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Design Matters for Management

Richard J. Boland Jr. and Fred Collopy

RECENTLY, OUR faculty had the good fortune to work with the world-renowned architect Frank O. Gehry and his firm, Gehry Partners, on the design and construction of the Peter B. Lewis Building as a new home for the Weatherhead School of Management. During the four and one-half years of working with Gehry Partners on the planning, design, and construction of the Lewis Building, we experienced an approach to problem solving that is quite different from our own, from that of the managers we study, and from what we teach to our students. We refer to this unique mind-set and approach to problem solving as a *design attitude*.

A DESIGN ATTITUDE

We believe that if managers adopted a design attitude, the world of business would be different and better. Managers would approach problems with a sensibility that swept in the broadest array of influences to shape inspiring and energizing designs for products, services, and processes that are both profitable and humanly satisfying. Gehry's approach to problems reflects the entrepreneurial spirit that was at the heart of the industrial and information revolutions. He approaches each new project with a desire to do something differently and better than he has done before and to experiment with materials, technologies, and methods in his quest. Working with him has led us to see

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Richard J. Boland Jr., *Weatherhead School of Management, Case Western Reserve University and University of Cambridge*. Fred Collopy, *Weatherhead School of Management, Case Western Reserve University*.

how both management practice and education have allowed a limited and narrow vocabulary of decision making to drive an expansive and embracing vocabulary of design out of circulation. In our focus on teaching students advanced analytical techniques for choosing among alternatives, our attention to strengthening their design skills for shaping new alternatives has withered. What is needed in management practice and education today is the development of a design attitude, which goes beyond default solutions in creating new possibilities for the future.

A decision attitude toward problem solving is used extensively in management education. It portrays the manager as facing a set of alternative courses of action from which a choice must be made. The decision attitude assumes it is easy to come up with alternatives to consider, but difficult to choose among them. The design attitude toward problem solving, in contrast, assumes that it is difficult to design a good alternative, but once you have developed a truly great one, the decision about which alternative to select becomes trivial. The design attitude appreciates that the cost of not conceiving of a better course of action than those that are already being considered is often much higher than making the "wrong" choice among them.

The decision attitude toward problem solving and the many decision-making tools we have developed for supporting it have strengths that make them suitable for certain situations. In a clearly defined and stable situation, when the feasible alternatives are well known, a decision attitude may be the most efficient and effective way to approach problem solving. But when those conditions do not hold, a design attitude is required. The decision attitude and the analytic tools managers have to support it were developed in a simpler time. They are the product of fifty years of concerted effort to strengthen the mathematical and scientific basis of management education. Today's world is much different from that of the 1950s when the movement to expand analytic techniques in management began to flourish. We are suggesting that now is the time to incorporate a better balance of the two approaches to problem solving in management practice and education.

The premise of this book is that managers are designers as well as decision makers and that although the two are inextricably linked in management action, we have for too long emphasized the decision face of management over the design face.

AN EXAMPLE OF THE DESIGN ATTITUDE

Toward the end of the design process for the Lewis Building, there was a need to reduce the floor space by about 4,500 square feet. One of us traveled

to Gehry's Santa Monica offices and worked with the project architect, Matt Fineout, on the problem. We first identified those miscellaneous spaces that had to be squeezed into the smaller footprint (tea kitchens, closets, rest rooms, storage areas, and spaces for copiers, fax machines, and printers). There were many constraints to be met including proximity to classrooms and offices, "ownership" by various departments and research centers, and circulation patterns in each area. We went through the floor plans, beginning with the lower level and working our way up to the fifth floor. The process took two days.

