemes for architectural projects. Similarly, researchers typically move through different phases of thinking as they work through various phases of inquiry to discover the answer(s) to the research question(s) posed.

In general, then, designers may well incorporate “episodes” of research activity as they move forward in the more dominantly generative mode of design and
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...researchers may well incorporate episodes of "design" (abductive reasoning) in more predediatively analytical reasoning.

To the extent that the "primary generator model" and/or similar analyses of logics-in-use employed by designers are accurate representations of the design process, research episodes may well occur in the midst of evaluating various conjectures—whether a conjecture for the entire project or for segments of it. And what of the systematic design process, which we initially labeled as an idealized reconstructed logic?

To the extent that the model of analysis-synthesis-design is loosely associated in practice with the concepts of programming and post-occupancy evaluations, the model continues to maintain influence in architectural practice. Nigel Cross, among others, has argued that expert designers tend to prefer a breadth-first (as opposed to depth-first) design process, which is more consistent with the primary generator model. However, in "situations where their knowledge is stretched," designers are more inclined to go with a depth-first approach. And this may mean that for novel, complex, and challenging design projects, architects will find it important to incorporate an in-depth analysis phase at the outset, including multiple episodes of research.

Moreover, in practice, many design projects may be developed through a process that entails either a variation or a hybrid of the two models. A recent project by the architecture firm Perkins & Will demonstrates a more fluid and multifaceted design process than was originally proposed by proponents of the systematic design process. Faced with the need to update their Atlanta office, the firm decided to conceive of the challenge as a "living lab" project that included an extensive pre-/post-occupancy evaluation process. This process incorporated many facets of analysis—from technical performance criteria to operational and aspirational issues. Substantive details of the research conducted in this project are discussed in Chapters 7 and 8.

BOX 2.4
Elaborations of the Primary Generator Model, Framing, and Schemata

Since the publication of Jane Darken's "primary generator" model of 1977, the previously proposed systematic design model has been the point of reference. A comparison of the two models is helpful to understanding the differences in approach. Darken's model, with its emphasis on the generation of ideas, is more suited for the initial stages of design, while the systematic design model is more appropriate for the development of specific design concepts. The systematic model provides a framework for the systematic generation of ideas, while Darken's model focuses on the generation of novel ideas through a process of idea generation and evaluation.

Figure 2.7 - Schon's Model of Reflective Practice: Courtesy of Taylor & Francis

...number of other scholars have proposed other formulations that are essentially consistent with the premise of Darken's model. These more recent contributions generally highlight somewhat different qualities or dynamics that may be entailed in the generator-conjecture formulation. They likewise serve as a counterpart to Simon's "rational problem-solving" model.

Donald Schon's concept of "reflective practice" is described in detail elsewhere in this chapter. In brief, Schon aimed to elucidate how tacit knowledge is intuitively drawn upon by practitioners who must take action in a given situation. This leads Schon to propose a model of "a reflective conversation with the situation" proceeds from "posing a problem frame and exploring its implications in 'moves' that investigate the arising solution possibilities." (See Figure 2.7). The potential consequences of these moves are then evaluated and new frames or moves may be considered. This formulation of reflective practice is very much consistent with Darke's model, but it is more generally applicable to professional practices beyond design.

In a similar vein, Peter Rowe's in-depth investigation of the design processes of three expert architects illuminated yet another implication of the generator model. Like Darke's interlocuents, the three architects Rowe studied each in different ways adopted a primary generator as an organizing principle early on, but in some instances these designers also demonstrated a tendency to steer with their initial concept for too long. "Even when severe problems are encountered, a considerable effort is made to make the initial (idea) work, rather than stand back and adopt a fresh departure." Rowe goes on to observe that in their efforts to stick to the "big idea," designers sometimes seemed "to cram the building into the architectural object they were shaping." In other words, while the...
primary generator often seems to serve as an essential kick-start to the design process. It can occasionally delay effective or timely resolution of the design process.

Established scholars of design process Bryan Lawson and Keen Dorst point out the significance of how design students learn, and design experts are able to "recognize" design situations, and "draw parallels with situations from other contexts." Drawing on terminology from cognitive psychology, the authors describe how design expertise must rely on the accumulation and cultivation of "schemata." They argue that "[w]hile design is highly situated, generic solutions usually provide poor outcomes," designers thus depend on the ability to recognize parallels with well-known situations but also detect subtle variations. The notion of schemata applies not only to individual designers but also to firms. Indeed, the community of professionals within a design firm may share a "common understanding of the relative importance of the members of the practice see it of various known schemata." The advantage of such collectively shared schemata is that a coherently connected design is likely to result from these circumstances, but the downside reiterates the conclusion that designers can stick to a guiding principle for too long or in the wrong circumstances.

