LEADING COLLABORATIVE ARCHITECTURAL PRACTICE

By Erin Carraher and Ryan E. Smith
with Peter DeLisle

Illustrations by Christopher Henderson

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Contents

Foreword: Integrative Practice—Enabling Adaptive, Collaborative Design

It was the winter of 2010. Our forty-person design and consultant team had just finished an early, fast-paced design phase for a large project in the midwestern United States on a grueling schedule. We were in the midst of a month-long process of transitioning our work to a design-build team who would execute construction documents and build the project. The newly selected facade fabricators were in our offices, having just flown 2,000 miles to Seattle so we could explain the project's design intent.

As we gathered around a laptop and projector in our workspace, we approached the meeting in a different way than we had ever done before—instead of showing drawings and renderings explaining the concept, we shared the underlying logic and algorithm that produced the idea. We demonstrated how the result changed as we modified the input parameters. We told them that what we had documented was simply a moment in time, not a finished solution. We asked for the fabricators' insight and expertise to refine the construction logic and resulting details.

Over the next two hours, we had one of the more exciting design conversations I can remember in my professional career. It's not overstating to say that there was palpable excitement in the room. Everyone sensed an opportunity to contribute to improving the design. It was clear from the dialog amongst this newly formed team that we had accomplished in one short meeting what many project teams fail to ever achieve: We had established trust.

The historically segmented and adversarial owner-architect-contractor triangle is transforming rapidly. Today, the pace and scale of this shift in our industry is fundamentally changing the way we interact, share, and deliver ideas. A new generation of leaders has emerged with a renewed outlook on the value proposition of design and construction services. Emerging methods of working that enable more cohesive and integrated

delivery are allowing project teams to leverage their collective expertise to achieve better results in less time within tightening budgets.

Navigating this evolving landscape and making the most of these conditions requires a broad understanding of the major challenges and the key ingredients for success. *Leading Collaborative Architectural Practice* is the industry's first guide to collaboration in this new age. It is an unparalleled orchestration of leading experts, case studies, and historical frameworks assembled to enable the modern practitioner to deeply engage and effectively lead in this new collaborative world.

In this era, large, multidisciplinary teams are successfully executing complex projects with accelerated schedules and stringent budgets thanks to new leadership, technologies, and teaming structures. Contributors to the design and construction process are interconnected like never before by shared project databases, linked information models, and digital networks. Amongst all of these new means and methods for designing and delivering buildings, the single most significant tool is *a new form of collaboration enabled by trust*.

There were three significant changes in the delivery environment contributing to transforming our collective landscape that I witnessed in that 2010 meeting in Seattle that made that day so emblematic of this shift in practice: new contractual terms of engagement of design teams, the evolving tools and technologies of delivery, and new approaches to project leadership. They are all interrelated and somewhat codependent, but looking at them individually helps clarify the role that each fills in the larger picture.

The most obvious fundamental change affected the basis of the relationship: triggered by a new contractual arrangement, the terms of engagement between designer and builder were no longer adversarial. An early design package led by a broad consultant team was transitioning to a design-build team responsible for completing the project. The traditional design-to-construction handoff with all its requisite inaccuracies, liability, and finger pointing was non-existent. In this arrangement, designers and builders worked together toward a common goal, where the values of both design quality and construction cost and logistics were shared as targets for success. The craftsmen—whose tools and hands would shape the ultimate building—were engaged in the dialogue during the design phase. The architects—whose design concept was driven by a series of critical performance, construction, and aesthetic criteria—were interested in how the means of craft could improve the design. Both entities were committed to working together toward common goals. This overlap of concept and craft, service and product, architect and builder was enabled by the team's collaborative engagement.

But the integration of design and construction expertise can only get us so far. New tools and technologies are becoming instrumental in the successful operation of multidisciplinary project teams. Vast quantities of information can be modeled, organized, and accessed by a wide array of users. Simulation of critical building performance objectives and construction sequencing are informing design in ways never before possible. Cloud-based collaboration platforms are connecting disparate team members in real-time within complex four-dimensional environments. Designers, now liberated from many repetitive tasks by automated tools, are able to interact with key collaborators at a more frequent rate and assimilate their input to inform intelligent models. Dynamic design platforms are becoming the new norm amongst teams, where flexible, relationship-based digital interfaces allow a more fluid and informed design process.

The most powerful of these tools are enabling designers to create new interfaces of interaction.

The emergence of visual scripting has empowered architects—once sidelined from the opaque world of software design—to craft their tools from the ground up. No longer are designers subservient to the tools given to them by the software industry. The tools are built for infinite expansion and customization, allowing the design process to include the making of the design tools themselves. The savviest teams are integrating digital tools in their design process as the fundamental generators of design, offering the parameters of algorithmic modeling to their team of experts to inform the core ideas of their work. In the most successful cases, these same tools are shepherding design data from early conception through the ultimate fabrication of componentry, reestablishing the continuum of creation that was the hallmark of the master builder.

Neither the new terms of engagement nor the emerging tools of the trade can be effective without appropriate leadership. The last fifteen years have seen the emergence of a new generation of vanguards who embrace collaborative design in powerful ways. These leaders are characterized by a few key attributes that differentiate them from their predecessors. They share a common commitment to enabling a performance-based design process where experts from across the supply-chain are meaningfully engaged in the development of design solutions. They acknowledge that successful design is a collaborative, cross-disciplinary effort. They see their role as the primary curators of an interwoven and dynamic collaborative environment.

In this new world, napkin-sketchers and their teams of drafters have been discarded in favor of a dynamic orchestration of adaptive, collective design processes that challenge entrenched, contentious project delivery models through changes in attitude and action in order to solve complex problems. Adaptive leaders have begun to emerge as those who provoke positive change and cultivate an environment of optimism, creativity, and potential. The emerging models of collective execution enable diverse teams of talented individuals to achieve what may never before have been possible.

Stephen Van Dyck
Partner, LMN Architects

Acknowledgments

This book is the result of a collaborative process that has spanned several years and would not have been possible without the efforts of many research assistants or the generosity of the design professionals who have shared their thoughts and work.

We would like to thank our editors and their team at Wiley—Helen Castle, Amanda Shettleton, Amy Odum, Calver Lezama, and Kalli Schultea—as well as the executive editor Margaret Cummins and vice president and publisher Amanda Miller for their support of this project.

Our research began through a grant from the American Institute of Architects Center for Integrated Practice, led at the time by Markku Allison. We would also like to thank Matt Welker, who supported and later led the management of the work for the AIA.

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The wealth of knowledge that leadership consultant Peter DeLisle brought to the project from his lifelong study of the topic was instrumental in shaping the project. His work with the AIA Dallas Emerging Leaders Program and AEC Knowledge on the topic of leadership development for architects has been broadly adapted for this book.

Christopher Henderson of Rexx Studio brought the concepts to life with his fantastic illustrations. His work in distilling a cohesive visual message from our complicated scribbles and scattered thoughts was critical in not only the final appearance but also the content of this book.

Many of the case studies and interviews originated out of a conference held in Salt Lake City, Utah in 2013 for the Center for Integrated Practice that brought together leaders in collaborative practice to share their work. We would like to thank David Scheer, co-chair of the conference, Kathleen Simpson, AIA staff liaison to the CIP, and Heather Wilson, executive director of AIA Utah, who were all part of making this event a success.

Jörg Rügemer, associate professor of architecture at the University of Utah, was an early contributer to the AIA resource, and several student research assistants have tirelessly worked on the project over

the years. They include Morgan Williams, Brennan Alldredge, Marin Smith, Matthew Reeves, Michael Hoehn, and Diego Garrido.

We would like to thank the vanguard of architects, engineers, owners, consultants, and thought leaders who have shared their experience with collaborative project delivery. We have learned much from their work and hope you will, too.

Renée Cheng, professor and associate dean of research at the University of Minnesota, provided her thoughts on the state of IPD and collaboration based on over a decade of in-depth research. She generously allowed us to adapt one of the case studies from her work for the GSA—*Integration at its Finest: Success in High-Performance Building Design and Project Delivery in the Federal Sector* (Cheng, 2015)—for this book.

Stephen Van Dyck, partner at LMN Architects, spoke with us about the firm's innovative Tech Studio model and taking on a leadership role in a 150-person firm before turning forty. He also shared his thoughts on the power of collaboration to develop innovative solutions that lead to better buildings for clients and the importance of knowledge sharing and research in both an interview as well as the book's foreword.

Emilie Taylor Welty, professor of practice at Tulane University and design/build manager at Tulane's City Center, spoke to us about the relationship between design/build and building designers, as well as what it's like to be a woman on the construction site.

CEO Fred Perpall and chief design officer Rick del Monte of The Beck Group presented their respective stories about becoming leaders and their organization's innovative leadership development program that addresses the holistic needs of future leaders at multiple stages in their careers.

Z Smith, principal and director of sustainability and performance at Eskew+Dumez+Ripple in New Orleans, discussed the importance of firms investing in and disseminating research in order to increase their competitive advantage in the profession.

Patricia Rhee, Partner at Ehrlich Yanai Rhee Chaney Architects, spoke about the role of gender in leadership and the importance of interpersonal relationships for collaborative firm culture and developing long-term industry partnerships in design-build projects.

Caryn Brause, assistant professor at the University of Massachusetts Amherst and author of *Designer's Field Guide to Collaboration*, and Clare Olsen, associate professor at Cal Poly San Luis Obispo and coauthor of *Collaborations in Architecture and Engineering*, engaged in a discussion about their research on collaborative teams in practice as well as the need for architecture education to teach leadership and collaboration skills.

Key contributors to the case studies include:

Alta Bates Summit Medical Center—Dudley Campbell and Eric Ubersax, the Devenney Group LTD

ASU Memorial Union—Daniel Hoffman, Tim Keil, Christiana Moss, and Chris Alt, StudioMA

Building 661—David Riz, KieranTimberlake; Bevan Mace, Balfour Beatty; and John Bechtel, The Pennsylvania State University

Bullitt Center—Brian Court, The Miller Hull Partnership

Global Center for Health and Innovation—Scott Crawford and Stephen van Dyck, LMN Architects

Odegaard Library Renovation—Sian Roberts, The Miller Hull Partnership; Steve Tatge, University of Washington; and Rob Warnaca, Mortenson Construction

Pittsburgh Medical Mall—Brian Skripac and Ron Dellaria, CannonDesign

Trefoil Ranch Cabins—Lisa Hardin-Reynolds, Girl Scouts of Utah; Jörg Rügemer and Erin Carraher, the Integrated Technology in Architecture Center at the University of Utah; and Kip Apostol, Euclid Timber Frame LLC

Wayne N. Aspinall Federal Building and US Courthouse—Renée Cheng, University of Minnesota; Roger Chang, Westlake Reed Leskosky; and Todd Berry, The Beck Group

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Introduction

Leadership and Collaboration

In a world where technology, project structures, contracts, and construction processes are becoming ever more complex, teams helmed by collaborative leaders are emerging as an alternative to separate parties who guard their individual interests. The teams themselves must be carefully structured in order to support effective behavior, develop innovative solutions, and deliver successful outcomes. To do so requires leadership—collaborative leadership—from architects and other project stakeholders.

Leadership and collaboration may at first seem to be contradictory terms. How can architects and design professionals lead and collaborate at the same time? The traditional concept of leadership as a top-down, authoritative structure is re-examined in this book relative to today's evolving collaborative project delivery models and innovative forms of practice.

Who leads project teams when architects, contractors, and owners equally share risks and rewards?

What role do leaders play in championing change and innovation?

How can leaders and team members learn to better understand and communicate with one another?

As leadership is reexamined to allow for a more situational approach, so too does the book question the concept of collaboration as it may typically be used in practice. Beyond merely "working together," collaboration as defined in this book is a much deeper commitment to a respectful, co-creative process that includes a multiplicity of people, processes, and tools that allow for each project team to more effectively, efficiently, and elegantly respond to the changing needs of today's practice environment.

Though every project, firm, and designer is unique, *Leading Collaborative Architectural Practice* aims to provide the first comprehensive resource for design professionals currently engaged in collaborative practice as well as those interested in doing so. Leadership and collaboration are explored at a fundamental level, best practices from other fields are translated into practical tools and tactics that design professionals can use, and successful collaborative projects illustrate the challenges and rewards of applying these principles in practice.

The authors are licensed architects, academics, researchers, and leadership consultants who collectively bring their diverse perspectives to each topic. Additionally, unique case studies and interviews with thought leaders in the field are interwoven through the book and are available in their full form in the supplemental resources.

Conceptual Framework

This book takes as a fundamental principle that regardless of the delivery method and technologies used on a project, architects must develop the interpersonal skills that define influential leaders in other industries. Today's ever increasing economic, social, and environmental pressures on projects demand that architects lead collaborative teams in order to address the complex programs, specialized project types, and social conditions that are prevalent in today's world.

The lessons contained herein aim to codify existing models of leadership theory, interpersonal skills, and communication techniques from other disciplines, distil best practices from successful precedents, and re-examine status quo processes through the lens of the social and behavioral sciences. In short, *Convergence* aims at having a calibrated depth across a breadth of subjects focusing on leadership and collaboration. These topics are applicable to leaders, team members, and practices of all sizes working across a variety of new construction and major renovation project types who are interested in joining the movement toward more collaborative practices.

There are many models of leadership and collaboration theory on the market today often differentiated by catchy names and relatable metaphors—all one needs to do is pass by an airport bookstore or browse the headlines of any business blog to find them. Rather than ascribe to one model, the authors have chosen to structure this resource around the commonly held, fundamental principles of leadership and collaboration as well as their application to the building industry.

Why Collaborate?

Collaborative teams almost always contribute to successful project outcomes and innovation. Those that do not fail to do so because of one or more dysfunctional behaviors that are easily remedied.

Our research has shown that having multiple eyes on a project solution helps teams avoid major errors. Collaborative teams offer more opportunities for new ideas that advance innovation. This is due to the diversity of members' backgrounds and prior experiences before joining the team. Finally, collaborative work environments encourage people to be self-motivated, self-assured, and satisfied with their jobs.

If collaboration is so valuable, why then are all teams not structured this way? Because it takes adaptive leadership to promote and support collaboration as a viable alternative to the status quo who are willing to invest in shaping a new culture within practice.

Contemporary leaders must be collaborative leaders rather than the authoritative or dictatorial leaders that helmed companies of the past. A collaborative leader has an ability, awareness, and commitment to lead project teams to work together to accomplish their goals. A collaborative leader may in fact not even be just one person but rather a collective of influencers from various firms who work together to fulfill project and organizational objectives and assume leadership responsibilities at appropriate points in the process.

This book builds off of a multi-year research and development project as well as an associated conference held in Salt Lake City, Utah in the fall of 2013 sponsored by and produced for the American Institute of Architects (AIA) to educate its members on collaborative project teams working in integrated models of practice. It joins other resources in documenting existing projects that model successful collaboration practices and providing translatable frameworks for those who believe that collaboration is a valuable resource in the design process.

How This Book Is Structured

The book is organized in five parts that present the history and contemporary conditions that shape today's building industry, the tools and tactics needed to develop and foster collaboration amongst various project stakeholders, and an exploration of the changing nature of the workforce, emerging technologies, and innovative business models that will impact the future of our practice. Each of the parts is briefly outlined below.

Part 1: Collaboration in Context

Part 1 provides the historical and contextual factors that contributed to the expedited rise of collaborative practice and Building Information Modeling (BIM). Additionally, common project delivery types are explored relative to the roles and responsibilities of each team member as well as strategies for making these processes more collaborative. Finally, the steps needed to create a physical environment that fosters collaboration and innovation are presented with an emphasis on structuring and sizing teams appropriately for the task at hand.