Working with large sheets of onionskin paper laid on top of floor plans, we would sketch possible arrangements until we had something we all agreed was a good solution. Then we would transfer the arrangement in red pencil onto the plans. Each move of one element affected others and often required backtracking and revising previously located elements. Many times during the two days, we would reach a roadblock where things were just not working out, so we would start with a clean sheet of onionskin and try a different approach. At the end of two days, it was a tremendous sense of accomplishment to have succeeded in locating all the required elements into the reduced floor sizes. We were working at a large table and Matt was leaning far onto it, marking the final changes. As he pushed back from the table, we were joking about how tedious the process had been and how glad we were to have it over. As we joked, Matt gathered all the sheets of onionskin and the marked-up floor plans, stacked them, and then grabbed an edge and tore them in half. Then he crumpled the pieces and threw them in the trashcan in the corner of the room. This was a shock! What was he doing? In a matter-of-fact tone, he said, "We proved we could do it, now we can think about how we *want* to do it."

What was going on there? A perfectly good solution had been worked out. It responded to all of our requirements and fulfilled the needs of the program. And it was difficult to accomplish. Why tear it up? A very different mind-set for approaching problems was evident here. Was this approach to problem solving an aberration of no consequence, or was it worth figuring out and considering its implications for management generally? The design approach of Frank Gehry and his associates may not mirror the work practices of the vast majority of architects. But he is one of the most successful and highly regarded architects of our day, and we believe there is something in his approach to problem solving that is an important part of his success. Bringing at least the flavor of his design thinking and design attitude to managers stimulated both the workshop and this book. Like the plans that Matt tore up that day, the ideas in this book are not meant to be the end point of managing as designing. They just show that we can do it—we can rethink managing as designing. The question is, how do we as managers want to do our designing?

6 THE DECISION ATTITUDE

A decision attitude toward problem solving is overwhelmingly dominant in management practice and education today. It solves problems by making rational choices among alternatives and uses tools such as economic analysis, risk assessment, multiple criteria decision making, simulation, and the time value of money. But for all the power of analytic approaches to problem solving, they share a central weakness in that they take as given the alternative courses of action from which the manager is to choose. The decision attitude is concerned with the various techniques, methods, algorithms, and heuristics that a manger can use in making such choices. In other words, it starts with an assumption that the alternative courses of action are ready at hand—that there is a good set of options already available, or at least readily obtainable. This is a decidedly passive view of the decision maker as a problem solver, and one that makes the untenable assumption that the alternatives that are on the table, or the first ones we will think of, include the best ones. The design attitude, in contrast, is concerned with finding the best answer possible, given the skills, time, and resources of the team, and takes for granted that it will require the invention of new alternatives. So, the decision attitude is in the unrealistic position of assuming that good design work has already taken place, even though that is not usually the case. It is, therefore, doomed to mediocrity in its organizational outcomes.

Take the classic inventory control problem as an example. A decision attitude toward that problem has traditionally modeled the inventory process as a buffer between varying demands placed on different sections of the production, distribution, and consumption chain. That image became the default approach for thirty years, while research and teaching on inventory control worked to perfect that model and enable the best possible decision making about the timing, quantity, and location of inventory acquisitions. As a result, we have developed elegant and powerful techniques for calculating reorder points, economic lot sizes, and risks of stock outs, as well as for minimizing holding costs. But we also became more deeply enmeshed in a default model of the inventory process that carried with it its own form of closure. We were blinded for decades to the possibility that inventories could be minimized by different means, such as by rethinking how we design our production processes, our relations with suppliers, our workforce, and our information systems. Only when we broke from the decision attitude in thinking about inventory control and engaged in a design attitude, did we start to see how it was possible to take the elimination of inventory, rather than its management, as our goal in a lean manufacturing approach to production. The design attitude toward problem solving was a higher order approach that allowed us to step

back from the decision-making techniques we had developed and ask the more fundamental question "what are we trying to do?"

The decision attitude is too susceptible to early closure of the problem-solving space, just as the design approach is too susceptible to keeping the search going long after it is beneficial. There is a time for openness and a time for closure in our project-based episodes of problem solving, and managers need to develop strength in both the decision and design attitudes.