Finally, Paton and Dorst's research study of expert designers' experience of briefing processes with their clients (their resulting typology of designer roles is discussed elsewhere in the chapter) returns us to Schon's concept of framing. The authors' general conclusion is that when the designers' roles in the briefing phase are relatively more collaborative, this typically entails a mutual reframing process with the clients and overall the collaborative reframing process tends to yield more innovative design outcomes. Figure 2.8 highlights both the barriers and enablers of this reframing. The barriers include: fixation by the clients on their initial idea (often a solution to a perceived problem). This fixation occurs when the brief is not clear or when the client's perception of the situation is unclear. The enablers of this reframing process include: the identification of the right problem; the use of metaphors; the exploration of alternative perspectives; and the use of analogies. These barriers and enablers together create a situation where designers must work to overcome these impediments in order to achieve successful design outcomes.


3 Ibid., 164.


2.3.3 The Scope of Design and Research

Multiple scholars of research and design have conceptualized the variations in the scope and application of each activity by employing terminologies of scale. In the research domain, Gary Moore has employed the terms big, middle, and small. So, for example, at the "big" end of the scale are very ambitious theories that explain a large scope of reality. The theory of gravity, which explains both the drop of a coin and the movement of planets, is such a theory. Relativity theory is also such a theory. Truly a large scope of coverage is envisioned by Stephen Hawking's references to GUT ("grand unified theory"). Hawking aims to unify the various fundamental forces in the cosmos (the strong nuclear force, the weak nuclear force, and the electromagnetic force) into a single explanatory framework.

At the other extremes are small, localized explanations for things. "I get depressed when the sky is overcast" may be a kind of small theory. It explains a very localized
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Le Corbusier's "A house is a machine for living"; or the Modernist "form follows function"; yet we argue that such examples are more properly understood as polemics. Since their purpose is to spur the use of a particular generative principle in design, such theories are essentially speculative. To be sure, speculative theory is well recognized in basic research disciplines as a generative instigation for hypothesis testing in subsequent research; yet further research on the viability of speculative design theories in architecture is rare (see Chapter 4).

However, what is commonly referred to as theory in the realm of architectural history is often the application of what we have termed broad cross-disciplinary "schools of thought," such as critical theory or poststructuralism (see Chapter 3).

In summary, to reference Friedman's position again, any of the three scales of research may generate questions at one or more of the other scales, so in essence each "may test the theories and findings of other kinds of research."53

3.3.4 Situated Design and Research in Action and Collaboration

Over recent decades, many scholars have written about how the practices of both design and research must be fundamentally understood as activities situated within the social context. In the academic setting, for instance, even students working on individual design projects are engaged within the larger culture of studio practices. And as Dana Coff's classic book, Architecture: The Story of Practice, reaffirmed, the practice of architecture is of necessity a social one, requiring effective engagement with design team members, consultants, and an array of clients and other stakeholders.54

Perhaps the most well-known and highly regarded example of this perspective in design practice is Donald Schön's concept of reflection-in-action. The term denotes the actual need in the professions to solve problems arising out of practical life-contexts.53 Schön proposes that design activity is a particular instance of reflection-in-action.53 Schön looks for patterns within context-specific design venues (e.g., a project in a design office, the history of interactions between instructor and student in the studio and its effect on the design). The emphasis is upon the specific design venue as a kind of microculture, complete with ways of doing, implicit understandings, technical terms, and so on, that all arise in the midst of creating a design. What results is a product that is the sum of the reflective actions taken in response to the factors unique to the concrete context.

In research, there has been a long-standing recognition of the importance of research that engages the specificity of real-life situations. Action research is a term given to studies that examine a concrete situation, particularly the logic of how factors within that situation relate to each other as the process moves toward a specific
empirical goal. The emphasis is on knowledge emerging from localized settings, as opposed to abstract knowledge applicable for many settings. Action research arises out of the social sciences; it has roots in the work of psychologists Kurt Lewin’s notion of field theory, which basically holds that theoretical knowledge and practical knowledge must inform each other in a concrete context for the establishment of a true field of endeavor. The applicability of this notion to the generative design process is quite evident.