This part will also review the strategies, tactics, and best practices associated with collaborative project delivery in the building industry such as Integrated Project Delivery, BIM, and lean construction techniques. Guidelines will be presented for when, why, and how to use these strategies for collaborative project delivery.

Part 2: Collaboration Tools and Tactics

Part 2 discusses team culture as a factor of each member's unique problem-solving style (i.e., cognitive style), which is critical to bridging between disparate working styles that invariably occur on any team.

Once established, all teams progress through a number of stages of development. A better understanding of how to constructively navigate these stages and address team dysfunctions that may arise along the way. With this understanding, architects will be better able to determine how their project team is currently operating and what is required to achieve greater success.

Part 3: Leadership Effectiveness

This section is concerned with the effectiveness of architects as leaders in project teams. It will introduce the three primary concepts of leadership—ability, awareness, and commitment—and allow readers to explore their own leadership traits (or lack thereof). Leadership styles will be outlined in order to allow readers to reflect upon their own approach and to understand what skills they need to develop to increase their influence on project teams.

Additionally, this section will review the developmental stages of design professionals and the associated interpersonal and leadership skills they should have in each range. Once understood, this information will help designers advance themselves and others by responding uniquely to the person or project at hand.

Part 4: Communication and Conflict

Part 4 discusses communication strategies and tactics that can aid leaders in influencing project delivery teams, including verbal and nonverbal methods of communication as well as ways of providing effective feedback. Feedback strategies, along with their methods and tactics, will be presented to identify and address potential barriers to motivation.

The section will review human motivation, or why people do things based on their needs and wants, which is essential for leaders to understand what and how to best reward and/or coach team

members toward more positive practices. Finally, the section covers effective strategies to move teams toward greater productivity through better communication and effective conflict resolution.

Part 5: Leadership in Practice

While previous sections of this book examined the forces that shaped contemporary crisis in architectural practice brought about by a history of disciplinary isolation and the development of a contentious, risk-adverse industry, Part 5 looks more broadly at the workforce and practice of tomorrow. This section will address how the changing demographics of the workforce will impact firm recruiting strategies and corporate culture; how architects can use different types of leadership to strategically address complex societal forces in order to respond to and succeed in a changing market; and how firms can consider adapting or changing the structure of their practice in order to best address current and future needs.

Additional Resources

There are a number of additional resources that are available via the Wiley online portal that supplement the content in the book itself (www.wiley.com/go/leadingarchpractice). These include full case studies of projects that exemplify the potential of collaborative project delivery, exercises to conduct individually or in groups that build collaboration, communication, and leadership skills, and quizzes that test comprehension of the topics presented as well as provide opportunities for continuing education credit.

Who Should Read This Book?

Existing leadership and collaboration texts are extensive in nonarchitectural fields but almost nonexistent within the profession. There is a significant gap in the market for both how the existing body of knowledge developed by business and management professionals on leadership and collaboration can be translated and applied in design and construction practices. *Leading Collaborative Architectural Practice* provides this much-needed content and is applicable to anyone engaged in the education or practice of designing and constructing buildings.

The presentation of the material is grounded in practical examples of firms of all sizes working across a variety of new construction and major renovation project types who are leading the movement toward more collaborative practices. *Leading Collaborative Architectural Practice* distinguishes itself from traditional leadership texts by providing in depth case studies as well as hands-on exercises that allow architects, owners, and contractors to put these principles into practice.

As the larger AEC industry emerges from the economic downturn brought about by the 2008 Recession, the time is ripe to engage in a dialog about how to build more resilient business models and practices. These issues will be at the forefront of discussions regarding collaborative practice as it continues to prove more humane, economically feasible, less litigious, and more successful than established models currently in place.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

PART 1

COLLABORATION IN CONTEXT

Part 1, "Collaboration in Context," presents the historical and contemporary factors that affect architectural practice, collaborative versions of the most common project delivery types, the value of collaboration (as well as addressing times when it is not appropriate), and outlines the factors needed to create a culture of collaboration in teams and organizations.

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CHAPTER 1

Collaboration in Practice

The Changing Landscape of Architectural Practice

Over time, the process of designing and constructing buildings has transformed from a holistic master builder model in which all aspects of the design and construction process are orchestrated by one individual, to the fractured landscape of the early twenty-first century, in which industry professionals are hampered by archaic procurement models and disincentivized from working together for fear of litigation. The causes of this devolution are varied, but the resulting state of practice is one of inefficiency, with architects facing constant value engineering to meet project budgets, poor coordination, and disintegration between parties in the construction document phase (Figure 1-1). The result is most often excessive change orders and requests for information, which breed constant anxiety on the part of the client over exceeding the project budget and schedule. All of these contribute to delays, compromises, and the failure of most projects to fulfill their full potential (AIA/AIA CC, 2009). In the midst of this chaos, architects are losing revenue and relevance at an alarming rate.

Welcome alternatives to these siloed, contentious, and risk-adverse practices have emerged with the rise of Building Information Modeling (BIM) and the development of collaborative contract structures in the early 2000s. These structures showed how the creation of joint partnerships between key stakeholders—owners, architects, and contractors at a minimum—who share both the risk and reward for a project's success could incentivize an integrated delivery approach. Analysts projected that the industry-wide adoption of such collaborative tools—as with any paradigm-shifting change—would be slow and gradual.

However, economic, societal, and technological agents of disruption brought about by the Great Recession of 2008 accelerated this timeline. The future of practice (and to some extent the current state) is now one in which collaborative teams work together for the success of the project as a whole rather than prioritizing their own interests. This significant and necessary cultural shift requires that training and best practices be developed not only to help architects through the transition but also to foster ongoing collaboration and innovation.

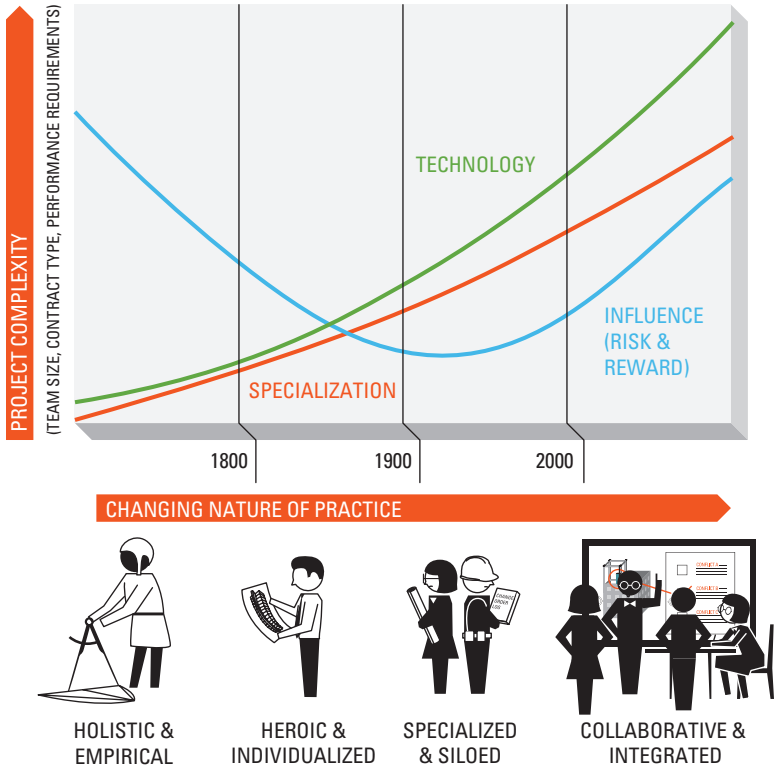

Figure 1-1 Culture of practice over time

The American Institute of Architects has been a leading voice in the national conversation regarding integrated and collaborative project delivery, calling for an industry-wide change. It developed *Integrated Project Delivery* (IPD) as one possible project delivery model that promotes a collaborative approach. The AIA also published a series of robust resources addressing the technical and procedural nature of IPD that have been widely utilized: *Integrated Project Delivery: A Working Definition* (AIA CC/McGraw-Hill, 2007); *Integrated Project Delivery: A Guide* (AIA/AIA CC, 2007); *Experiences in Collaboration: On the Path to IPD* (AIA CC/AIA, 2009); *IPD: Case Studies* (AIA/AIA MN, 2010); and *IPD: Updated Working Definition* (AIA/AIA CC, 2014).

In 2008 the AIA published a series of contract documents to provide three approaches to integrated delivery:

1. Transitional forms that are modeled after existing construction manager agreements (including owner–contractor, owner–architect, and general conditions contracts);
2. Multi-party agreements that create a single agreement that parties can use for IPD projects; and
3. The single purpose entity (SPE) contract that creates an LLC comprised of key stakeholders for the purposes of the project, which demonstrates the most robust engagement with this project delivery model.

Despite its promise, most practitioners have been slow to adopt IPD in the fullest sense, struggling to justify its value over traditional practice, to understand how to integrate the approach into existing practice structures, and to anticipate what the ramifications might be to changing the status quo (AIA CC/AIA, 2009). In 2008, a group of early adopters, made up of owners, architects, and contractors, gathered at a symposium conducted by the AIA California Chapter to share their practical experience. Although very few had participated in a "full" IPD project, all were engaged in integrated forms of project delivery and identified the following characteristics and structures that define Integrated Project Delivery:

Characteristics

- Results in efficiency and reduces redundancy
- Gets the right information to the right people at the right time
- Results in more accurate cost estimating earlier in the design process
- Decreases the risk of construction delays and additional costs
- Values people over technology
- Is unique to each project and team
- Is not appropriate in all situations

Structures

- Requires the right people
- Requires that all parties buy into the process
- Relies on trust
- Requires the owner's direct involvement throughout the entire process
- Requires a clear understanding of the process by all parties
- Requires clearly defined goals for the project and for all parties
- Requires leadership and structure
- Requires technical excellence
- Requires clear roles and responsibilities for each team member
- Requires a clear definition of risks and rewards
- Requires investment in team building, not just team assembling
- Often requires training to shift team members into a collaborative mindset
- Requires continuous education as new members join the team
- Requires transparency
- Results in personal rewards such as ownership and enjoyment of the process in addition to financial rewards
- Requires starting with "who" before "how"
- Requires a plan of action be developed at the beginning of the process by the key stakeholders collectively
- Requires clear decision-making processes and rules of engagement
- Requires regular, frequent meetings by the key stakeholders
- Requires personal, face-to-face communication
- Requires careful listening and asking questions
- Requires addressing issues and concerns in real time (AIA CC/AIA, 2009)

With such a list of clearly beneficial qualities and requirements, the question remains, why have there been so few projects that implement IPD holistically? The answer is that collaboration is simple in theory but difficult in practice. It is not easy for any industry to make the shift to a collaborative

approach and maintain the energy required to collaborate well over time, especially in one with as long a history of contention as that of the design and construction industry.

Collaboration has long been seen as either requiring the magical convergence of an ideal group of people or as hindering the "lone genius" model of traditional architectural mythology. It is, however, a skill set that can be taught and developed. Such skills, including leadership, collaboration, trust, and communication, need to be understood by architects in a way that provides both a conceptual grounding as well as the practical tools necessary for implementation. Although collaboration is rewarding when done well, it is not easy.

The Rise of Integrated and Collaborative Project Delivery

Effectively structured, trust-based collaboration encourages parties to focus on project outcomes rather than their individual goals. Without trust-based collaboration, IPD will falter and participants will remain in the adverse and antagonistic relationships that plague the construction industry today. IPD promises better outcomes, but outcomes will not change unless the people responsible for delivering those outcomes change.

(AIA CC, 2007)

A collaborative practice is distinguished from that of a typical, multiperson office by the intentional integration of diverse voices and expertise in all stages of the design process. Although architecture is by nature almost never a solitary act due to the size and complexity of its products, traditional models of practice and education have conditioned architects to develop a singular voice. The real fear in collaborating is that we and our work will be mediocre; a race toward the lowest common denominator, and with it, irrelevance; we will be seen as just one more designer among designers. The truth, of course, is by not collaborating architects become marginalized. Not knowing how to effectively collaborate will lead to their irrelevance" (Deutsch, 2014).

A defensive posture led to architecture being surpassed in significance by numerous allied fields such as engineering and manufacturing, which had long since streamlined their development and fabrication processes with great success. In 2004, Stephen Kieran and James Timberlake published *Refabricating Architecture: How Manufacturing Methodologies Are Poised to Transform Building Construction* (Kieran and Timberlake, 2004). The book challenged architects to recognize the current state of affairs and called for a radical rethinking of the ways in which buildings were made, through the adoption of advanced technology such as mass customization and information management tools. It called for integration, not segregation, in the process of making buildings: "The first act of design in this world beyond the old equilibrium is the redesign of the relations among those responsible for the making of things." They posit that in an integrated model of practice, the "intelligence of all relevant disciplines is used as a collective source of inspiration and constraint" (Kieran and Timberlake, 2004, 13). The central tool that allows for such a model to work is what they called the "IT/software enabler."

Although the authors do not mention BIM specifically in their book, the idea of a digital tool that supports the shared flow of information, instantaneous communication, and the interconnection of all disciplines is clearly outlined. Later that year, Phil Bernstein and Jon Pittman, in a white paper

written for Autodesk Building Solutions, echoed Kieran and Timberlake's call for the profession to cease operating in a model of discrete resource-intensive and inherently inefficient phases of design and construction. They proposed BIM as the tool to enable such collaboration (Bernstein and Pittman, 2004).

Bernstein and Pittman cite the sixfold greater investment in technology by the manufacturing industry as compared to that made by architecture and construction during the same time frame, as well as the increasingly competitive global market as indicators of the industry's lack of advancement. They argue that allied fields had "turned long ago to model-based digital design processes based on data that supported engineering analysis, bill-of-material generation, cost modeling, production planning, supply-chain integration, and eventually computer-driven fabrication on the factory floor," and were exerting a competitive pressure that the *AEC* industry could no longer ignore (Bernstein and Pittman, 2004). While these lessons were not lost on AEC stakeholders, the nature of the building industry—where project teams focus their efforts on the realization of a single, unique product and rarely work together more than once—made any effort to create more continuity difficult (Bernstein and Pittman, 2004).

Sharing of digital information prior to BIM was rare due to the lack of trust between architects, engineers, and contractors; the intermittent nature of technological implementation in practice; the lack of confidence in the accuracy of digital information transferred from one platform and discipline to another; and the lack of incentive (or more accurately the disincentive) for any party to take on more than their contractually obligated role in the process for fear of increased risk. Such an environment was ripe for disruption.

The introduction of BIM represented even more of a technological paradigm shift than the earlier transition from paper to CAD, because it also affected the social nature of practice, requiring new standards, workflows, and means of communication (Bernstein and Pittman, 2004). Even after BIM began to become more commonly known, design professionals struggled to understand how to harness its full potential. "[I]t is clear that there are many views as to what BIM is. Incorrectly seen as a technological solution to CAD integration, BIM places the effective use and exchange of 'information' at its heart. As a result, BIM will have an impact on most areas of business management and operation. It will revolutionise methods of working and fundamentally redefine the relationships between construction professionals. It will challenge current thinking on contracts and insurance and most importantly, it will support the integration of the design and construction teams" (NBS, 2011).

Bernstein and Pittman predicted that industry-wide adoption of BIM would be a slow process, prodded along by outside influence from clients and incentive-based contracts (2004). A year-long examination by the AIA in 2006 resulted in the *Report on Integrated Practice*, which foregrounded the need for the profession to address the changing needs of clients and society through alternative modes of project delivery, not just through technology. The report overview begins with a statement by 2002–2007 AIA vice-president and Miller/Hull partner Norman Strong: "Technological evolution coupled with owner demand for better, faster, less costly construction projects and more effective processes are driving change in the construction industry. These changes are revolutionary in nature. They will transform practice as we know it today." He concludes with the statement: "Together we have a very small window to change the trajectory

of the profession, and to best ensure its continued relevance" (Broshar et al., 2006).