WHY DESIGN MATTERS FOR MANAGEMENT NOW

It is commonplace today to note that management as a profession is in a difficult situation. The last few years have been a continuing tale of misdeeds, failures, and embarrassments. Both the fantasies of a "new economy" and the exuberance of the dot com bubble are things that the entire managerial establishment participated in creating. From government policy to investment banking to venture capitalists, to auditors, to educators, to stock analysts, the scope of complicity is almost universal. Where do we look for an explanation of failure on such a mass scale? Is it the complexity, uncertainty, and chaos of modern times that brought about the dot com bubble, or Enron, or Global Crossing, or First Capital, or the telecom collapse? Or is it something more fundamental? We argue that our everyday image of what a manager is, along with a specialized language of management education that has been developing for more than fifty years, has very much to do with it. The problem is rooted in the training of managers as decision makers and in the vocabulary of choice that is imbedded in our increasingly monoclonal MBA programs and their Executive Education arms.

The recent failings of management have been attributed to moral lapses or lack of adequate regulatory oversight, but that seems an unlikely or at best only partial cause. Over time, we will no doubt see additional regulation and a call for more ethics courses in management schools, but we do not believe that either of those attempts at remedies will be successful. That is because the failings of management are most directly attributed to a famine of good ideas. To take one highly visible example, Enron's management failed to make the earnings and cash flows it had promised and resorted to creating revenues and hiding debt through complex transactions because they didn't have sufficiently good ideas to make sales and profits in real ways. Off-balance-sheet financial manipulation was the best idea they had, and no matter how bad that idea was, they were not able to generate a better alternative.

Exotic methods of financial analysis do not create value. Only inventing and delivering new products, processes, and services that serve human needs can do that. But managers are not trained for that type of life. Instead, they are

trained and rewarded for being decision makers—to have alternatives presented to them from which they make choices by computing net present values, optimizing underassumed constraints, and trading off risks for returns. There is something tragically missing from management practice and education today, and missing even from our managerial icons. That missing element is an image of the manager as an idea generator who gives form to new possibilities with a well-developed vocabulary of design. Managers as form-givers care deeply about the world that is being shaped by a business and refuse to accept the default alternatives. They understand that the design of better products, processes, and services is their core responsibility. The design attitude is the source of those inventions. A decision does not generate inventions, no matter how advanced its analytic capabilities.

Management school faculty members should also consider how our own role as educators has played a part in bringing about the conditions and mindsets underlying recent events. Like it or not, management education is involved in the current problems of the corporate world and will also be involved in any reforms that help lead to a recovery of management's leadership role in society. More of the same does not seem to be a viable formula for the future of management education.

PRECEDENTS FOR A DESIGN ATTITUDE IN MANAGEMENT THINKING

Herbert Simon, Nobel laureate in economics, wrote *The Sciences of the Artificial*, which is one of the finest examples we have of a well-developed theory of the design attitude for managers. Simon called for a new curriculum for management education based on design. He saw management as a profession whose training should follow that of engineering or architecture as an applied science, not that of the natural sciences. The manager's professional responsibility is not to discover the laws of the universe, but to act responsibly in the world to transform existing situations into more preferred ones. Simon held that, like the engineer or the architect, the manager is a form-giver who shapes organizations and economic processes. As he states in the preface to the second edition:

> Engineering, medicine, business, architecture, and painting are concerned not with the necessary but with the contingent—not how things are but how they might be—in short, with design. (Simon, 1996, p. xii.)

To summarize Simon's argument very briefly, humans have a limited cognitive capacity for reasoning when searching for a solution within a problem space. Given the relatively small size of our brain's working memory, we can

only consider a few aspects of any situation and can only analyze them in a few ways. This is also true of computers, although the constraints are less obvious. The problem space that a manager deals with in her mind or in her computer is dependent on the way she represents the situation that she faces. The first step in any problem-solving episode is representing the problem, and to a large extent, that representation has the solution hidden within it. A decision attitude carries with it a default representation of the problem being faced, whereas a design attitude begins by questioning the way the problem is represented. To use Donald Schon's classic example, if we refer to an urban neighborhood as a blight it evokes a particular problem space where certain types of design intervention are seen as most appropriate (cutting out the blight, bringing in a fresh form of life). We have seen the results in town planning that flattened whole sections of a city and replaced them with more "healthy" elements. If we label the same area a folk community, we can marvel at the resilience of its social support networks and approach it with designs for strengthening its existing social infrastructure.