A more focused version of action research is design-decision research, proposed by Jay Forbus and Lin Kantrowitz. In action research, the researcher is still taken. Design-decision research embeds the researcher more into the actual concrete process; indeed, the authors underline the point that the “researcher” in their model can be the various players of a process themselves. In this sense, “researchers” and “designers” are “one community” and not two; facility programmers, architects, market analysts, communications consultants—can be a kind of “new practitioner” that not only makes decisions but also assesses those decisions from the perspective of research. Forbus and Kantrowitz give the example of a bank that wished to build a wing, outfitted appropriately for its “high-value” customers. Yet in-depth interviews and focus group discussions revealed that the better approach would be to provide spaces for individualized personal contact, thus avoiding alienating other customers while providing the personal attention the management wanted for the elite clients. It is easy to see how these interventions can aid in the overall design process in an episodic fashion. It is also easy to see how, when design incorporates these approaches, research strategies addressed elsewhere in this book (for instance, in Chapter 7 on qualitative research) can be harmonized for design decisions. Forbus and Kantrowitz themselves list many “phases” of a building’s life cycle to which this approach can be applied: planning, programming, feasibility studies, design, construction, operation, fine-tuning, renovation, maintenance, repair, and so forth.

Earlier in this chapter, many of the examples we highlighted regarding the coexistence of design with episodic instances of research implicitly emphasized the single designer. Much has been written recently on the alternative to this paradigm—namely, collaborative design. It is in recognition, at least in part, of the fact that much of architecture emerges as a result of team effort, as opposed to the efforts of a single “star” architect.

Yet more than ever, especially in projects that are increasingly complex, the design process necessarily calls upon the expertise of a wide variety of disciplines. How does this work? And in what ways? How do we understand the role of the architect? Or design team consultants? Or the client? Or the users? Even though much has been written regarding this topic, it is an area that is wide open for more in-depth research. Here, we summarize an exemplar of design process, a theoretical model, and recent research.

In a classic example of collaborative design and research, Charles Moore provides an illuminating account of the work in his St. Matthew’s Church project in a suburban of Los Angeles (see Figure 2.9) in his book’s The Politics of Architect-Client Relations. The original church was destroyed by fire, and Moore’s firm was hired by the parish with the requirement that any design proposal must be approved by two-thirds of the congregation—something that may have trouble agreeing “what day it was.” Moore’s solution was to allow the design to emerge by means of collaborating with the congregation in four “open design charrettes” over a period of four months. During this participatory process, many different tactics were used to arrive at a design consensus. These included “awareness walks” of the site, jotting down feelings and observations. Following this, the congregation used found objects (foam Loops, cellophane, scissors, paper, even parsley) and made various configurations. In the

Figure 2.9 The pergola at St. Matthew’s Church, Los Angeles. Designed by Charles Moore. Photograph courtesy of Linda Groft.
The second charrette, Moore’s team showed slides of other church buildings; even though
a dark wood building was a pre-charrette favorite, images of a white church by
Asko received many positive votes. During the third charrette, the congregation
was given building shapes to work with to express their visions. The team then
took all of these inputs and developed some drawings and a model, all of which
they left with the people for a month. In the end, 87% of the congregation ap-
proved the design.

Moore’s approach reflects many of the characteristics of qualitative research,
such as having no preset theory of design strategy going into a research venue, and
“living” with the people to develop “thick” accounts of how they perceive things.
Moore recalls: “Being a part of making that church was an opportunity to work to-
ward an architecture filled with the energies not only of architects but of inhabi-
tants as well, and helping people to find something to which they can belong.”

Groat has pointed out that traditional images of the architect have often been
one of either the architect-as-technician, or the architect-as-artist. Both of these
models not only set apart the architect in an individual role (hence perhaps encour-
ging a “star” quality), they also bring about disjunctions between what architects
design and what everyday clients want. Groat’s alternative proposal is that of
the architect as a cultivator. Cultivator of what? Says Groat:

“Once we . . . foster environmental values that focus on the common good and
reinforce the connectedness of people within an organization, a community, or
society as a whole, we are then confronting the essence of cultural life. It is at
this point that the model of the ‘designer-as-cultivator’ comes into its own.”