The model of integrated practice was put forward as a "future perfect vision" where

> [A]ll communications throughout the process are clear, concise, open, transparent, and trusting; where designers have full understanding of the ramifications of their decisions at the time the decisions are made; where facilities managers, end users, contractors and suppliers are all involved at the start of the design process; where processes are outcome driven and decisions are not made solely on first cost basis; where risk and reward are value-based, appropriately balanced among all team members over the life of a project; and where the profession delivers higher quality design that is sustainable and responsive (Broshar et al., 2006).

Through technology, the communication barriers between silos would be demolished, allowing practices and projects to achieve their full potential. This revolutionary change promised to free architects from the burden of documentation and allow for greater focus on design (Broshar et al., 2006).

Presenting arguments for the benefits of BIM, architect and educator Daniel Friedman wrote that "the true potential of this technology in practice (for architects) presupposes deeper collaboration among all parties to the contract. That means dynamic hierarchies, joint authorship, and shared risks, responsibilities, and rewards—and we expect subsequent changes in the contract language to reflect these new relationships" (Broshar et al., 2006). Thom Mayne, in his report essay "Change or Perish," warned architects: "You need to prepare yourself for a profession you're not going to recognize a decade from now, that the next generation is going to occupy" (Mayne, 2006). Asked to revisit his statement in 2009, Mayne stated that the changes to practice were proving even more extreme than he had predicted.

> Today I would think that you couldn't even run a practice without having advanced performance techniques for understanding the way your projects operate within functional terms, within environmental terms, within technological terms, and for looking at the development of a project in the early stages, the cost models that are connected to extremely precise performance objectives. It's not evolutionary . . . our clients expect this. And, given current economic conditions and the way the relationship with subcontractors and our engineers has evolved, a huge amount of these people already are advanced in these areas and also have expectations of receiving 3D drawings and not normative drawings (Smith, 2009).

In 2007, the AIA National and AIA California Council published *Integrated Project Delivery: A Guide*, which outlined the ways IPD could be utilized in practice. It cited inefficiencies in the construction industry resulting in up to 30 percent waste, the lack of interoperability among AEC stakeholders costing the industry almost $16 billion annually, and the worst performance of any nonagricultural industry since 1964—construction productivity having decreased while all other industries increased over 200 percent during the same time frame—as clear proof that the old ways would no longer suffice (AIA/AIA CC, 2007).

This *IPD Guide* provided the first definition of IPD as a "project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction"

(AIA/AIA CC, 2007). It offered the notion that principles of IPD could be applied in multiple contract structures but that all projects claiming to be integrated included *highly effective collaboration* among the key stakeholders—owner, architect, and contractor—over the entirety of a project.

> IPD leverages early contributions of knowledge and expertise through utilization of new technologies, allowing all team members to better realize their highest potentials while expanding the value they provide throughout the project lifecycle. At the core of an integrated project are collaborative, integrated and productive teams composed of key project participants. Building upon early contributions of individual expertise, these teams are guided by principles of trust, transparent processes, effective collaboration, open information sharing, team success tied to project success, shared risk and reward, value-based decision making, and utilization of full technological capabilities and support (AIA/AIA CC, 2007).

The Great Recession had a marked impact on the accelerated adoption of BIM. A 2008 report titled *Building Information Modeling (BIM): Transforming Design and Construction to Achieve Greater Industry Productivity* found that in the face of the economic downturn, BIM adoption was expected to rise significantly as experienced users were able to differentiate themselves within the extremely competitive market by bringing added value and efficiency to their clients (McGraw-Hill Construction, 2008).

Between 2007 and 2012, the adoption of BIM increased by 75 percent, with approximately 90 percent of medium and large firms reporting the use of such tools (McGraw-Hill, 2014). In 2014, Patrick MacLeamy, CEO of HOK and chairman of buildingSMART International, referenced the undeniable force that BIM had become by stating that "those who practice in the old way are soon going to find themselves without work. Either change, get with the program, or go out of business." He goes on to state that the next great evolution in the industry will be aligning collaborative relationships between key stakeholders with the transfer and flow of information between these parties (McGraw-Hill, 2014).

MacLeamy had been an early advocate for IPD, particularly with regard to its ability to address the increasing cost and complexity of making design changes in a project over time by shifting the bulk of coordination efforts to earlier in a project's timeline. Consciously or unconsciously referencing a 1976 diagram drawn by Boyd Paulson in the *Journal of the Construction Division*,[1] MacLeamy sketched a set of relationships between time, complexity, influence, and cost in a construction project during a 2004 meeting that have become known as the MacLeamy curve (Figure 1-2).

In 2014, the AIA and AIA California Council released an updated report on IPD in order to distinguish it from other forms of project delivery,

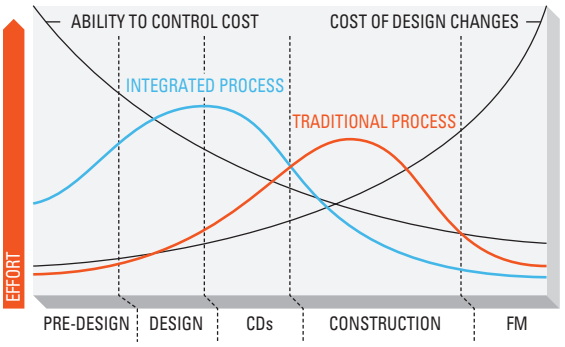

Figure 1-2 MacLeamy curve

[1] See www.danieldavis.com/papers/boyd.pdf.

sometimes referred to as "IPD lite" or "IPD-ish," that had begun to become popular alternatives to a "true IPD" project. The refined definition states:

> Integrated Project Delivery (IPD) is a project delivery method that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to reduce waste and optimize efficiency through all phases of design, fabrication and construction. The Integrated Project Delivery method contains, at a minimum, all of the following elements:
>
> - Continuous involvement of owner and key designers and builders from early design through project completion.
> - Business interests aligned through shared risk/reward, including financial gain at risk that is dependent upon project outcomes.
> - Joint project control by owner and key designers and builders.
> - A multiparty agreement or equal interlocking agreements.
> - Limited liability among owner and key designers and builders (AIA/AIA CC, 2014).

At the core of this model (Figure 1-3) is the creation of a project team that shares financial risk and reward through the creation of a multiparty contract and a commitment by all parties to create a shared culture of joint decision making that foregrounds what is best for the project rather

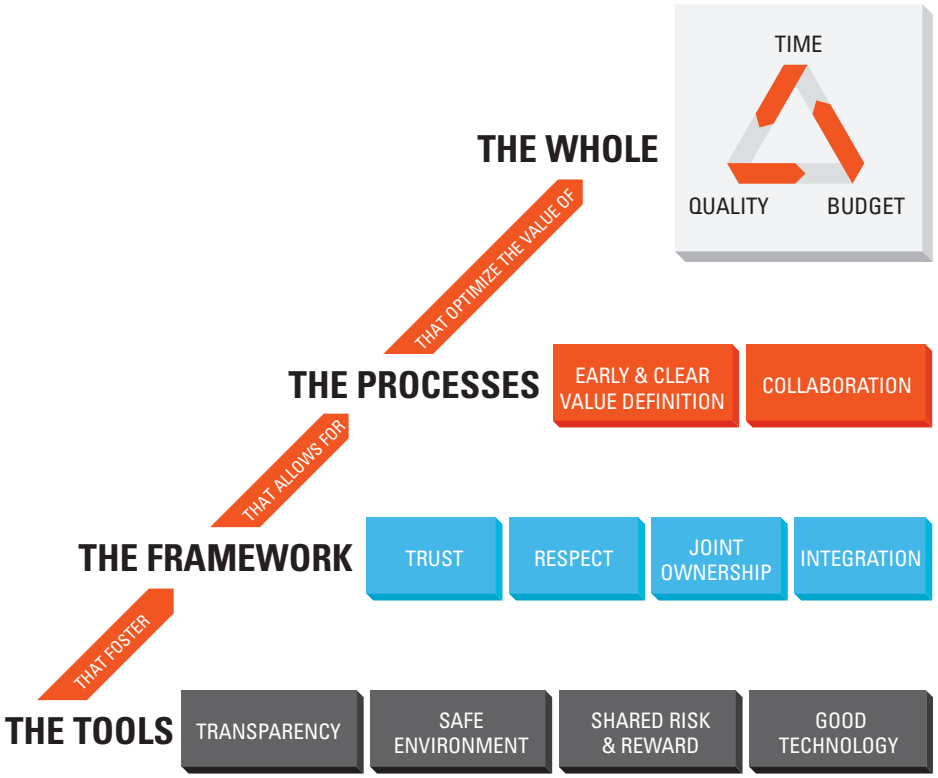

Figure 1-3 IPD fundamentals

than for one particular entity. Early integration of the key consultants and constructors leads to more accurate information and more effective decision making. Effective teams demonstrate respect, trust, and transparency, which are outlined in joint contracts but established by team leaders and sustained by members throughout the process (AIA/AIA CC, 2014). Interpersonal as well as infrastructural components were highlighted as critical to an integrated approach, each requiring equal investment.

Mutually Beneficial Collaboration

The most exciting groups—the ones. . .that shook the world—resulted from a mutually respectful marriage between an able leader and an assemblage of extraordinary people. Groups become great only when everyone in them, leaders and members alike, is free to be his or her absolute best.

(Bennis and Biederman, 1997)

The relationship between leadership and collaboration is interdependent rather than conflicting as one might first imagine, especially in creative fields and complex contexts. With relatively simple technical problems that have known variables leading to a right or wrong answer, traditional top-down models of leadership can be effective. With adaptive or "wicked" problems, however, complex partnerships among diverse experts are often required (Bennis, 1999). Such collaborative teams require that the experts be brought together efficiently when and where their efforts are most needed. Each must understand their specific role as well as the overall project vision, a dance that is choreographed by the team's leaders.

Leadership is grounded in a relationship between leaders, followers, and the common goal they want to achieve (Bennis, 2007) (Figure 1-4). Leaders do not operate alone or exist in a vacuum. "Any person can aspire to lead. But leadership exists only with the consensus of followers," said Warren Bennis, who is widely regarded as the father of modern leadership studies. Bennis contends that the opposite is also true—great teams always have a powerful leader. This person is not always the most technically or creatively skilled member of the team but the one who has the ability to assemble a team with the right skill sets, build consensus around a shared vision, and enable each team member to do their individual best. This more often than not means getting out of the team's way rather than micromanaging their process. In architectural practice, the leader/team dynamic exists within the office as well as among interdisciplinary project teams.

In today's increasingly complex society, where seemingly the only certainty is change, architects are tasked with challenging traditional disciplinary silos and hierarchical management structures. They must find new ways to critically address the complex issues of our time through coordinated collaboration with an increasingly vast array of specializations. Collaborative teams must work across disciplines and value the collective mind over the individual genius without losing their specific disciplinary expertise in the process. "Whether the task is building a global business or discovering the mysteries of the human brain, one person can't hope to accomplish it, however gifted or energetic he or she may be. There are simply too many problems to be identified and solved, too many connections to be made" (Bennis and Biederman, 1997). Despite such calls to collaboration, society in general—and architectural practice in particular—still champions the myth of the creative genius whose singular vision drives all great work. To achieve effective collaboration, the dynamics of teams must be understood as a whole comprised of discrete parts: leader, follower,

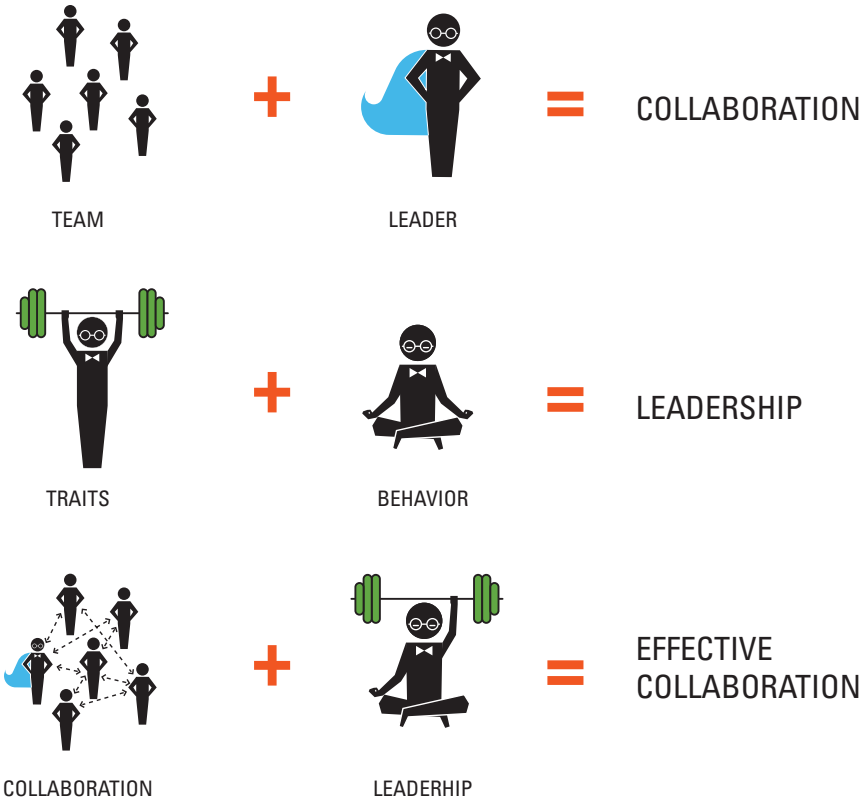

Figure 1-4 Effective collaboration

followers working together (i.e., team), and team orchestrated by leader (i.e., collaborative team).

Kieran and Timberlake put the exponential increase of complexity seen in today's practice that demands such specialization in context:

> Hundreds of years ago, all of architecture could be held in the intelligence of a single maker, the master builder. Part architect, part builder, part product and building engineer, and part materials scientist, the master builder integrated all the elements of architecture in a single mind, heart, and hand. The most significant, yet troubling, legacy of modernism has been the specialization of the various elements of building once directed and harmonized by the master builder. The multiple foci at the core of specialization have given rise to a world that is advancing while fragmenting. We applaud the advancement, but deplore a fragmentation that is no longer unavoidable and so needlessly diminishes architecture. Today, through the agency of information management tools, the architect can once again become the master builder by integrating the skills and intelligences at the core of architecture. The new master builder transforms the singular mind glorified in schools and media to a new genius of collective intelligence. Today's master architect is an amalgam of material scientist, product engineer, process engineer, user, and client who creates architecture informed by commodity and art. By recognizing commodity as

> an equal partner to art, architecture is made as accessible, affordable, and sustainable as the most technically sophisticated consumer products available today (Kieran and Timberlake, 2004).

Collaboration must be built, sustained, and grown culture-wide within firms and project teams. The leaders of such teams are tasked with nurturing individual members' abilities in integrative, synthetic thinking, empathetic understanding, and constructive communication to support success rather than employing top-down autocratic managerial styles or micromanagement (Figure 1-5). "The atmosphere most conducive to creativity is one in which individuals have a sense of autonomy and yet are focused on the collective goal. Constraint (perceived as well as real) is a major killer of creativity" (Bennis and Biederman, 1997). Essentially, people want to be led, not managed.

The urgency behind the change to more integrated and collaborative approaches has been driven by forces outside the discipline. The scope creep seen in contractors' services required the discipline to sprint to catch up or risk losing relevance and revenue. The technological shift to BIM as a powerful information sharing tool spurred a rapid rise in specialization in allied fields, with practitioners scrambling to differentiate themselves in a more and more competitive market. Architects, the last great generalists, must either similarly specialize and risk becoming obsolete with the next market shift or make the case for the value of their integrative expertise and lead the formation of collaborative teams with allied professionals to address the complex nature of most of today's boundary-pushing projects (Olsen and MacNamara, 2014).