Simon concludes by asking us to strive for a kind of design that has no final goals beyond that of leaving more possibilities open to future generations than we ourselves inherited. He also asks us to avoid designs that create irreversible commitments for future generations and to strive to open ourselves to the largest number of diverse experiences possible, in order to allow us to draw from an ever-wider variety of idea sources in order to make our designs humanly satisfying as well as economically viable.

BASIC ELEMENTS OF A DESIGN ATTITUDE

By *design attitude*, we refer to the expectations and orientations one brings to a design project. A design attitude views each project as an opportunity for invention that includes a questioning of basic assumptions and a resolve to leave the world a better place than we found it. Designers relish the lack of predetermined outcomes. As Frank Gehry said several times during the workshop, "If I knew how a project was going to turn out, I wouldn't do it." Each project is an opportunity to ask oneself anew what is the real problem being faced and what is a best solution?

In the design of the Peter B. Lewis Building, Gehry Partners started with some disarmingly simple questions: "What is teaching?" "What is learning?" "What is an office?" "What is a faculty?" Design is often an opportunity to go back to those assumptions that have become invisible and unnoticed, yet are the real reasons we are working on the project. A designer looks for the real thing we are trying to accomplish, unvarnished by the residue of years of organizational habit.

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The single overriding commonality in all design projects, as Simon puts it, is the urge to "change an existing state of affairs into a more preferred one." Each project is an opportunity for betterment over existing products, services, or processes. Obviously, we don't start with a clean slate and must take into account the current state of technology, human skills, environmental forces, and so on. Even given that, each project is a chance to ask what we are really trying to accomplish in our organization and how the piece that we are working on now can help make the experience of our workers, customers, suppliers, and publics a better and more rewarding one. A good design solution is one that is more satisfying in more ways than any available, feasible alternative. A good design solution solves many problems, often ones that were not envisioned in its development.

The importance of the design attitude was attested to by Frank Gehry several times during the workshop, especially when he pointed out that wherever we look in the world, we are surrounded by mediocrity. Why is that? And more importantly, why do we continue to create a mediocre world for ourselves? One often hears the argument that it is "economics" or "costs" or "limited budgets" that are to blame. If only we had more money, more time, more staff, more of something, we would be able to do things better. It is time we rejected such defeatist, shortsighted views. It is time we faced up to the fact that the decision attitude toward problem solving that dominates management education, practice, and research favors default alternatives and locks us into a self-perpetuating cycle of mediocrity.

A design attitude to problem solving does not have to cost more—and is the best alternative we have for breaking out of the path-dependent replication of familiar patterns of management. A design attitude can bring us path-creating ideas about new ways to use technology, new materials, and new work processes that can change the definitions of cost and efficiency, making better solutions attainable at less cost. What attitude toward problem solving should guide us in our work? A decision attitude that chooses from among the alternatives that are already at hand or a design attitude that strives to construct a more satisfying solution than what has so far been proposed? A design attitude fosters an acceptance of and a comfort with a problem-solving process that remains liquid and open, celebrating new alternatives as it strives to develop a best design solution.

FRANK GEHRY'S DESIGN ATTITUDE

Frank Gehry's approach to design is distinctive in that he constantly works from multiple perspectives. He works with multiple models on multiple scales and works with both sketches and physical models simultaneously. Finally, he

brings software into the process only at a late stage, working first with hands and materials to shape his design ideas.