Groat means to shift the attention from the architect as sole technician or sole
artist to a role that is sensitive to a larger communal mission of well-being. She
structures her argument by borrowing seven categories of values from organiza-
tional theory.46 The author, Richard Barrett, suggests that, in good organizations,
individuals are cultivated to rise above self-interest to take on communal and ulti-
mately global interests of well-being. Groat adapts this model for her proposed
paradigm of the architect-as-cultivator (see Figure 2.10). In short, the architect as
cultivator encourages three things. He or she emphasizes process, by which Groat
believes architecture can engage and shape the world in constructive ways; sec-
ond, a collaborative and participatory spirit on the part of the architect. Second,
means a collaborative and participatory spirit on the part of the architect, where
different disciplines contribute in concert to a solution; community is inherent in
this process. Third, borrowing from the title of Barrett’s book, Groat’s architect-as-
cultivator is one that has “a sensitivity for the cultural as the soul of design.” By this
means a vision for the mission of the common good, with the architect motivating
his/her team to recognize that quality environments “can only be realized by fully
engaging the social and cultural milieu in which it is embedded.”

In some organizational situations, however, the collaborative process may
occur only between the client organization’s leader and the designer or design
team, thereby not permeating the larger organizational context. There is, for
example, a well-documented case of an advertising agency executive collaborat-
ing with a well-regarded designer to create a transformative virtual office
environment. Although the design goal was to encourage more innovative work
and to engender a more communal environment, the employee response was
overwhelmingly negative; many struggled to get work done in an environment
that felt like “a cocktail party,” fought over too few desks, and desperately tried
to define a personal space by displaying family photos. In other words, de-
spite what appeared to be effective collaboration at the top, the design process
did not engage the situated organizational context. A similar dynamic seems to
have occurred with the design of the Seattle Public Library project, where there
appeared to be an effective collaboration between the library leaders and Rem
Koolhaas, but much less so with the community at large (see Box 12.2 in Chapter
12).

Just as there needs to be an alignment of organizational values, environmental
values, and the architect/designer’s role (see again Figure 2.10), there is addition-
ally an essential alignment to the briefing and ongoing design process. Indeed, the
entire design engagement process is also influenced by an organization’s underlying
values, which in turn affects the nature of user participation, how information is to be gathered, and even how design decisions are made.

A research study of expert designers by Paton and Dorst demonstrates a remarkable convergence with Geor’s cultivator model. The authors’ purpose was to investigate the variety of ways in which designers worked through the project briefing phase with their clients. In their interviews with 15 designers, they asked about the nature of the briefing processes for what the designers deemed to be “typical” and “innovative” projects. Paton and Dorst’s in-depth analysis of these interviews revealed a typology of four designer roles. The designer’s least-favored role is that of technician, whereby the designer is presented with a well-defined brief and is simply expected to carry this out. In the role of facilitator, the designer accepts the client’s established criteria for the project, but is able to devise an appropriate solution for the problem as given. In the third role as expert/artist, the client is accepted as knowing what they need and the designer is responsible for framing the project with them to achieve a workable outcome. Finally, for all but 4 of the 15 respondents (for whom the expert/artist role was preferred), the designer found the role of the collaborator to be the most satisfying. In this role, both the client and the designer mutually work on framing the project, in terms of both problem and solution spaces.

This typology is represented in Figure 2.11 and shows that the technician role is characterized by either limited or virtual no collaborative engagement in problem definition, solution formulation, or iterative refinement of the design. By contrast, at the other end of the scale, the collaborator role entails the full engagement of the designer in all three categories of involvement. Interestingly though, some architects or designers may see advantages in the expert/artist role, it actually entails only partial or medium levels of involvement in two of the three categories.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Point of Entry to Project</th>
<th>Involvement in Problem Space Formulation</th>
<th>Involvement in Solution Space Formulation</th>
<th>Amount of Iteration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technician</td>
<td>End of planning</td>
<td>No</td>
<td>No</td>
<td>Low</td>
</tr>
<tr>
<td>Facilitator</td>
<td>Near end of planning</td>
<td>No</td>
<td>Partial</td>
<td>Low</td>
</tr>
<tr>
<td>Expert/Artist</td>
<td>Mid-planning</td>
<td>Partial</td>
<td>Yes</td>
<td>Med</td>
</tr>
<tr>
<td>Collaborator</td>
<td>Beginning of planning</td>
<td>Yes</td>
<td>Yes</td>
<td>High</td>
</tr>
</tbody>
</table>

Figure 2.11 Matrix of designer roles. Redrawn from Bec Paton and Koos Dorst, “Briefing and Reframing: A Situated Practice,” Design Studies 32(3) (November 2011): 583, with permission from Elsevier.