All of this leaves generations of practitioners and leaders faced with examining the very means and methods of their work. Architects have a long disciplinary history of creative problem solving dealing with multiple streams of information. Their ability to synthesize these variables into a cohesive end result is the very skill set needed to address the barriers to a more collaborative practice culture (Figure 1-6).

The types of practitioners and leaders that will thrive in the increasingly global, digital, value-based, and market-driven world are those who are able to not just problem solve but challenge the very nature of the problems themselves. "The new economies demand a deeper conception of talent and the organic nature of our lives demands it, too. What we become in future is deeply influenced by our experiences here and now," says education reformer

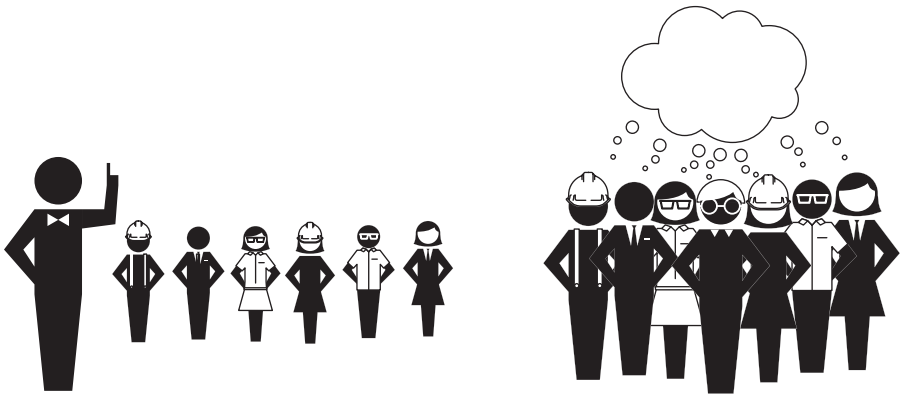

Figure 1-5 Autocratic versus collaborative leaders

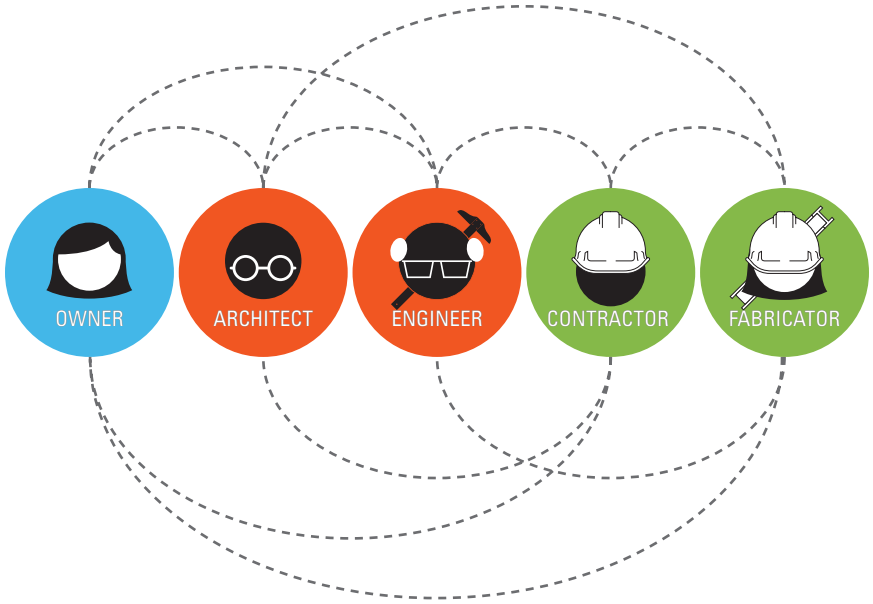

Figure 1-6 The collaborative team

Ken Robinson, who champions creativity as a critical skill for all contemporary students. "Education is not a linear process of preparation for the future: it is about cultivating the talents and sensibilities through which we can live our best lives in the present and create the best futures for us all" (Robinson, 2011).

In a 2015 global survey of more than 7,500 senior executives and business leaders, leadership development and strategic change were identified as critical to a business's success. However, the majority of these same individuals felt that their organizations fell short in the execution of these priorities:

> Leading for change requires a different set of skills than those required for traditional business management. Change leaders must be agile, flexible, resourceful, and have the ability to navigate unknown situations. They must be good listeners and open to new ideas from all corners of the organization. And, most importantly, change leaders must be able to articulate a vision and inspire others to higher levels of performance.[2]

The lack of follow-through in the architecture industry relative to the aspiration for a more collaborative approach is in part the result of a lack of academic and professional training on the subject. Architects are trained how to design buildings, not how to lead or participate in teams of multidisciplinary professionals with different personalities, cultural backgrounds, and communication styles. The archetype of the "natural" leader is a false one: the skills and abilities that define a successful leader who can foster collaboration in teams are in fact teachable and learnable.

[2] Korn Ferry Institute, "Real World Leadership: Part One: Develop Leaders Who Can Drive Real Change." Available at http://static.kornferry.com/media/sidebar_downloads/Korn-Ferry-Institute_RealWorldLeadership_Report-1.pdf.

Leadership and Followership

What distinguishes an effective from an ineffective follower is enthusiastic, intelligent, and self-reliant participation—without star billing—in the pursuit of an organizational goal. Effective followers differ in their motivations for following and in their perceptions of the role. Some choose followership as their primary role at work and serve as team players who take satisfaction in helping to further a cause, an idea, a product, a service, or, more rarely, a person. Others are leaders in some situations but choose the follower role in a particular context. Both view the role of a follower as legitimate, inherently valuable, even virtuous.

(Kelley, 1988)

In a global culture of participatory democracy, hierarchical management structures are more outdated than ever. As a result, the stereotypical roles of leader and follower must be reexamined. The time when leaders directed and followers did what they were told is long past. "Leadership has changed and so has followership. The assumptions on which the [social] contract is based are being challenged on a regular basis, not by the few but by the many, and generally in ways that are technologically revolutionary"(Kellerman, 2012). Power, authority, and influence—which were the leader's right in the past—no longer motivate an empowered workforce to do its best work. Leaders are required to prove their worth or be removed. "For a century or more, democratic leadership has been, or was presumed by the majority to be, a meritocracy, which is why we came to include that anyone can be a leader—so long as he or she has the right stuff." The "right stuff" boils down to ethics and effectiveness (Kellerman, 2012). As the idiom says, Caesar's wife must be above suspicion. So too must leaders.

Leaders' influence is quickly eroded if they are seen as breaking the unwritten social contract of trust with their team by appearing unethical or ineffective. Followers go along with leaders for any number of reasons, but the ideal one is that they believe in the leader's integrity and competence. Should a leader fail to deliver on these expectations, followers quickly become disillusioned (Kellerman, 2012). Leaders value followers as well; a survey of more than 300 business executives revealed that effective followership is a critical skill set, particularly in determining career success, and accounts for 99 percent of team performance and quality of work. It is based on emotional intelligence and interdependent on effective leadership. Nevertheless, 96 percent of respondents also said that people don't know how to follow (Hurwitz and Hurwitz, 2015). How then does one learn how to effectively lead and effectively follow?

Leadership has long been the most sought-after skill set that ambitious students sought to acquire from high-powered academic business and management programs. Such programs do not, however, teach followership skills, despite the fact that most members of the workforce—including leaders themselves—spend most of their time following. One could argue that there is a direct correlation between this top-heavy approach and architecture education, which to a large extent still focuses almost exclusively on the development of the individual design mind rather than the creative team. Despite the fact that organizations live or die based not only on how well their leaders lead but also on how well their followers follow, education continues to be biased toward the small percentage of the workforce that will become traditionally defined leaders. This leaves the majority to their own devices to figure out how to most effectively follow (Kelley, 1988). In the movement to more horizontal administration structures and leaner organizations, followers are taking on more autonomy (Lipman-Blumen et al., 2008), and in some cases rejecting traditional leadership structures entirely.

As with leadership and collaboration, leadership and followership have a mutually beneficial rather than a mutually exclusive relationship. Guiding principles for leaders and followers that lead to effective collaboration include:

- A mutual respect for leadership and followership, including respect for the equal, dynamic, and different qualities of each;
- The understanding that leaders help clearly frame the problem, allowing followers to work creatively within a given set of parameters;
- The need for all parties to constructively challenge each other and critically examine their own actions to ensure the process remains effective and lines of communication stay open;
- The use of a "Yes. And. . ." model of situational development, where existing positive attributes are valued and built on, rather than a "No. But. . ." model that begins with resistance when the proposal is not in keeping with past models; and
- The need for the entire team to agree to a set of mutually beneficial objectives (Hurwitz and Hurwitz, 2015).

Effective leaders of collaborative, creative teams know that the real capital in creative organizations is its people. Robert Kelley's 1988 article, "In Praise of Followers," outlines two dimensions that are important to understand in evaluating effective followership—to what degree followers exercise independent, critical thinking and where followers fall on a scale from passive to active. Effectiveness, he proposes, occurs when followers think for themselves and work with energy and assertiveness. Effective followers are distinguished from ineffective followers by their ability to self-manage, their commitment to the organization, their competence and focus, and their independent, critical thinking (Kelley, 1988). To build followership, three principles are key:

1. Followers must feel ownership, which is achieved through the development of a sense of place, self, and impact.
2. They must be trusted by and trust their leaders. Trust is built over time, and requires vulnerability on the part of followers; and
3. They must operate in a context of transparency, which allows for direct communication of ideas and concerns to the team (Lipman-Blumen et al., 2008).

Contemporary leadership theory holds that the qualities that define effective leaders and effective followers are largely the same and are not tied to a person's intelligence or character. The roles of leader and follower are often situational and change depending on the context. For example, a project manager may be a leader to the design team working under her while also being a follower to the partners of the firm. The ways in which a person's roles are defined within a given context influence the results, meaning that firms need to cultivate a culture where leaders and followers take on clearly defined "different but equal" responsibilities. According to Kelley:

> People who are effective in the leader role have the vision to set corporate goals and strategies, the interpersonal skills to achieve consensus, the verbal capacity to communicate enthusiasm to large and diverse groups of individuals, the organizational talent to coordinate disparate efforts, and, above all, the desire to lead. People who are effective in the follower role have the vision to see both the forest and the trees, the social capacity to work well with others, the strength of character to flourish without heroic status, the moral and psychological balance to pursue personal and corporate goals at no cost to either, and, above all, the desire to participate in a team effort for the accomplishment of some greater common purpose (Kelley, 1988).

With a more critical and contextual perspective on the traditional roles of leaders and followers, it is easy to see that all people take on some aspects of each on a regular basis. With the knowledge that culture shapes outcomes, practitioners can become even more collaborative members of organizations and build and take part in more effective teams. Kieran and Timberlake outline the reasons why these situational relationships are the result of the complex nature of contemporary practice. "The making of architecture is an act of organizing chaos," they state. This is especially true in an ever more complex world of products, engineers, specialists, and regulatory bodies. They propose that architecture should "accept chaos as inevitable and working to understand, appreciate, and organize complexity" (Kieran and Timberlake, 2004). Good collaboration can address such multifaceted problems through the collective intelligence of multiple disciplines and manage the "organized chaos" of practice through clear communication, defined roles and responsibilities, mutual respect, and trust.

THE PROMISE VERSUS REALITY OF INTEGRATED PROJECT DELIVERY—INTERVIEW WITH RENÉE CHENG

An award-winning educator, Renée Cheng is a professor and the Associate Dean of Research at the University of Minnesota's College of Design, where she directs the Master of Science in Architecture program with a concentration on research practices. A registered architect, Cheng's professional experience includes work for Pei, Cobb, Freed and Partners and Richard Meier and Partners before founding Cheng-Olson Design.

Nationally recognized as an expert on emerging practices and technology, her research involves documenting case studies of buildings that integrate design with emerging technologies, most recently focusing on IPD. She has written and lectured extensively on the topic, having completed three seminal case study publications on the topic—IPD Case Studies (AIA/AIA MN, 2012), Integration at Its Finest (Cheng, 2015), and Teams Matter (Cheng, 2016)—with another in development studying Lean and IPD.

In addition to sharing a case study from her 2015 GSA report, Professor Cheng spoke with us about the promise of IPD and whether the reality is living up to the hype.

Erin Carraher: You were involved as an author of the AIA's 2006 "Report on Integrated Practice" and have been developing case studies on IPD projects for a number of years. From your perspective, how do you see the changes toward more collaborative contract structures and the introduction of technologies like BIM impacting practice?

Renée Cheng: We've been witnessing a fundamental change in practice starting with the economic downturn, moving to more collaborative models. Technologies like BIM and Lean tools and processes are well-aligned to support collaboration; in fact, I would say they are essential.

To succeed, IPD needs tools like BIM that enable an integrated flow of information. It also needs the attention to process that Lean brings to the team. BIM on its own can be effective for solid documentation and communication, Lean on its own can increase team effectiveness, but it's really when you see all three being used together where the payoff of integration really occurs.

I'm hopeful that more collaboration is producing better outcomes for our industry, but concerned that there is a misperception that what we are doing is streamlining by reducing time on design. Streamlining in my mind is reducing what you might call low-quality time—hours spent on documenting disputes or mediating problems caused by errors that could have been foreseen.

(*continued*)

(*continued*)

High-quality time is time spent on the design and planning; every hour spent on design is more than regained later in the process and improves the outcome for the user.

I'm seeing that Lean is incredibly effective in the construction phase but someone needs to understand what Lean principles mean to the design process. It's not all about reduction of time, it's about improving quality, which might actually mean more time or more iterations. Architects need to be the leaders in how design benefits from collaborative, Lean principles.

Carraher: Despite the development of contracts by the AIA and other organizations that specifically address integrated forms of project delivery, there have been surprisingly few projects that have reported using these documents. Have you seen any reasons for this in your research?

Cheng: It's true that the majority of IPD projects I've studied are using customized contracts. Sometimes they are built upon those industry templates, but really contracts aren't the place to start. There has been a lot of debate about the effectiveness of "soft" language—trust, respect, transparency—in a contract. I would say the process of *developing* the contract is key to establishing a culture of collaboration, trust, and transparency.

For example, in one of the projects we are studying now, there is one owner who did two projects under very different contracts. The first was classic, full-on IPD and the second had some IPD conditions but also more conventional language that didn't release liability. The project teams understood the differences in the contract, yet behaved quite similarly. So you can say the contract didn't make a difference. Personally, I believe that the level of trust created by developing and working under the first contract allowed them to continue the IPD behavior even under a more conventional contract.

Carraher: Many projects report using IPD principles within a more traditional contract structure. What are some of the challenges to fully adopting IPD?

Cheng: Full adoption isn't the goal. I don't think it is realistic to say all projects should use IPD contracts in the future. The issue is changing the culture of the building industry regardless of project size and location. The real driver of change needs to be creating buy-in regarding the value of collaboration—how much more successful, less litigious, and more fun the process is and how much more innovative the results are when everyone is engaged in the conversation.

The questions are how you drive these full benefits of everyone working together on a project to enable having the discussions needed to figure out how to work together. Early planning is key, though it's painful when you want to get started. All of the project teams that took the time to plan said there was a huge payoff in the end. Those who didn't had repeated issues that cost them a lot of time and ill will later in the process. Spending time developing the contract is one way to do this. Others focus more on the pressure points of a project, the drivers of complexity. Lean processes can be really effective to expose those drivers, especially the ones that are not immediately apparent.