Like most architects, he starts with rounds of interviews—in our case, with faculty, staff, and students. He also asked us to write a short statement about our image for the learning environment we desired. From those, a program for the building was developed, showing the various functional needs and the amount of space dedicated to each, such as faculty offices, PhD areas, student study and lounge areas, classrooms, seminar rooms, communal gathering areas, and staff areas. The relative sizes of these required spaces were then translated into sets of wooden blocks of various sizes colored by function. Combinations of blocks were used to play with the massing of the building and to give an overall sense of how the functional areas might be distributed in the building. As a project's design progresses, the number of models grows into the hundreds. Some models are at the grandest scale, filling up one or more eight-foot-by-four-foot pieces of plywood base, and some are of much smaller scale, perhaps modeling just one window or a corner element of the building. For our project, we had dozens of models for faculty offices and many separate models for each classroom.

The Gehry design approach works from both the inside out, as in the massing-models, and from the outside in based on freehand sketches of the building by Frank Gehry, such as shown in Figure 1.1. These are meant to be spontaneous and evocative of both form and emotion. A constant problem he recognizes is how to keep the feelings of the initial sketches as the architects proceed through the design. An important strategy in that process of trying to keep the feelings alive is to work with their hands, making models of the exterior and interior elements out of paper, metal, plastic, waxed cloth, or whatever material gives them both the form and feeling that they are seeking. There is an important lesson here for management. As Edwin Hutchins demonstrates in *Cognition in the Wild*, thinking is not something done exclusively inside the head, but is often accomplished in interaction with other people and with our tools. Spreadsheets are one example of how managers use tools for thinking, and tactile, material models are another, relatively unexplored possibility. The more ways of thinking we have available to us, the better our problem-solving outcomes can be.

Both the interior spaces of the building and the exterior form have a logical as well as an emotional ideal that is being sought. In looking for inspiration on these dual faces of the building, Gehry draws on paintings, sculpture, music, and nature for inspiration. For the exterior of our building, he was working with an image of water flowing over rocks, as well as an image of metal and brick melting into one another. At the same time as the work on our building is proceeding, he is working on other projects, and one can see in his studio

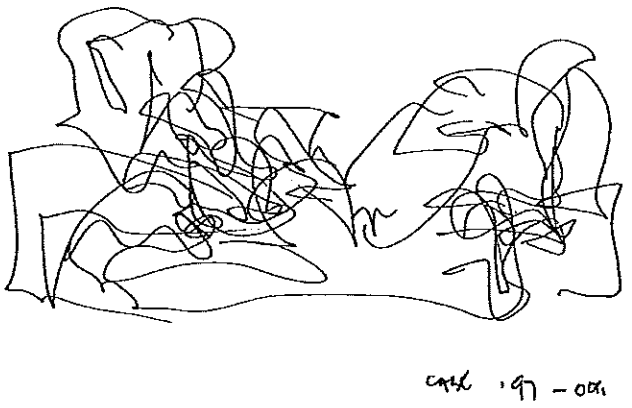

FIGURE 1.1 An early Frank Gehry sketch of the Peter B. Lewis Building

how there is a family resemblance among them. As he says, "You cannot escape your vocabulary." But he puts significant effort into trying to do just that, by looking outside of architecture for inspiration and guiding concepts. The sense of discovery is palpable in their studio.

The three-dimensional software they use to refine the design and work out the details of how the structure is to be built only comes into play after they have arrived at a model they are satisfied with as their "final" design. But realizing that it is final only in a tentative way, always subject to change as they continue to find better solutions to the many layers of problem solving reflected in the design. Once at this stage of the physical modeling, they digitize the model, both interior and exterior, and begin working with the software system to add the specifications and details that will make it build-able. Many technology advocates will see this practice as anachronistic, noting that you can sketch free form and also model in three dimensions with a computer interface that can essentially replicate whatever medium you prefer to work in. Gehry Partners thinks this is a mistake and that the use of the software as a design tool too early in the thinking process works against their commitment to openness in their search for best solutions. The software will inevitably favor some ways of approaching the design problem over others and some ways of working with the tools over others, both of which are to the detriment of the design process. They believe that keeping the connection between the initial sketches and the physical models as close as possible, with both being an inti-

mate, tactile form of work in which mind, hand, heart, and materials are a closely integrated instrument of cognition and creativity, is the best way to maintain the desired feeling in their work from start to finish.