Equally important from the designer’s perspective, the examples of projects that entailed the collaborative mode were seen as more diverse and innovative. And the interactions between designer and client were experienced as “highly iterative, transparent and playful.” The authors then go on to analyze the type of conversation that occurs between client and designer working in the collaborative mode. In these cases, “[e]ngineering a diaolgical approach, using a context-specific language framework and asking leading questions [authors’ emphasis] were . . . identified as means to de-structure a situation through language co-creation.”

The authors also argue that, in addition, employing a “co-created language” serves to establish a level of trust between client and designer. This dialogic engagement may well lead the client and designer to mutually re-frame the nature of the design project, often involving “research on behalf of, and with, the client to reframe the situation (e.g., user-centered design techniques revealing the situation, rather than conforming to a list of functional requirements).”

The authors observe that their interviewees expressed curiosity “to find out about the client’s world and incorporate that into the situation being framed.” Finally, they conclude that such “[t]ransitory framing and reframing practices” should be cultivated among expert designers and students alike. “The design professions would do well to collectively reflect on these practices in order to . . . cultivate innovative projects.”

2.4 RESEARCH, DESIGN, SCHOLARSHIP, AND SCHOLARSHIP IN PRACTICE

There are many external forces driving the interest in relating the domains of research and design. One is the academic environment. Some 20 years ago, Boyer and Mitgang’s important work, Building Community: A New Future for Architecture Education and Practice, called for a more diverse approach to defining research. They noted that because the academy places more emphasis on traditional research, some architectural faculty felt that design activity is considered less scholarly. In an earlier work, Scholarship Reconsidered, they suggested that the traditional model of research as discovery be supplemented by added categories of scholarship in integration, application, and teaching. We agree with Boyer and Mitgang’s intent that different categories of intellectual contribution are equivalent, not in kind but in import and value. We noted this in passing in the first edition of this book, but developments since 2005 make this matter more important for this present edition, as will be evident in the following.

Another impetus for relating design to research comes from the profession. The American Institute of Architects now offers considerably more resources for
research to its members in comparison to 10 years ago.\textsuperscript{38} For example, in 2003, the Latrobe Fellowship, awarded biennially, was instituted by the AIA College of Fellows as a substantial research grant. The 2011 program (for instance) focused on public interest practices, and asked these distinct research questions: What are the needs that can be addressed by public interest practices? How are current public interest practices operating? What is necessary for public interest work to become a significant segment of architectural practice?\textsuperscript{39} In 2004, the Research for Practice (RFP) program was instituted, which led to the 2007 Research Summit in Seattle, Washington.\textsuperscript{40} It was at this summit that the profession started to develop—in logical argumentation terms—an overall research agenda for the AIA, complete with a set of technical categories for research, e.g., pure basic research, use-inspired basic research, pure applied research and development.\textsuperscript{41} It is not clear what these categories exactly mean; the noteworthy point is the effort itself to frame a research agenda.

Also noteworthy is to "increase university research capacity and funding opportunities" as one of the organization's long-range goals.\textsuperscript{42} In 2006, the AIA added the Upjohn Research Initiative, encouraging members to submit grant proposals detailing research with projects. In 2012, Wang contributed the section on research methods for the AIA Handbook, 15th edition. One of the exemplars featured in this article underlines how the Upjohn Initiative brings together practitioners with academic faculty for joint research projects.\textsuperscript{43} All of this emphasizes how overlaps between research and design have increased even since the publication of the first edition of this book in 2002.

To return to the academy: the interest in coupling design with research is also driven by institutional pressures. At the university level, there is an increasing trend for architecture faculty to hold the PhD research degree, as distinguished from the practice degrees, the MArch or BArch. (This relates to the second issue that we suggested, at the outset of Section 2.2, to be considered along with technical distinctions between design and research.) A search of the documents of the National Architectural Accreditation Board (NAAB)\textsuperscript{44} indicates that the percentage of architectural faculty holding PhD degrees was not even a measure until the 2010 report (at which point it was roughly 17%); the 2011 report has it at 28.5%, although the differences in the reported total number of full-time faculty between the two years is considerable, so the percentage increase is probably not as significant as the numbers suggest.

More anecdotal but probably more indicative evidence of pressure that some design faculty experience can be found on the online NAAB forums. The following example raises a good point: that sometimes the interdisciplinary programs within which architectural faculty reside often do not recognize anything but the PhD.