There are a lot of people saying they are doing integrated or collaborative project delivery, but the extent to which they are doing so varies. Those who are doing it well have a high level of support—even to the extent that it is a part of the firm's business plan. It also takes investment on the ground level—people who know how to do it and who can train others on a new project. You can train up people on a new project and pretty quickly bring inexperienced people up to speed. It requires coaching, though. The type of expertise required is sometimes coming from outside facilitators who have backgrounds in any number of fields—personally, I'd like to see more architects in this space so that design issues are more highlighted.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 2

Collaborative Project Delivery Tools

Traditional versus Collaborative Project Delivery

The programming, design, construction and management of buildings requires the coordination of numerous stakeholders and organizations. Critical to the successful delivery of a complex building project is the effective guidance of diverse parties into a productive and responsive force representing the interests of the project stakeholders. Many project delivery methods have evolved over time. Traditionally, the owner, or a representative of the owner, selects the delivery method or hires the architect or construction manager as a representative to lead the process of selecting the appropriate delivery method. In order to participate effectively in project teams and gain more influence in the process, architects need to understand the characteristics of the standard project delivery methods as well as the collaborative alternatives (Figure 2-1).

When asked in 2012 to project how the industry would change over the next decade, Phil Bernstein stated: "Most traditional iconic project delivery models will still exist, but strongly influenced by integrative strategies. In CM-at-risk, for example, a GMP [guaranteed maximum price] will be much more robust because of the predictive qualities of BIM. Plus there will be stable, repeatable integrated project delivery models. You'll also see AEC players in long-term, repeatable relationships, having reduced levels of friction through integrated strategies" (McGraw-Hill, 2012). This statement tracks with the implementation to date of "true" IPD projects, which were estimated to number around 200 in 2014 with likely hundreds or even thousands using principles of IPD to integrate collaboration into more traditional forms of project delivery (AIA CC, 2014).

Parts of this chapter are excerpted from: *Integrated Project Delivery: A Guide* (AIA /AIA CC, 2007), developed jointly by the American Institute of Architects National and AIA California Council. Thank you to AIA National and AIA California Council for permission to include these excerpts.

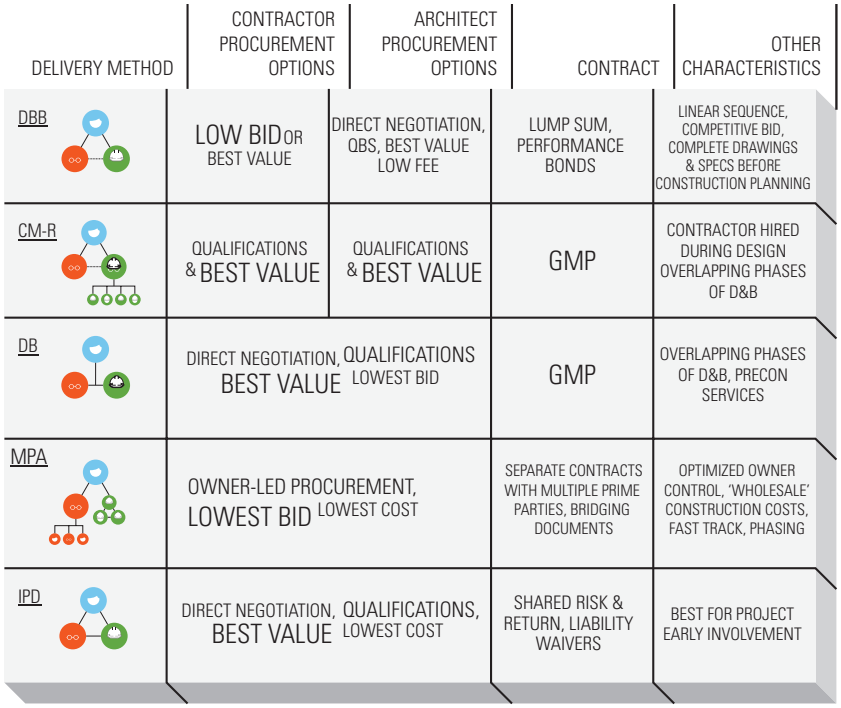

Figure 2-1 Project delivery structure comparison

Collaborative Design-Bid-Build

Sometimes called "traditional" project delivery, *design-bid-build* (DBB) has been used for most of the twentieth century as the predominant form of project delivery for public work. DBB uses a competitive, open bid process in which multiple general contractors vie to have the lowest bid on a project based on a set of construction documents. Performance bonds and various statutory requirements are employed to protect taxpayers' money.

DBB aims to create the most competitive environment in the belief that the free market is the best way to ensure economic discipline and result in the lowest-cost building. It should be noted that while this delivery model may yield the lowest initial cost on the design documents prepared for the project at the time of bid, it may not be the lowest cost over the entire project when costs resulting from incomplete documents, poor communication of information between parties, and other inefficiencies are taken into account (AIA/AGC, 2011).

A defining characteristic of DBB projects is that three prime players—owner, architect, and contractor—engage in two separate contracts: *owner–architect* and *owner–contractor* (Figure 2-2). The selection of a contractor is most often based on the lowest bid price rather than any direct input from the architect. The contract structure creates three distinct phases—design, bidding, and building—as the method's name suggests. These phases are usually distinct and sequential. When they do overlap, it is often because the project is being fast-tracked or bid out to multiple prime contractors to expedite the construction process and not necessarily as a way

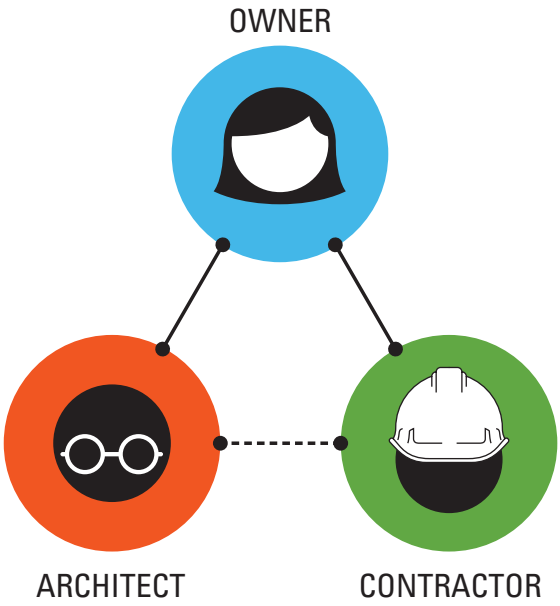

Figure 2-2 Design-bid-build project delivery structure

to create a more collaborative or informed process (AIA/AGC, 2011).

As the most common delivery method during the early twenty-first century, DBB is well established, and the roles of the stakeholders are generally understood. Contract documents are typically completed in a single package before construction begins, requiring construction-related decisions in advance of actual execution. This includes a complete written specification to ensure quality standards are met. Construction planning is based on the contract documents and specifications. In theory, all parties agree to the scope and details of the finished building as defined by the bid documents before construction begins.

There are inherent contradictions with attempting to integrate collaborative practices into the design-bid-build (cDBB) process. Because the contract in this delivery method is based on contractors' lowest bids on documents that are often not finalized, the result is that contractors work with missing information while architects struggle to maintain design intent in the face of disruptive change orders. DBB fosters less communication than other delivery methods and often leads to adversarial relationships between stakeholders—a climate that creates waste by virtue of inefficiencies, rework, and litigation. Although the challenges of this model may be overcome, it is difficult to create a culture of collaboration using the DBB model.

Integration relies on collaborative teams that ideally have near equitable decision-making authority. But owner control, or the perception thereof, is one of the greatest challenges of traditional delivery. In DBB, especially with multiple prime contracts, the owner holds much responsibility and experience, giving them an authoritative position in the project delivery. This can limit other stakeholders from offering input and has the potential to hinder collaboration. As such, the owner is really the key to ensuring that a DBB form of delivery is collaborative, and owners may not have the expertise in team formation and operation in order to maintain a high level of collaboration. An additional challenge DBB presents is that the owner is required to negotiate separate contracts with the designer and the contractor(s), respectively. This not only works against cohesion, but it also requires owners to ensure that each contract is the same regarding processes and performance requirements so that motivations are as similar as possible between stakeholders. Methods have been devised to ensure this consistency by the owner:

- Negotiate parity in all agreements.
- Develop a set of general conditions all the parties agree to be governed by.
- Subscribe to a teaming agreement that all stakeholders will follow to ensure unified actions in the delivery process (AIA/AIA CC 2007).

Integrated delivery works to unify design and construction activities, suggesting that the contractor is engaged during design phases. Although DBB

does not inherently allow for this to occur, there are a few options to encourage engagement, including:

- Owner and architect consider bidding the project at the earliest stage possible.
- Owner and architect express their intent and desire to proceed in an integrated fashion upon acceptance of bids.
- Stakeholders collaborate to the greatest extent possible (CMMA, 2012).

Under this modified form of traditional DBB, the owner must be aware that the project bid documents are potentially not 100 percent complete. This can lead to a loss of accuracy and increase in contingencies during bidding. Cost escalation can be avoided by adapting the way in which hard budgets are established by letting them be revised through contractor input on the contract documents. Additional rework will likely be required as a result of this process, which should be anticipated by the owner and adjusted in the designer's fee structure (AIA/AIA CC 2007).

Collaborative CM at-Risk

Construction manager at-risk (CM at-risk) involves a construction manager who takes on the risk of building a project. The architect is hired under a separate contract with the owner. The construction manager oversees project management and building technology issues, areas in which they typically have particular background and expertise. Management services may include preparation of cost models, advice on the time and cost consequences of design and construction decisions, scheduling, cost control, coordination of construction contract negotiations and awards, timely purchasing of critical materials and long-lead-time items, and coordination of construction activities (AIA/AGC, 2011).

As with DBB, CM at-risk is structured with three prime players—the owner, architect, and CM at-risk—that enter into two distinct contracts between the owner and architect and between the owner and CM at-risk (Figure 2-3). A key difference with CM at-risk is that the selection of the designer and builder is based on qualifications or the best value instead of the lowest fee or competitive bid. Other typical characteristics of CM at-risk include the hiring of the CM during the design phase, clear quality standards and prescriptive specifications outlined, the establishment of a guaranteed maximum price (GMP), and perhaps an overlap between the design and build phases. In CM at-risk, preconstruction services can be offered by any of the three prime players in order to bridge from design to construction. The term "at-risk" can refer to the contractor taking on performance risk associated with holding the trade contracts. "At-risk" can also mean that the project has a guaranteed price or GMP. It is important to understand what is meant by "at-risk" in any given situation (AIA/AGC, 2011).

CM at-risk is similar to design-bid-build in terms of the challenges of incorporating collaborative processes. An exception is when the CM at-risk uses a contractor as the CM at-risk manager (CMc).

The CMc delivery model is particularly well suited to collaborative delivery because the constructor already serves as construction manager during the preconstruction portion of the project. This has the added advantage of bringing relevant stakeholders into the project early when decisions have the greatest potential impact on cost and schedule performance.

The difference between traditional and integrated CMc delivery models is not in the structure of the contracts but in the increase in the number of collaborative opportunities among stakeholders. Whereas the traditional CMc delivery model (in

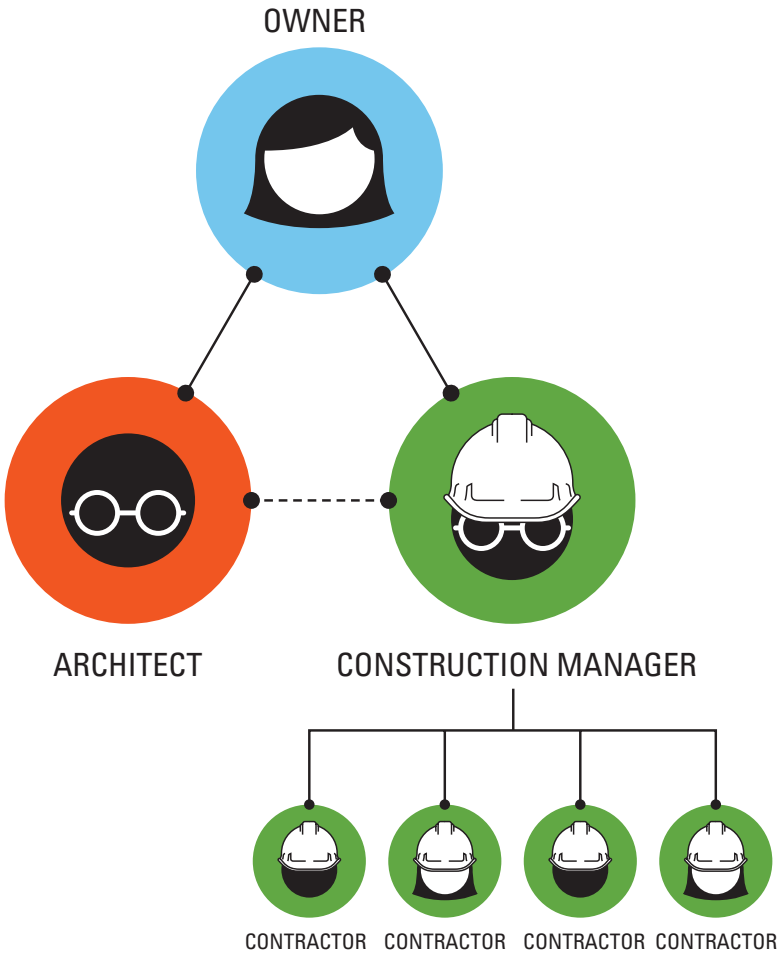

Figure 2-3 Construction manager at-risk project delivery structure

which the CMc is brought onto the project prior to construction but otherwise follows traditional service scopes for both architect and constructor) might be considered at least partially integrated, a fully integrated CMc project might see the architect and the constructor working with the owner to establish project goals, utilize BIM, and adopt other principles of integrated implementation techniques (AIA/AIA CC 2007).

Construction management is appropriate to public and private projects of almost any scale in which budget or schedule must be closely monitored or when extensive coordination of design consultants or trade contractors is required. Because work performed by trade contractors is still typically awarded based on competitive bidding, the CMc satisfies the bidding requirements of most public procurement codes. As a result, in instances where a bid delivery method is required, CMc offers the best potential for approximating fully integrated delivery (CMMA, 2012).

The separation of contracts poses a challenge to implementing collaborative processes in the CMc delivery model. The owner must negotiate separate

contracts with both designer and constructor. In order to achieve commonality of purpose and processes, the owner will either negotiate the agreements to work together or require the adoption of a set of general conditions or a teaming agreement controlling all parties' behavior (AIA/AIA CC 2007).

Collaborative Design-Build

Design-build has gained popularity in recent years because of owners' desire for a single contract and single party of responsibility for design and construction. In the design-build approach to project delivery, the owner contracts with a single party—the design-build entity—for both design and construction. The design-build entity can be led by an architect or a contractor and can consist of any number of people. As with CM at-risk, the timing of an agreement for a GMP from the design-build entity varies from project to project (AIA/AGC, 2011).

In design-build, there are two primary players, the owner and the design-build entity that have one contract between them (Figure 2-4). The selection of the design-builder may be based on direct negotiation, qualifications, best value in fees in total project cost, or lowest bid. Due to the integrated nature of the contract, design and construction activities occur with overlapping phases throughout the process. A single point of responsibility allows for some design decisions to be made after construction has commenced and overall project planning and scheduling can occur prior to mobilization. As with CM at-risk, design-build projects may include preconstruction services such as constructability review and bid management offered by any of the stakeholders—architect, CM, or contractor (AIA/AIA CC 2007).