This illustrates another way in which managers can begin learning from the work practices of successful designers to reorient their own thinking. When exactly should an organizational process be embedded in computers and information systems? What parts of the process are better handled outside those systems, relying upon the kinetic and holistic interaction of participants with materials and with one another? These are questions we do not ask ourselves often enough.

THE USE OF MODELS IN DECISION AND DESIGN

When the Peter B. Lewis Building project began, we thought we understood what the process would be like. The Lewis Building project was broken into stages running from an initial feasibility study, to a detailed definition of the program requirements, to the conceptual design, to the detailed design, to the construction drawings, to bidding, and finally to construction. Each phase had a clear objective and led to a well-specified outcome and set of deliverable documents. And the project did follow that structure—but the architects' design attitude brought the process to life in a unique way.

After the school's requirements were identified and while the architects were in the initial design phase, Frank Gehry visited us with a model to show what he was thinking and get reactions. We were under the impression that his first model was a rough version of the finished project—that it would be refined and perfected over time and eventually become the final design. But that's not what happened.

We had anticipated that the essentially favorable reaction that the faculty had to the initial model that Frank Gehry presented, coupled with various suggestions the faculty had made, would lead the architects in a process of refining that initial model to perfect the original idea that was latent in it. So we could not understand the architects' reluctance to take the initial model as seriously as we did. Frank Gehry and his senior partner, Jim Glymph, would say things like, "this is just a place to start," or "it's the beginning and it will change." And of course we thought we knew what they meant by saying it would change, but in hindsight we realize that we didn't. The next model we saw was very different from that first one, and this process continued through several rounds before you could say the underlying form had stabilized and we were working with models that were indeed becoming refined with each iteration.

It struck us that he was using models in a very different way than what we were used to. He sees a model as a kind of three-dimensional sketch to stimulate thinking and explore ideas about possible ways that the project could go. We, in contrast, tend to use the concept of model as a theory of a situation and its solution. When we model, it is much more serious and stable — meant from the beginning to be a kind of truth that captures a situation in an abstract, compressed way.

For Gehry Partners, the model was a physical tool for thinking, not a representation of the building they were designing. Frank Gehry would often point to the model, saying, "This isn't what we are doing — it's not the building." And it took a very long time for us to begin to realize what he really meant. Faculty approached the model assuming it was the abstract essence of what the completed building would be like. We expected that the work to be done with the model was to improve it against all the many criteria that had been established, in light of the aesthetic statement that the architect intended for it. It was this expectation of our decision attitude that Frank Gehry was saying no to. His model was not the building because his search for a solution was still ongoing in a fundamental sense. The model did not contain an essence of the building, and we as faculty were not prepared to understand that.

The two examples of their design practice that we have seen, and the one that opened the article in particular, show us something that is central to Frank Gehry's design attitude, which is his relentless search for openness. His commitment to openness is evident in his attempts to bring in influences from many other domains during a design project and also in his determination to not allow a problem to be closed prematurely.

CALL FOR A DESIGN VOCABULARY

Simon argues that how we describe what a manager is and how a manager should think, what a problem is and how it should be approached, and what a good and true course of action is and how it is to be achieved, are all dependent upon our vocabulary. Good designers show an awareness of their own vocabulary and what it does to their work. Part of engaging in good design is choosing a vocabulary or language to use in defining the design task, generating alternatives, and making judgments of balance, fit, and scale. The awareness of one's own vocabulary and its impact on one's design work makes design an ideal vehicle for creating dialogue across specialized professions. It enables diverse professionals to engage in discussions about the qualities of their vocabularies, the creative experience of designing, and the criteria for making design judgments.