Thus, the NAAB, according to this individual, should simply convert bachelor's and master's degrees into doctoral degrees retroactively:

There are several programs throughout the country (and world) where architecture, landscape architecture, planning or design related courses and/or programs are offered under the umbrella of another college. . . . These other departments are not familiar with the architectural structure of "terminal master degrees." . . . Many MArch/BArch graduates have lost jobs due to this. Solution: retroactively change the titles to D.Arch.\textsuperscript{45}

We certainly do endorse this suggestion; our task here is to highlight the increasing pressure to recognize research rigor in design inquiry, as evidenced by the increased demand for doctoral degrees, and also to highlight the good work being done to recognize broader definitions of research in relation to design.

To this end, Ellson and Estman's 2008 report, Scholarship in Public: Knowledge Creation and Tenure Policy in the Engaged University,\textsuperscript{46} offers good criteria for measuring research rigor of the work of faculty housed within departments that conduct nontraditional research. Based on structured interviews with a wide sampling of U.S. faculty in the arts, humanities, and design, Ellson and Estman propose several "continuum structures" for accommodating research activity from scholarship to public engagement, from scholarly to creative acts, a range of choices for being a "civic professional," and a "continuum of actions for institutional change.\textsuperscript{47} The authors say this (the italics are theirs):

The term continuum has become pervasive because . . . it is inclusive of many sorts and conditions of knowledge. It resists embedded hierarchies by assigning equal value to inquiry of different kinds. Indiscernibility implies choice: once a continuum is established a faculty member may, without penalty, locate herself or himself at any point.\textsuperscript{48}

Most notable about Scholarship in Public is the title itself: it casts public and civic engagement as a mode of research and, among other things, faculty work in theater, art and civic dialogues, historical preservation, urban design, and community development are all offered as examples. The authors define publicly engaged academic work as . . .

... social or creative activity integral to a faculty member's academic life. It encompasses different forms of making knowledge about, for, and with diverse publics and communities. Through a coherent, purposeful sequence of activities, it contributes to the public good and yields artifacts of public and intellectual value.\textsuperscript{49}
Key terms and phrases here indicate departure from traditional modalities of scientific inquiry. Most obvious is the word artifacts. Ellison and Eatman are explicit in holding that outcomes of research need not be concepts communicated by writing or nomenclature; they can be artifacts such as performances, exhibitions, certain objects or buildings. "Making knowledge about, for or with" suggests situated and contextualized outcomes that do not promise universal applicability, but rather find relevance in particular social-cultural venues. However, even as these modes of research are new, the terms "collaboration," "purposive sequence of activities," and "contributes to the public good" all echo well-known measures of research quality: for example, validity, reliability, even that elusive word that nevertheless crops up in all discussions about research quality: robustness. Thus, Ellison and Eatman make clear that these new modes of research should exhibit "relationships of resemblance and unlikeliness." By that they seem to mean that, even in their "unlikeliness," these new forms of research must be "judged by common principles, standards to which all academic scholarly and creative work is held." They specifically state what these standards ought to be: (1) clear goals; (2) adequate preparation; (3) appropriate methods; (4) significant results; (5) effective presentation; and (6) reflective critique.

**BOX 2.5**

**Public Scholarship in Ritzville, Washington**

Since 2005, Professor Janetta McCoy and her students have engaged in interdisciplinary work with the community of Ritzville, Washington (see Figure 2.12). Once a thriving place, the town in rural central Washington has seen a decline in its fortunes since Interstate 90 was gradually completed over the course of the latter half of the last century, reducing Ritzville to no more than an exit off the highway. With state and local funding, McCoy began her work by asking her design students to work with the community in conceptualizing alternatives for an abandoned high school in town. The collaborative conference center to attract visitors, a microbrewery, a farming museum, and a trade school as "a laboratory for learning about historic preservation." The collaboration stirred considerable interest from the Ritzville community, says McCoy: "It gets students involved with folks in a rural community who don't look like them, and the process also educates the community about design." Over the years, McCoy's efforts have gone beyond the limitations of semester schedules.

Various funding sources, such as the Ritzville Public Development Authority, have enabled McCoy to run summer studios, hire outside consultants, and pay student workers; all for promoting economic growth through enhancement of the built environment of Ritzville. McCoy's students have conducted feasibility studies, documented the built inventory of the town, and continued to do design projects. One of these involved designs for converting an empty hotel into housing for the elderly; this project garnered huge support from the citizens. McCoy and several other faculty now have in place the Rural Communities Design Initiative, which seeks funding sources to support academic design collaboration with rural communities.