Under design-build, the design team and build team are contracted at the same time, making early

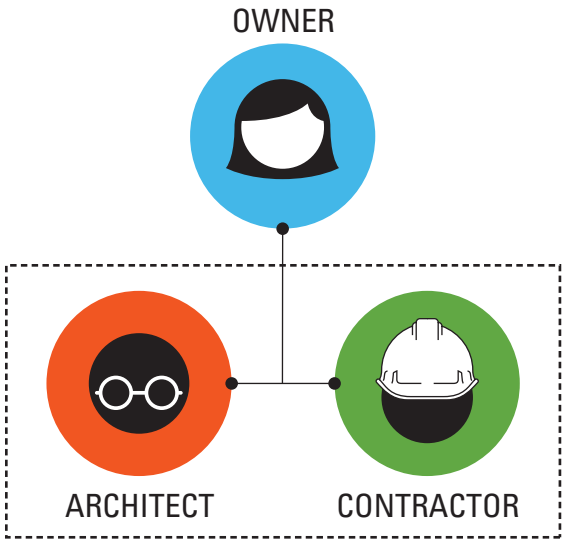

Figure 2-4 Design-build project delivery structure

collaboration possible. Often with design-build the two parties have elected to work together and therefore likely have an established relationship and process of engagement. Additionally, the owner is a member of the design-build team and takes on varying levels of involvement. In traditional design-build, the owner participates through completion of design and then seeks to minimize involvement during construction as to avoid risk. This reduces the likelihood for innovation and continuous improvement. In order to achieve integration, the owners may adjust their expectations and outline this increased engagement with the stakeholders contractually, including the following recommendations for increased collaboration throughout the project cycle:

- Alter compensation models to create incentives for the team to seek improvements.
- Link compensation to project goals, such as cost and schedule, as well as to sustainability and energy performance.
- Establish target cost, eliminate GMP, and use open book accounting (AIA/AIA CC 2007).

In integrated design-build, decision making is distributed among the team as appropriate and coordinated by the design-builder. The architect does not hold the same contractual relationship with the owner under design-build unless the architect serves as the leader of the design-build team. However, there is still a duty to deliver the owner's defined project, assist the design-builder in achieving project success, and safeguard the public. The open, collaborative nature of integrated design-build facilitates this process (AIA/AIA CC, 2007).

Design-build standard form contracts can be easily modified to reflect an integrated delivery approach. The design-build delivery method has been established long enough to be a well-understood baseline. Therefore, achieving an integrated approach is a matter of adding clarity of roles and scope of service rather than altering the fundamental structure of the design-build agreement. Additional early participants may be added along with their roles and responsibilities. Requirements for design consultants to collaborate with related trade contractors and vendors, share model data with them, and incorporate their input should be added as well (AIA/AIA CC, 2007).

Costing in design-build agreements is usually fixed early in the form of a guaranteed maximum price, with the designer-builder liable for most of the risk. Deferring the GMP until later in the process allows the benefits of early trade involvement, model-based decision making, and collaborative efforts to be realized before costs are finalized. The agreement should reflect flexibility in the agreed-upon process and timing for establishing and maintaining the project budget (AIA/AIA CC, 2007).

Compensation for the design-builder is often determined by a percentage of construction cost, either fixed or subject to a GMP. A formula for sharing any achieved savings below the GMP may be determined as incentive to the team or as part of the design-builder's compensation. The efficiencies of an integrated approach may identify savings over a traditional baseline approach. As integrated projects become more common, such comparative savings may become less useful as a project metric for determining shared savings (AIA/AIA CC, 2007).

Having a portion of compensation tied to achieving (or missing) project goals is another possible incentive-based compensation method. The design-builder may put portions of anticipated profit at-risk against the goals or additional compensation may be made available for going beyond a baseline measure. Portions of the design-builder's services such as criteria development, evaluating alternatives, and other work prior to establishing the GMP are often compensated based on time and material costs (AIA/AIA CC, 2007).

Multi-Party Agreements

Multi-party agreements (MPAs) (Figure 2-5) create a single entity from the primary project participants through a contract that outlines their respective roles, rights, obligations, and liabilities. "Multi-party agreements require trust, as compensation is tied to overall project success and individual success depends on the contributions of all team members" (Victor O. Schinnerer & Company, Inc., 2007). This type of agreement is particularly well suited for projects that are complex or uncertain; requires thorough planning, careful negotiation, and intensive team building exercises; and varies in form to respond to specific project needs. The primary types of multi-party agreements fall into three main categories: project alliances, relational contracts, and single purpose entitles (Victor O. Schinnerer & Company, Inc., 2007).

Project alliances were adapted from the oil industry to provide a model where the owner

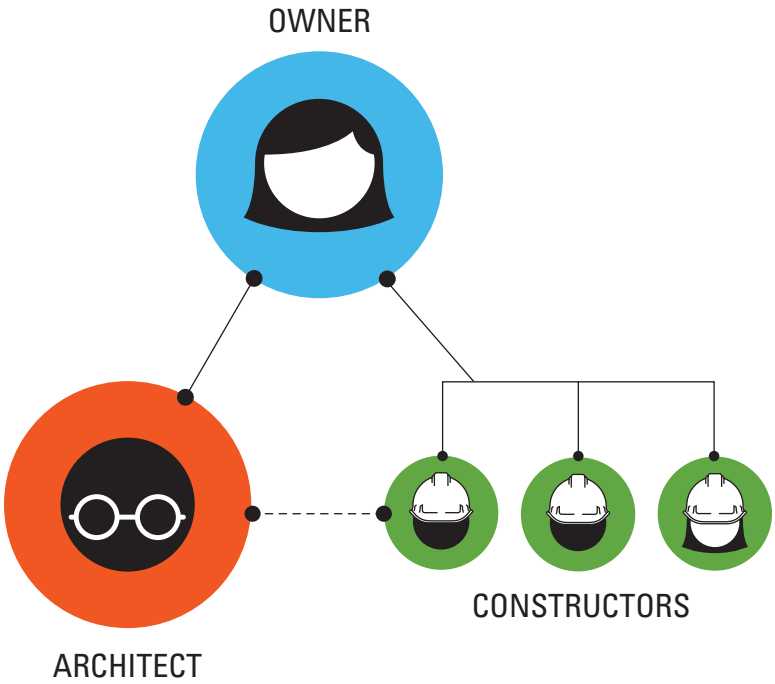

Figure 2-5 Multi-party agreements

guarantees direct costs of non-owner parties but payment of profit, overhead, and bonuses are tied to the project's outcome. Decisions are consensus based, and the ability of one party to file claim on another is limited to gross negligence and willful termination of involvement. Single purpose entities (SPEs) are temporary, formal legal structures that are created to plan, design, and construct a project (Dal Gallo et al., 2009). "In an integrated SPE, key participants have an equity interest in the SPE based on their individual skill, creativity, experience, services, access to capital or financial contribution." Relational contracts also create virtual organizations but differ in their compensation, risk, and decision-making processes from project alliances. The degree to which each party limits liability is more variable and compensation, while performance based, is not tied to the overall project success. Consensus is determined by the team, but the owner maintains ultimate decision-making authority (AIA/AIA CC, 2007; Victor O. Schinnerer & Company, Inc., 2007).

Although multiparty agreements may take on many forms, the fundamental attributes remain the same:

- The parties are bound together by a single agreement or an umbrella agreement.
- The agreement creates a temporary, virtual, or formal organization complete with management and decision-making processes.
- Processes are tailored to support the team environment.
- Decisions are arrived through consensus and seek "best for project" outcomes.
- Some portion of compensation is tied to project, not individual, success.

- Roles are assigned to the person or entity best capable of performing (AIA/AIA CC, 2007; Victor O. Schinnerer & Company, Inc., 2007).

Integrated Project Delivery and Collaboration

In today's project atmosphere, one could argue that the delivery of traditional design and construction services has devolved into an adversarial process resulting in inefficiency, mistrust, and commoditization of services among owners, architects, contractors, subcontractors, and suppliers who each have their own agendas. At the same time, today's buildings are complex machines requiring many professionals with different specialized knowledge in order to be built. As a response to this paradox, the industry has begun to look to more collaborative nontraditional delivery methods to facilitate better communication, reduce and share risk, increase profits, and provide a positive experience for stakeholders. Integrated Project Delivery (IPD) (Figure 2-6) is an example of one such collaborative delivery system (AIA/AGC, 2011).

IPD is conceptually based on a collaborative arrangement of the major project stakeholders early in the process and implemented in an environment of "best-for-project" thinking and shared risk and reward (Figure 2-7). Project stakeholders in collaboration define project issues at the outset, helping to identify conflicts, establish performance criteria, minimize waste, increase efficiency, and maximize the scope for limited project budgets. The ultimate goal is to create a project environment that produces a positive outcome for all stakeholders. Although not exclusive to the IPD delivery method, multiparty agreements can include incentive clauses based on shared savings among the project team (AIA/AGC, 2011).

Structurally, the key participants in IPD are bound together as equals. The stakeholders share

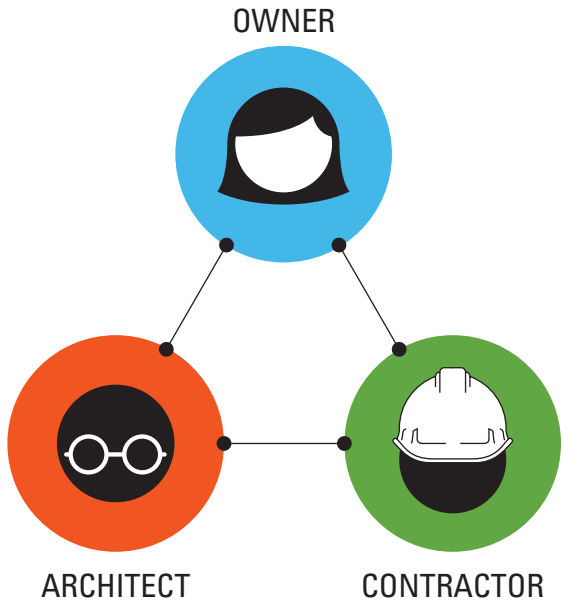

Figure 2-6 IPD structure

financial risk and reward based on the project outcomes. Liability waivers exist between stakeholders, and fiscal transparency between parties and early involvement between key participants is critical. Jointly developed project goals and targets are established, and the criteria for such are mutually agreed upon through collaborative decision making.

IPD typically includes a minimum of three prime players including the owner, architect, and contractor. Because of early engagement of the design and build teams, IPD encourages a continuous execution of design and construction, with input and decision making for both phases taking place throughout the process. Collaborative project planning and scheduling, as well as the selection of the architect and contractor team, is typically accomplished through direct negotiation, qualifications-based selection, or best value (fees). It is rarely if ever selected based on lowest cost (AIA/AGC, 2011).

IPD engenders mutual respect and trust, a willingness of parties to collaborate, and absolute

open communication. It is important to note that some projects use a hybrid approach, with integrated practices or philosophies applied to more traditional delivery approaches such as CM at-risk, design-build, or design-bid-build (where the owner is not party to a multiparty contract). In addition to not using a multiparty contract, IPD hybrids are characterized by "traditional" transactional CM at-risk or design-build contracts, some limited risk-sharing, and some application of IPD principles. In short, IPD is not only a structural model but also a behavioral strategy that can be implemented in any contract (Figure 2-7) (AIA/AGC, 2011).

To work collaboratively as a team, owners, and architects who aid owners in selection of contracts should select stakeholders either via direct negotiation based on reputation and experience, past performance, and qualifications, giving less consideration to fees, price, or man-hours, or via a weighted consideration of both qualifications and fees. Selection of stakeholders based on lowest fee or cost alone rarely achieves cost performance goals, and often produces litigious projects that are difficult to complete without wreaking havoc on all parties involved. This means that owners should give as much or more weight to who will be performing the work than how the work will be accomplished. It has been documented in many business scenarios and building industry projects that the lowest-cost approach is more of a gamble than a methodical approach to creating the best value for the project and owner.

The Value of Collaboration

One of the first questions asked by any party when considering a more collaborative approach to project delivery is often, "What is it going to cost?" Although fully implemented IPD as representative of a highly collaborative process is still in its infancy, anecdotal evidence is strong that the model provides significant cost and time savings.

Studies of BIM adoption similarly indicate significant cost benefits, particularly in collaborative contexts where multiple parties are all working from a shared model. One metric used to evaluate this effectiveness is the cost of change orders as a percentage of the overall construction budget. In a study of over 400 projects, this percentage dropped from 18.42 percent in projects that used traditional 2D coordination drawings to 11.17 percent in projects that used BIM in-house and to 2.68 percent in projects that shared a BIM model and data with multiple parties. There are also time-based benefits: short-term investments pay off more quickly through the reduction of documentation errors and omissions (i.e., change order costs), which contributes to repeat business, shorter project duration, and increased profit over time (McGraw-Hill Construction, 2012).

BIM in and of itself is not effective; it must be employed in a thoughtful way with specific purposes and standards in mind. Research from Penn State breaks BIM down into a more nuanced series of operations to help project teams better define how they will use this technology in projects by identifying the objectives and determining the characteristics of the shared model (Kreider and Messner, 2013).

Research comparing cost performance and avoidable change orders in collaborative versus non-collaborative projects confirms that collaborative projects consistently outperform noncollaborative ones (Figure 2-8). Cost performance (the measure of percentage difference between the budgeted and the actual cost of a project) ranked consistently positive, with up to 21 percent savings documented in collaborative projects. Traditional projects had a higher overall range in positive and negative savings, which suggests that they are significantly less reliable in terms of consistency (Kulkarni et al., 2012).

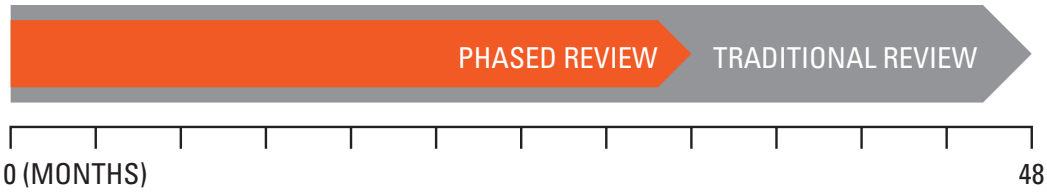

Figure 2-7 Integrated project team

Figure 2-8 Project delivery success factors

Collaboration is measurably effective not only based on the tools (BIM) and project delivery types used but also relative to when it is implemented.

The main criteria for measuring the success of any project delivery method are cost, quality, time, safety, and how well the project ultimately serves its intended purpose. However, responsibilities for meeting these criteria vary by method. Each delivery method offers a different level of risk to the owner. All things being equal, project teams, and the firms that are merged to create them, prefer delivery methods where risk is consistent with their tolerance to assume that risk. Risk is a key consideration when choosing a project delivery method and is often one of the main obstacles to implementing a more collaborative approach. Integrated delivery methods, such as design-build and IPD, have a structure focused on collaboration while eliminating the adversarial nature of traditional models such as design-bid-build and to some extent CM at-risk.

Conversely, integrated delivery methods have financial risks associated with the time and energy invested in selecting, structuring, and maintaining the integrated team workflow. When determining the level of integration a team will engage in, the owner and stakeholders should give careful consideration to the potential effect on the delivery method and the structure of the contract. While they may be preferable for many reasons, collaborative teams are only necessary when schedules need to be expedited and the complexity of the project demands multiple forms of specialized expertise. It is recommended that owners and project teams perform a cost–benefit analysis on the return on investment for integrated forms of delivery that can, especially in smaller and less complex projects, take considerably longer and require more total cost to weigh the value versus price of such choices.