One thing that struck us in the project with Gehry Partners was the fre-

quency with which they used the word *vocabulary*. They meant it in a broadly embracing way to include not just the words they were using, but also the strategies of problem solving they were drawing upon, the kinds of imagery they were being inspired by, and the materials, shapes, and textures of the design elements that formed a kind of language for the project. It was a language unique to that project, and the vocabulary of the project was a distinctive one with its own feelings, tensions, and inner logic. Any new element in the design entered into the context of that vocabulary and was judged not in its own terms, but in light of how it fit with, resonated with, contrasted with, or clashed with that vocabulary. This awareness of their language and their work practices as a vocabulary is a very important difference between the design and the decision attitudes toward problem solving. An awareness of one's own vocabulary is the first step to questioning it with a design attitude and exploring how different vocabularies yield more creative problem representations and enable the development of better designs.

We should make it clear in this discussion that we are not just talking about creativity. Creativity is certainly a good thing, and creativity is necessary for improvement in all our human endeavors. But creativity is not sufficient for a design attitude to problem solving, just as it is not sufficient for a decision attitude. The questions really should be: Creativity in what problem space? And creativity toward what end? Consider, for example, the inventory decision-making process discussed above. Much creativity has gone into the refinement and elaboration of the decision models for inventory control. Creativity itself is not going to bring us to the organizational, product, or process innovations we require. Creativity needs the guiding energy of a design attitude in order to focus our efforts on results that will be truly innovative and produce long-lasting organizational betterments. Design is in that sense larger than creativity. Design provides a context for creativity by channeling it toward humanly satisfying purposes, and that is why we cannot allow calls for increased creativity and techniques for enhancing creativity to take the place of increased attention to a design attitude in management practice and education.

At the Weatherhead School, we are rethinking the familiar vocabulary, images, and frameworks of management education and reviewing its evolution over the last fifty years. In doing so, we see that the late 1950s were a challenging time in management education, but of a different sort than the difficulties we face today. At that time, advances in the physical and behavioral sciences were showing the power of quantitative analysis and analytic thought processes in those domains, and management education was definitely behind the accomplishments of other academic disciplines. The Carnegie Commission and the Ford Foundation had undertaken major studies of management education and both had concluded that it was in dramatic need of

increasing the amount and rigor of quantitative analysis and analytic techniques in the curricula. The Ford Foundation established a number of PhD fellowships to encourage training of new faculty in the application of quantitative and analytic approaches from economics and behavioral sciences to research on management issues. Similarly, the Carnegie Commission outlined a program for strengthening the study of statistics and mathematical techniques in management schools. So the late 1950s and early 1960s proved a turning point in management education, marked by a recognition that the pendulum of teaching and research had swung too far away from the quantitative and analytic approaches of the sciences and too far toward the detailed practices of management.

Today the pendulum has once again swung too far and is in need of correction. An emphasis on quantitative methods and analytic techniques is fine, as long as you are already dealing with your best ideas about the situation you face and the alternatives open to you. But the more turbulent and chaotic the environment of business becomes, the less likely that is to be true. In those conditions, something else is needed—something that will help put better ideas and alternatives on the table for analytic consideration and quantitative assessment. We propose that a design attitude toward problem solving can do that.

Even seemingly nonquantitative frameworks that are central to our curricula today, such as Porter's strategy model or Kaplan's balanced scorecard model, share some of the characteristics of the most advanced analytic techniques. They enable managers to take extremely complex, ambiguous, and multifaceted situations and bring them under a conceptual apparatus that breaks them down into component pieces in order to apply logical operations for thinking through difficult decisions. This seems eminently sensible, but it springs from a mind-set and approach to management problems that is in part to blame for the sad record of management performance. They are the latest default alternatives for thinking through complex situations. The ideas and alternatives for action to be considered in a decision are to a large extent already embedded in those frameworks. They do enable the surfacing of the ideas inherent in them, but they are a constraint to generating new and different ideas. This is, of course, even truer for more highly quantitative and analytic techniques.