McCoy's work, as an example of public scholarship as defined by Ellison and Eatman, can be assessed by the criteria the authors provide: (1) clear goals; (2) adequate preparation; (3) appropriate methods; (4) significant results; (5) effective presentation; and (6) reflective critique.

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**Figure 2.12:** Professor Janetta McCoy (standing in the background, facing left) in her work with the community of Ritzville, Washington. This particular project was for the design of an interactive structure representing the history of Ritzville. Photograph courtesy of Isi Ogur.
Turning to the European scene, in their article "Building a Culture of Doctoral Scholarship in Architecture and Design: A Belgian-Scandinavian Case," Halina Dunin-Wąsiewska (from the Oslo School of Architecture) and Fredrik Nilsson (from the Chalmers School of Architecture in Sweden) report:

In September 2003, the Bologna-Berlin policies recognized doctoral studies as the third cycle in European higher education. For the St-Lucas School of Architecture (Belgium), this meant developing a new culture, a culture of research and doctoral scholarship. The intentions of the school were to develop experimental, practice-based concepts for this research, rather than to attempt to emulate the discipline-based research that is characteristic of the academic fields.

To this end, Dunin-Wąsiewska and Nilsson were engaged by St-Lucas to develop an eight-module (over two years) curriculum in which practitioners pursue doctoral-level studies in "research by design." This program was implemented in 2006. The eight modules bore these titles: (1) Research Methodologies and Communication; (2) Knowledge; (3) Reflection; (4) Design Cognition; (5) Why/ How Design Research; (6) Artifact, Action and Observation; (7) PhD by Practice; (8) By Design for Design. Based on the "Roskilde Model" for doctoral education developed in Denmark in the 1990s, the approach "consisted of short periods of concentrated ... teaching by international lecturers, preceded by intense literature studies, and followed by practical exercises such as the writing of essays." In June 2012, Wang served as the opponent for the public defense of the first doctoral candidate to go through the St-Lucas doctoral system (in collaboration with Chalmers University in Gothenburg, Sweden). The successful candidate, Nel Janssens, is both a practitioner and instructor at St-Lucas. Her dissertation, entitled "Design-Driven Participatory Research," takes four conceptual projects—one taking eight years to complete—and derives principles that philosophically advance Crois's theory of "designerly thinking" as well as Lang's work on the deontological nature of much of architectural practice, to wit, that design decisions are made in accordance with the designer's "value-laden" commitments (deontology is discussed in Chapter 4). Although it does not neatly fit into the research strategies addressed in this book, Janssens's approach clearly involves qualitative ethnography and logical argumentation, employing critical theory as a school of thought. The point, however, is that the ethnography of her own experiences in the practice venues that produced the concept is of her own experiences as practice venues that produced the concept is of her own experiences. Through the lens of standard discipline-based doctoral research, Janssens's work can be (and was) questioned about the circularity of her own practices as her "samples." But Janssens' work fits all the criteria of Ellinor and Ettman's study; its goals were clear; the literature and practice preparation were extensive; appropriate methods were used; the results were significant both in its intended consequence (as a theory of deontological practice that engages and includes the public) and in its unintended consequence (as a pedagogical method for teaching design studies); the presentation was effective; and her work amounted to an engaging critique of design process (as well as itself undergoing reflective critique in the public defense).

Figure 2.13 is a PowerPoint slide used in a seminar for doctoral students Wang conducted at Chalmers University in June 2012. The slide situates the first edition of this Great-Wang research methods text as one heading of a heuristic matrix...

Figure 2.13 A heuristic matrix of different domains of research—including design—with "relationships of resemblance" to standard measures for research quality. The dots represent proposed locations on the matrix where various student dissertation proposals can be situated. Diagram by David Wang.
that includes Practice, Design, and Critical Intervention as the other heads. On the slide, the Groat-Wang book is labeled "Academia," in that the first edition has been primarily used in academic venues for architectural research (among them the Chalmers). Readers will recognize the chapter headings covered in the book. The Chalmers. Readers will recognize the chapter headings covered in the book. The Chalmers.

2.5 CONCLUSION

Architectural research, then—and we can be more general to say this about all design research—is experiencing an exciting time of development. Since the first edition of this book, much has emerged in attempts to bridge the gap between design and research as these terms have been conventionally understood. This bears out our view, which, again, is that design and research are neither polar opposites nor equivalent domains of activity, instead, subtle nuances and complementarities exist between the two. At their respective poles, yes, research tends to be more conceptually systematic, whereas design activity makes episodic uses of research (more examples of this are covered in Chapter 4). But as the developments in Europe are beginning to suggest, the "episodic" moniker for research in design is itself increasing in sophistication, as the domains of design and research achieve more nuanced complementarities.