When Not to Collaborate

Collaboration is almost always viewed in a positive light, even though most people have had negative "teamwork" experiences. Collaboration has demonstrable benefits, as previously discussed, which lead to innovation, efficiency, and enjoyment. However, there are times when collaboration is not appropriate, and may even be detrimental, taking time and effort that does not always yield an appropriate return on investment. Collaboration requires just as much if not more individual work outside the collective work sessions to be effective. Collaboration can also lead to the dilution of good ideas and the development of "groupthink," while individual efforts may have equaled or exceeded that of the group. Good collaboration requires the recognition of what tasks can be done by an individual and which ones will benefit from the collective energy of the group (Pressman, 2014).

Morten T. Hansen lists three pitfalls to avoid when beginning a collaborative process: (1) overestimating the economic value of collaboration, (2) underestimating the costs of collaboration (in time, money, and infrastructure), and (3) ignoring opportunity costs associated with pursuing collaborative rather than more specialized projects (Hansen, 2011). He defines collaboration as either a "premium" that can add value to a project or a "penalty" that can add cost. "Never forget that the goal of collaboration is not collaboration but, rather, business results that would be impossible without it. . . . Although the collaboration imperative is a hallmark of today's business

environment, the challenge is not to cultivate more collaboration. Rather, it's to cultivate the right collaboration, so that we can achieve the great things not possible when we work alone" (Hansen, 2011).

Renée Cheng, in her introduction to Andrew Pressman's *Designing Relationships: The Art of Collaboration in Architecture*, furthers this idea as to when and when not to use various project delivery tools and methods.

> BIM can exacerbate distrust and create impediments to communication. If communication is poor or lack of trust leads to defensive behavior, the BIM model can become a battleground. Ownership of information may come under dispute, leading to excessive tracking and reporting on every aspect of the model. BIM models contain a great deal of information, and in a situation where trust is lacking, addressing disputes over each data point could consume time rather than save it.
>
> For low-risk projects—those using conventional processes, known systems, and a straightforward program—BIM, IPD, and Lean can result in lost time and increased tension. BIM may be more effective in its non-interactive mode, serving as three-dimensional documentation for the architect to generate two-dimensional views. In general, low-risk projects can use relatively simple communication tactics and basic strategies to achieve success (Pressman, 2014, xii).

Just as using BIM does not assure smooth communication, the use of an IPD model does not ensure alignment and trust. Used together, BIM and IPD can be a very effective set of tools for a team to enable great communication, efficient collaboration that is both streamlined and innovative, and to cement a culture of trust and respect that leads to success. IPD is essentially the written contractual assurance that the team will "play well together" with minimal contractual barriers to collaboration. Lacking case law, the question remains—can subjectively defined behavior be regulated with IPD contracts? While elements of IPD contracts such as shared risk and reward pools have produced documented savings and innovation, the "softer" language around mutual trust and respect have less tangibly measured effects and results (Pressman, 2014, xii).

CASE STUDY EXCERPT: WAYNE N. ASPINALL FEDERAL BUILDING & U.S. COURTHOUSE

This case study was originally developed by Renée Cheng as part of her research for the Office of Federal High-Performance Green Buildings at the U.S. General Services Administration (GSA) and has been adapted and reprinted with their permission (Cheng, 2015). This excerpt highlights the contract development process and collaborative practices used by the design-build team. The full report can be found at www.gsa.gov/collaborativepractices.

Collaborative versions of traditional project delivery types have developed in recent years to facilitate better communication, reduce and share risk, increase profits, and provide a positive experience for project owners. Such approaches are particularly effective in complex projects with significant time constraints or that require multiple forms of expertise.

(*continued*)

(*continued*)

Figure 2-9 Aspinall building post-renovation *Photography by Kevin G. Reeves; Courtesy of DLR Group*

Project Overview

Design architect: Westlake Reed Leskosky (WRL)

Architect of record: The Beck Group

Owner: U.S. General Services Administration (GSA)—Rocky Mountain Region, Region 8

Contractor: The Beck Group

Key stakeholders:

Construction management assist: Jacobs Technology, Inc.

Commissioning agent: M.E. Group

Location: Grand Junction, Colorado

Project type: Historic renovation

Project duration: June 2010–February 2013 (delivered on schedule)

Size: 3-stories, 41,562 SF

Budget: $15 M (met budget)

Project delivery: Design-Build

Introduction

The modernization of the Wayne N. Aspinall Federal Building and U.S. courthouse in Grand Junction, CO, was a response to the federal

government's goal of achieving carbon-neutral buildings by 2030 (Figure 2-9). The U.S. General Services Administration (GSA) is responsible for delivering much of the space requirements for federal agencies and represents a significant percentage of the annual construction market. During the recent recession, the GSA received $5.857 billion of funding from the American Recovery and Reinvestment Act (ARRA), of which $4.5 billion was allocated to convert existing GSA buildings into high-performance green buildings.

As the GSA's first net-zero-energy building to be listed on the National Register of Historic Places, the Aspinall project was meant to serve as a model for the high-performance renovation of historical buildings. The project's complex structure required the team to navigate several bureaucratic review and approval processes, such as historic preservation entities that had regulatory power over the design, the mandate that the building remain open during construction, necessitating phasing and swing-space planning, and the tight schedule and stringent reporting requirements as a result of its federal funding.

Project Framework

With only five months to develop a scope of work, solicit proposals, and award the project contract, the GSA's procurement team made the decision early on to use a design-build project delivery method to meet the tight schedule (Figure 2-10). They hired Jacobs Technology as the construction manager-as-advisor (CMa) to assist in this process.

The GSA-Jacobs team crafted RFP to integrate the high-performance goals within a structure that invited open dialog with participating firms on how they could best be met. "What we found to be incredibly helpful going through the procurement process was allowing the teams that were bidding on the project to provide innovative solutions, pushing this project in terms of its sustainability goals," said the GSA project manager.

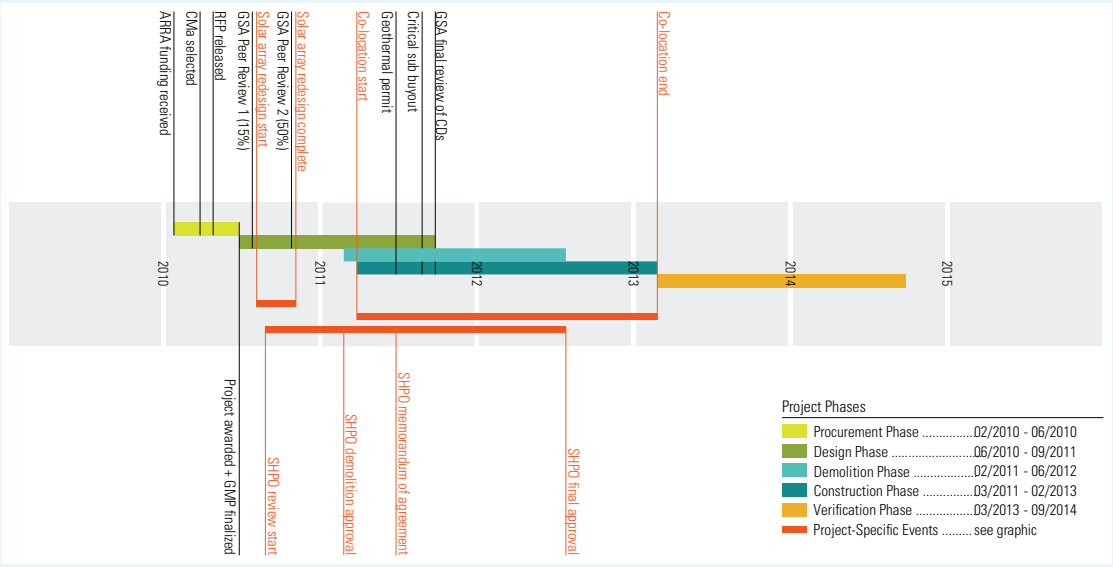

Figure 2-10 Project timeline *© Cheng, 2015 ; diagram by Chris Wingate*

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The GSA implemented best-value-selection processes on all ARRA projects, allowing for the selection of team members based on a combination of past performance, technical capacity, and qualifications. The selection of the design-build team involved a two-step process involving an open RFQ round followed by an RFP. Two rounds of interviews were conducted with the short-listed firms.

The high-performance goals became a primary driver during the GSA's selection process. The design-build team of the Beck Group and Westlake Reed Leskosky won the project by ambitiously outlining in their proposal how the project might exceed the mandated goals to achieve net zero and LEED Platinum certification.

Westlake Reed Leskosky (WRL) is a firm of architects, engineers, and technology designers. Based in Cleveland, OH, with multiple offices nationally, the firm offers in-house engineering, sustainable design, historic preservation, and information technology consultants that support a diverse portfolio of cultural arts buildings, museums, and historic restoration projects.

The Beck Group is an integrated firm of architects and contractors headquartered in Dallas, TX, with offices nationally and in Mexico, and a local Denver office providing oversight for this project. Beck provides full service design and construction as well as real estate development, sustainable design and consulting, and finance and technology services.

The integrated team's proposal featuring net-zero energy and LEED Platinum ratings as part of their "innovative options" at time of bid gave the GSA the confidence to raise the already-aggressive energy goals for the project. The GSA contracting officer was able to incorporate into the final contract many aspects of the Beck/WRL proposal. By developing the contract in such an interactive manner, the high performance goals became more than just a contractual obligation; they served as positive drivers of success (Figure 2-11).

Collaborative Culture

This team placed emphasis on strong interpersonal relationships and an open-minded approach to achieve a collaborative culture: "The tools to collaborate are personal tools," said one member of the project team. "I don't know if you can really mandate or dictate collaboration through contract language. You understand the shared goals, objectives, understand where you're trying to go; and you move forward with the project as professionals." Specific leadership strategies included using meetings to consistently celebrate success so that even minor progress served to build the team and collaborative culture.

Several other factors have been identified as contributing to the successful collaboration. Both Beck and WRL are interdisciplinary firms with established cultures of working cooperatively amongst disciplines and under unified sets of enterprise goals. Although the firms had not worked together previously, their internal organizations were compatible and needed very little alignment (Figure 2-12). A high level of accountability amongst team members was reported as a key to developing trust: team members reported that they believed that others would perform as promised and that each team member or organization would hold themselves responsible.

The GSA's project coordinator emphasized attitude in addition to expertise as critical for those working on the project, defining the "right people" for the job as those who are willing to dedicate themselves to the project: "[The Aspinall project team] has been one of the most engaged teams from all perspectives,

Figure 2-11 Public space interior *Photography by Kevin G. Reeves; Courtesy of DLR Group*

and the commitment by everyone on the team internally and externally, I think, was a huge part of the success."

The project team also identified the leadership skills of the GSA project manager as an important factor in the project's success. Specifically, the project manager spearheaded the collaboration throughout the project, supervised decision making, and almost single-handedly managed the complexities of the ARRA design guidelines, schedule, reporting procedures, and project budget procedures so

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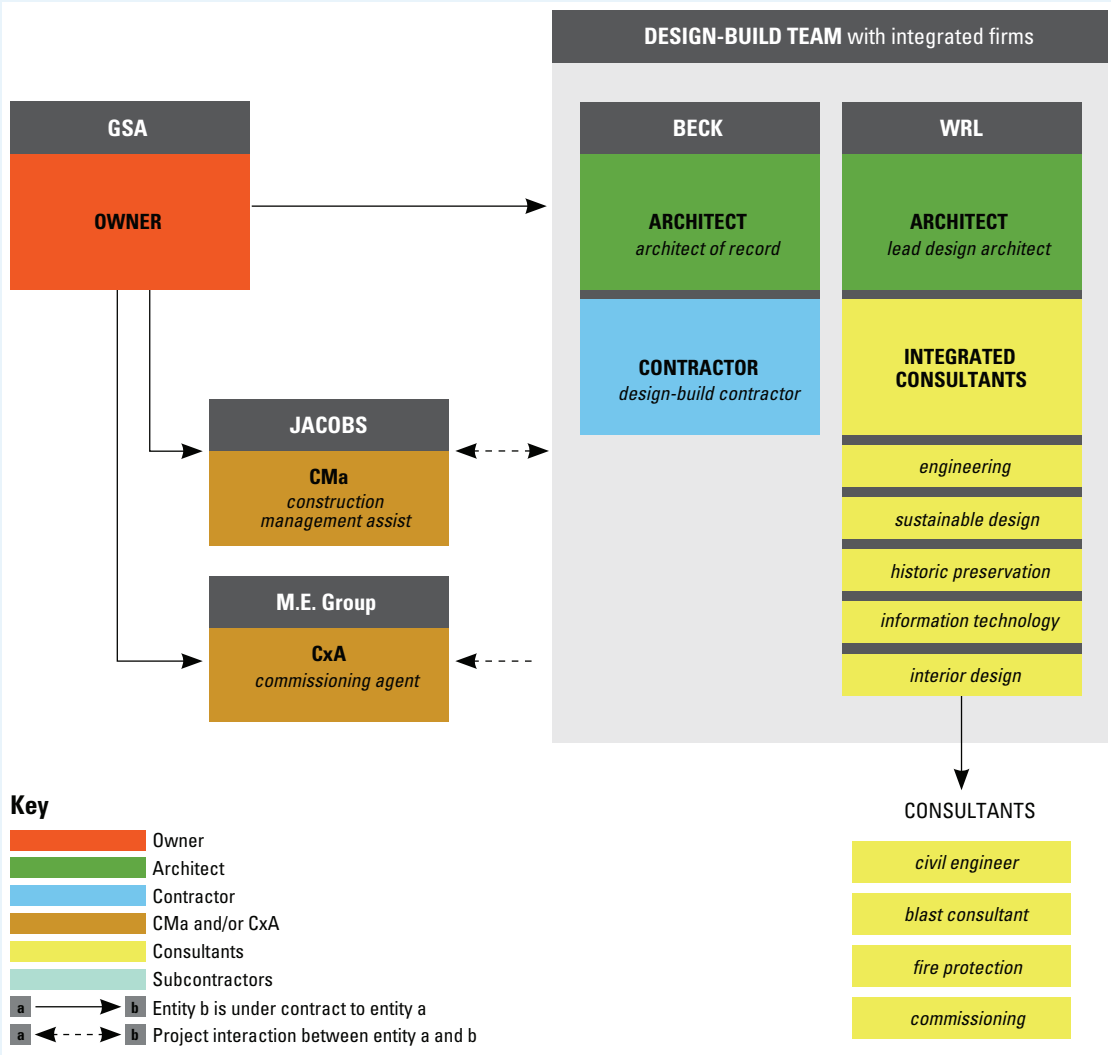

Figure 2-12 Project team organization *© Cheng, 2015; Diagram by Chris Wingate*

the project team could remain focused on design and construction.

Co-Location

The Aspinall project team identified co-location as an effective process tactic that supports collaboration. The project team was located in several different states during the design phase. Once construction began in March 2011, key team members moved to offices located in the basement of the Aspinall building and noted a marked change in their ability to work effectively together.

The team believed that co-location helped support communication, collaboration, and efficient management of project issues. "[Co-location] fostered the opportunity to communicate a lot more than you would if you were trying to coordinate and schedule calls. I think it drove accountability: You couldn't dodge each other. You would go knock on somebody's door—in most cases we just kept our doors open—and you kind of floated among the offices if you needed to talk to somebody. It broke down formal barriers and made it easy to communicate, collaborate, and work through project issues. Stuff comes up every single day on a fully occupied building renovation." The GSA project manager concurred that frequent informal interactions were "very helpful in addressing issues early, as opposed to waiting until the next time we were able to all get together."

Role Definition

Thanks in large part to the integrated nature of Beck and WRL's firm cultures, the combined project team quickly achieved a high-functioning and self-accountable working style. Role definition between the two primary firms focused on outlining the responsibilities of WRL as lead design architect and Beck as architect of record. At the beginning of the project, the team created a matrix of project responsibilities that would have traditionally been assigned to these two roles. The team then assigned each responsibility to the firm best equipped to fulfill the need. The project team believed that this process helped build a collaborative attitude between WRL and Beck, as each firm came to understand and leverage the strengths of the other.