A WORKSHOP ON MANAGING AS DESIGNING

As a first step in encouraging management to take a more balanced approach between the decision attitude and the design attitude, a workshop on manag-

ing as designing was the inaugural event in the Peter B. Lewis Building, sponsored by the National Science Foundation and the S. Rose Corporation. We were pleased to see the widespread interest in bringing design thinking into management practice and education reflected in the outstanding quality of participants who agreed to write a contribution for the workshop and for this book.

The workshop began with a keynote presentation by Frank Gehry in which he discussed his design process and his approach to managing his own firm, Gehry Partners. That presentation, along with the question-and-answer sessions that followed, seeded the vocabulary and issues for discussion over the next two days. On the second day, Karl Weick gave a keynote that brilliantly applied Frank Gehry's process of architectural design to the problems of organization design facing managers today.

Participants had written and circulated short provocations before the workshop and developed them into the chapters that follow. These capture central themes of the workshop discussion and emphasize that architecture and other design professions have much to offer managers who are looking to increase both the logic and beauty of the organizations that they create through their day-to-day problem solving. Among the themes explored in this volume are:

- Managers, as designers, are thrown into situations that are not of their own making yet for which they are responsible to produce a desirable outcome. They operate in a problem space that has no firm basis for judging one problem-solving move as superior to another, yet they must proceed.
- Design thinking is evident in the history of management methods and organization structures and processes, especially as they relate to ensuring control of an organization. Design thinking is also at the core of effective strategy development, organizational change, and constraint-sensitive problem solving.
- Managing as designing is a collaborative process, not the work of a single, heroic maestro. Innovative methods of collaborating across disciplinary, functional, and organizational boundaries are essential to the design of successful new products and processes. Good dialogue and persuasive argumentation, along with the physical handling of artifacts, contribute to the quality of design ideas.
- Better organizational environments for successful, value-creating designs can be achieved both at the organizational and the societal level. And better approaches to the education of managers in design thinking can also be achieved. These remain as unmet challenges for the next decades on a global scale.
- We are always trapped by our vocabulary. The familiar vocabulary of management brings premature closure to problem solving by, for instance, shifting focus to discounted cash flows and calculations of cost and profit, almost before a design process has started. This can turn a design process that is best kept in a liquid state into a crystallized one and closes design inquiry.

- Using multiple models of a design problem and the working ideas for its solution can bring out different aspects of the design problem, different difficulties to be overcome, and a different sense of what a good solution might be—all of which contribute to a higher quality solution.
- Sketching, mapping, and storytelling are potential complements to models, both physical and analytic, in keeping an evolving understanding of a design problem in a more liquid state.
- Beware of falling in love with your ideas. In a difficult situation, the pressure is intense to find a solution, and the first good idea you encounter will hold great attraction. It is hard not to fall in love with an attractive idea, especially if it is your own, but a good design solution requires that you remain open to letting it go as alternatives arise.
- Seek functional solutions that meet the widest possible meaning of *functional*. A design solution is only truly functional if it meets the design criteria of all who are affected by it, including customers, employees, neighbors, publics, and future generations. This turns the criteria of functionality into an endless search because all the competing demands can never be met, and helps keep our approach to a problem in a liquid state.
- Above all, try! Try to break from the default solution. Try to solve each design problem in a better way than before. Try to expand the advantageous, innovative use of technologies, including those that are emerging, as well as those that are forgotten. Try improvising with available technologies and ideas as a form of innovation. Try to strengthen the range and power of your design vocabulary, including the metaphorical imagery and narratives you draw on to inspire your thinking. Try to set the highest standards for design excellence and refuse to settle for unnecessary compromises.

REFERENCES

Simon, H. A. 1996. *The sciences of the artificial*, 3rd ed. Cambridge, MA: MIT Press.