NOTES

5. Ibid., 18.
7. David Wang and Ambler Joplin, "The Design Substrate: The Phenomenological Unity Enabling Howard Gardner’s Theory of Multiple Intelligences," Environmental & Architectural Phenomenology Newsletter (Winter 2009). Also available online at: www.arch.kou.edu/seminars/Wang_Joplin.htm. "Design involves innate processes by which inarticulate needs achieve articulate expression in social-cultural life. As a noun, 'design' denotes the designed object itself or the act of design. But as a verb, 'design' reveals itself to be much more than discrete acts but, rather, includes the inarticulate processes enabling such acts leading to designed objects. It is the phenomenological unity of these inarticulate processes that we call the design substrate."


12. Fouhy, 461.


15. Ibid., 41.


22. Ibid.


24. Salomon, 34.


28. Ibid., 250.

29. Kaplan, 10.

30. Ibid.


32. Ibid., 15.

33. Ibid., 16.


36. March, 269.

37. Ibid.

38. Cross, *Design Thinking*, 16.


40. Lawson and Doran, 36.

41. Cross, *Design Thinking*, 16.

42. Rooversberg, 17.


45. Cross, *Design Thinking*, 145.


50. Ibid., 510.

51. Ibid.

56. Ibid., 76–104.
57. Dorwin Cartwright (ed.), Field Theory in Social Science: Selected Theoretical Papers by
Kurt Lewin (Chicago: University of Chicago Press, 1975).]
58. Jay Fubelton and Mia Kastrowitz, "Design Research in the Swarm," in I. Zube and
G. Moore (eds.), Advances in Environmental Behavior and Design, vol. 3 (New York:
60. Ibid., 304.
61. Andy Pressman, The Principal's Role: The Politics of Architect-Client Relations (New York:
62. Ibid., 65.
63. L. Geist, "A Conceptual Framework for Understanding the Designer’s Role: Technician,
Artist, or Cultivator?" in Paul Knox and Peter Orleans (eds.), Design Professionals and the
64. Richard Barrett, Liberating the Corporate Soul: Building a Visionary Organization
66. Ibid.
67. Linda Gratz and Lawrence Stern, "Cultivating Organizational Values: A New Model
17–21.
68. Bec Paton and Ken Dorst, "Reframing and Reframing: A Situated Practice," Design
69. Ibid., 579.
70. Ibid., 582.
71. Ibid., 580.
72. Ibid., 581.
73. Ibid., 586.
74. Erich L. Boyer and Lee D. Mägen, Building Community: A New Future for Architecture
Education and Practice (Princeton, NJ: Carnegie Foundation for the Advancement of
Teaching, 1990), 53–57.
75. Erich L. Boyer and Lee D. Mägen, Scholarship Remade: Priorities of the Profession
June 12, 2012.
77. "AIA College of Fellows Awards 2011 Latrobe Prize for Public Interest Practices in
79. Ibid.
80. Ibid.
81. The project is "Main Street Connectivity: Patterns and Processes Linking Urban
Commercial Patches," Principal Investigators: Edward A. Shriver Jr., AIA, Principal,
Strada Architects LLC; Rami el Samahy, Carnegie Mellon University; Kelly Hustad,
Carnegie Mellon University. See "2011 Upjohn Research Initiative Program—Grant
June 12, 2012.
84. Jade Ellison and Timothy K. Saitman, Scholarship in Public: Knowledge Creation and
Tenure Policy in the Engaged University (Syracuse, NY: Imagining America, 2008).
85. Ibid., 10.
86. Ibid., 10.
87. Ibid., 6.
88. Ibid., 6.
89. Ibid., 9.
90. Holba Denison-Wyseth and Fredrik Nilsson, "Building a Culture of Doctoral Scholar-
ship in Architecture and Design: A Belgian-Scandinavian Case," Nordic Journal of
91. Ibid., 47.
92. Neil Jessup, Utopia-Driven Projective Research: Doctoral dissertation, Chalmers School of
Architecture, June 2012.
210.
94. David Wong, doctoral research seminar, Chalmers University, Gothenburg, Sweden,
June 7, 2012.
96. Ibid., 14–15.