WRL used their integrated team of architects, engineers, and historic preservation and sustainability consultants to play a larger role during the beginning of the project to define the design. Responsibility shifted to Beck during the second half of the project during the execution of the design. However, both firms held responsibilities and actively contributed and collaborated throughout the project.

Construction on the project began in March 2011 and ended in February 2013, on time and on budget. The building has received accolades for both the process and end result, winning several national design awards since completion (Figure 2-13). Much credit for this can be given to

Figure 2-13 Rooftop PV array *Photography by Kevin G. Reeves; Courtesy of DLR Group*

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the project team for their collaborative approach and steadfast commitment to the larger project goals.

The team attributed the success of the fluid roles to the time and energy invested in creating a strong team culture that balanced change with maintenance of clearly defined responsibilities. The consistent core team created tolerance for shifting members that allowed optimization of expertise and agreed that decisions should be made based on the input of the subject-matter expert, regardless of the person's title or role in the firm.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 3

Creating Collaborative Environments

Collaborative Infrastructure

When collaborative teams perform well, it is often both because of and despite their composition. Studies of team behavior reveal that specialized teams, each assembled with specific expertise to address aspects of complex problems, "are less likely—absent other influences—to share knowledge freely, to learn from one another, to shift workloads flexibly to break up unexpected bottlenecks, to help one another complete jobs and meet deadlines, and to share resources—in other words, to collaborate" (Gratton and Erickson, 2007). Factors such as size, location, specialization, and diversity lower the team's natural tendency to work well together (Figure 3-1).

To build infrastructure that fosters collaboration among such team members, leaders can utilize a number of strategies:

- Invest in building and maintaining personal relationships.
- Build new teams on the foundation of existing relationships.
- Ensure that team members' individual roles are clear.
- Support a sense of community through events and activities.
- Model collaborative behavior from the top.
- Use coaching to reinforce a collaborative culture.
- Provide training in collaboration strategies.
- Adapt leadership style to specific conditions (Gratton and Erickson, 2007).

Physical Space

Successful teams spend a significant amount of time working face to face. There are advantages to team members' working in such close

This chapter includes excerpts from *IPD Teams: Creation, Organization, and Management* (Ashcraft, 2011a). Available at www.hansonbridgett.com/Publications/pdf/~/media/Files/Publications/IPD-Teams.pdf. Thank you to Howard Ashcraft for permission to repurpose this content.

Figure 3-1 Collaborative project delivery requires collaborative behavior

proximity. For example, the speed of communication is enhanced as compared to traditional email or telephone interactions. If multiple skill sets and diverse knowledge are needed, these resources are available much more quickly than they would be through other means. In addition, a large portion of communication occurs through nonverbal cues provided through face-to-face interaction, improving both the quantity and quality of information transference. Physical proximity also allows team members to develop an understanding and appreciation of each other's strengths, weaknesses, and personalities, which is important for establishing and maintaining relationships of trust—a critical component of collaboration (Ashcraft, 2011a:8,19).

In larger projects, *cross-functional teams* may be formed and even colocated for all or part of the project. Cross-functional teams are those made up of members with different specializations brought together to address specific project-related tasks (Lussier and Achua, 2013). *Colocation* offers opportunities to enhance project culture by housing the key stakeholders in one space (Figure 3-2). The colocation site may provide a physical space separate from the individual firm and serves as a demarcation point between corporate and project cultures. The organization within the colocation site can reduce any residual effects of corporate cultures and support the project identity by organizing teams based on cross-functional tasks rather than by firm. In a collaborative, cross-functional workspace, a person's direct employer shouldn't be discernable without asking (Thomsen, 2011:23; AIA

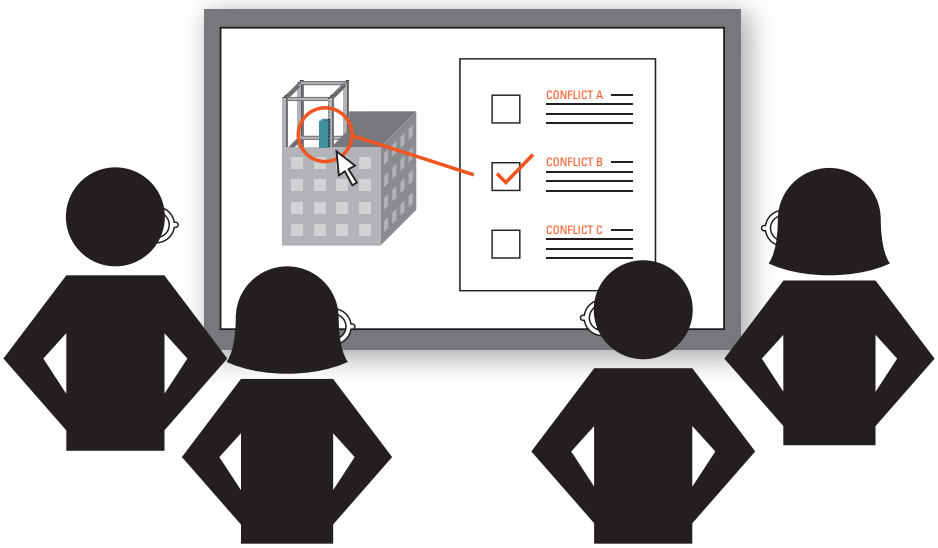

Figure 3-2 Colocation

CC/AIA, 2009:11-12; Ashcraft, 2011a:4,17; AIA/AIA CC, 2007:9).

An alternative to full-time colocation is the use of *big rooms* as meeting places for intense interaction and discussion. These are regularly scheduled meeting places in which a work group (core team, cross-functional team, etc.) meets to discuss the project (Figure 3-3). Meetings are held in the same location each time to ensure consistency. There are rules for engagement and interaction in an effort to keep the meetings as efficient as possible. Often in these meetings the shared BIM model is projected on a large screen and issues are worked out in real time (Thomsen, 2011:13; AIA CC/AIA, 2009:11-12; Ashcraft, 201a1:8,19; AIA/AIA CC, 2007:9). In order to reduce the length of meetings and keep individuals on task, team leaders often keep the work environment active, giving time allotments to each person, and sometimes invite an outside facilitator to keep the meeting on schedule (Henderson, 2011).

Physical proximity assists with the management of a complex project team. If all groups primarily work from their home offices without the advantage of colocation or big room meetings, they lose the opportunity to provide input or advice to each other on a more regular basis and are more likely to duplicate efforts or to waste time on work that is irrelevant. If the participants are physically present in one place, they have more direct access to what others are doing and can head off wasteful detours before they occur (Ashcraft, 2011a:19). Many practitioners cite the informal interactions that result in a shared workspace, such as overhearing conversations between other team members, "water cooler encounters," and better interpersonal relationships, as equally helpful in this regard.

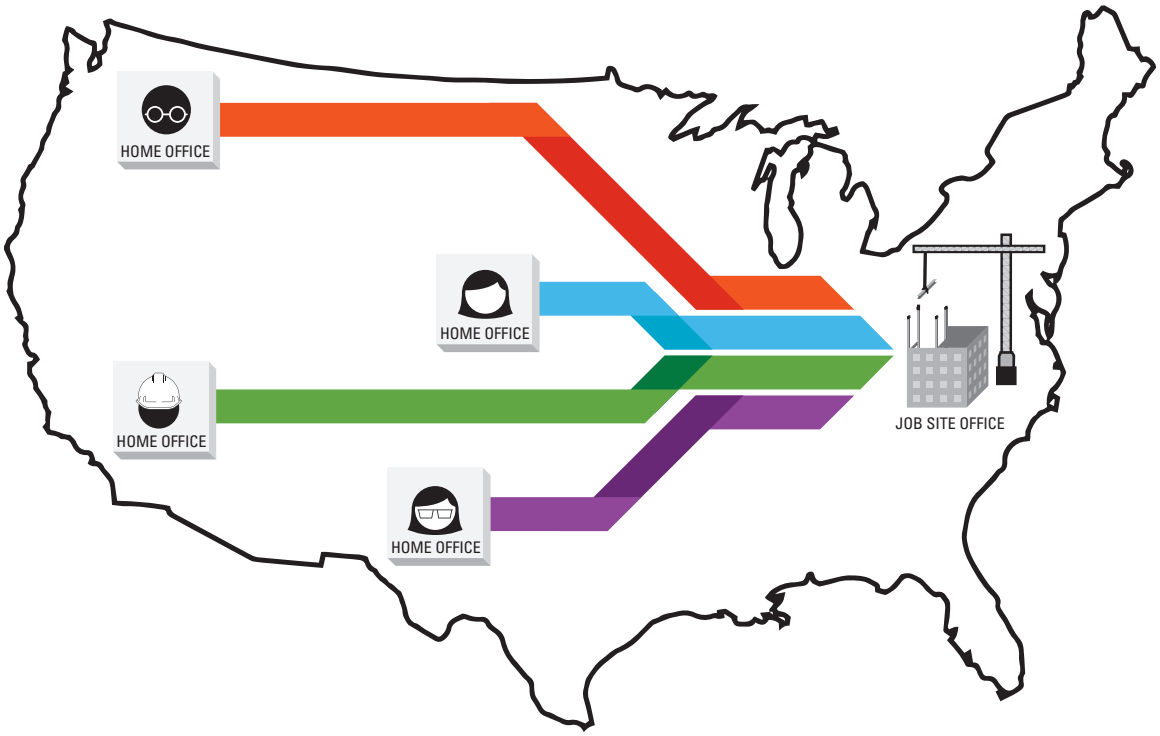

Figure 3-3 "Big room" collaboration

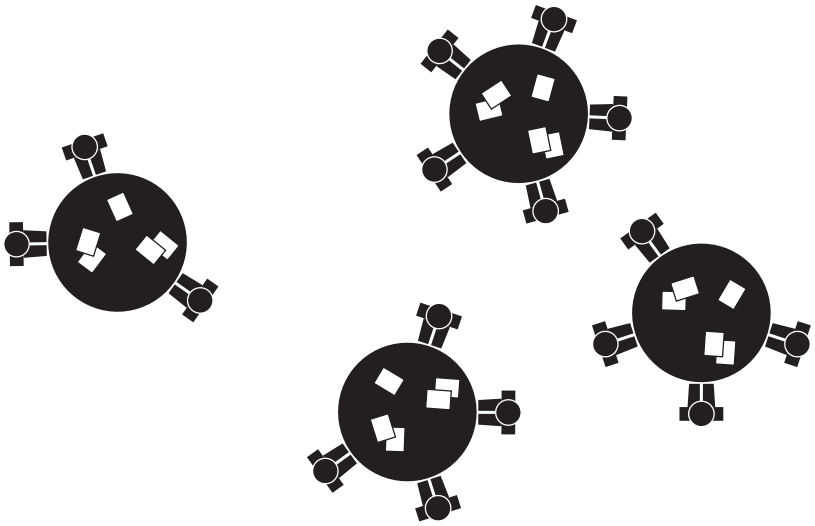

Figure 3-4 Spatial clusters

A disadvantage of colocation and big room meetings is the amount of time spent by stakeholders and the owner in meetings and face-to-face coordination. This can be overcome by having a clear standard regarding when coordination occurs and when individual work can be accomplished. For instance, a team member who asks incessant questions that, while valid, may be interruptive to others' productivity should be encouraged to approach colleagues within specified time frames. The rules of engagement must be precise, including when and how frequently it is appropriate to engage in informal conversations about projects. As team members become more comfortable with one another, discussions can also quickly drift to personal conversations about home life or common interests. Although team collegiality is important, it can lead to an overly informal and unproductive workplace if not managed properly.

In organizing collaborative environments, spatial clusters allow team members to quickly resolve problems with the project without having to walk across the office (Figure 3-4). KieranTimberlake organizes their workspace in clusters with all of the furniture on rolling casters with drop-down outlets and data tracks. Workspaces can then be reorganized on the fly when a new problem emerges. This practice includes other stakeholders when they come to the office to coordinate. Boulder Associates Architects in the San Francisco Bay area work in colocated environments on Sutter Health projects. They recognize the need for spatial clusters in the work environment as well (Henderson, 2011).

Social Structures

In a study of complex, collaborative teams in business, product design, and process development, each firm that demonstrated innovative and effective performance had leaders that had invested significant effort in building and maintaining relationships. There is no one right way to accomplish this. In fact, the more specific relationship-building practices are to the firm context and culture, the more effective they prove to be (Gratton and Erickson, 2007). Collaborative cultures in themselves don't ensure effective team performance, however. Oftentimes,

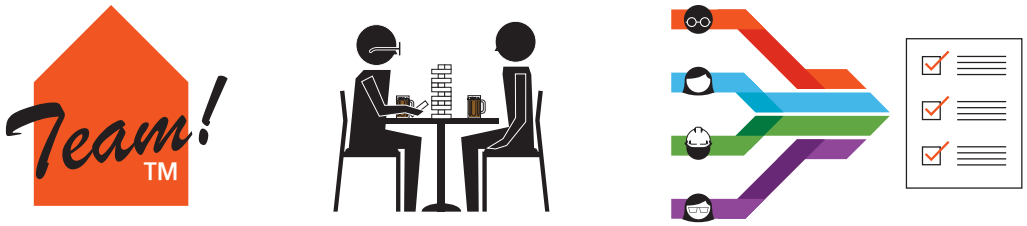

Figure 3-5 Social culture development tactics

teams are encouraged to collaborate and want to collaborate but don't have the specific skills necessary to do so.

When developing a project delivery team, there are methods to increase team cohesion and identity (Figure 3-5). For example, project-specific logos and signage should replace or supplement individual company identification (Ashcraft 2011a:4). Group events, such as barbecues, community volunteering, fundraisers, project-sponsored sports teams, or any activity that brings team members together without reference to their parent company or firm, help to promote group identity. Jointly working to develop graphic standards and project protocols can also strengthen project culture. These methods are outside of the actual work on the project and might be considered social context tactics, but the importance of fostering collective buy-in and a sense of ownership of the project from all the stakeholders should not be overlooked.

Before a project begins, owners and stakeholders should consider holding a retreat or boot camp. These activities bring teams together for a concentrated coordination or teambuilding session (or both) that can help start building team culture from the very start by developing trust among teams and communication among team members. Retreats are also an opportunity "to assess the strengths and weaknesses of team members, improve interpersonal skills, address training opportunities, clarify goals and expectations and enhance the team's ability to use the tools and techniques required for the project" (Ashcraft, 2011a:13).

The military has long known that separating people from their environment and then challenging them with intense, physical activity quickly creates a group identity among former strangers (hence the term *boot camp*). Retreats function in a similar, if less rigorous, way. Moving team members to a physically separate place, reorganizing them across corporate lines, and engaging them in training or work exercises also start the transformation from individual to project identity. The activities that take place can involve "real" work that benefits the project, but more often than not they involve scenarios and role-playing exercises. Such early, shared experiences play a meaningful role throughout the project delivery process in maintaining team cohesion (Ashcraft, 2011a:13; Hackman, 2011).

Training and Support

Firm and project leaders are not the only factors that shape collaborative teams. Often, human resource practices, such as staffing assignments, performance

management, promotion, rewards, and training have an impact on how teams are assigned to tasks, whether or not they are prepared to take on such tasks, and how they receive critique and commendation. The most significant impact HR practices have been found to have on team performance is through training and support for informal community building (Gratton and Erickson, 2007).

While the "soft skills" necessary for collaboration are often seen as common knowledge or as life skills learned in childhood, the mindful implementation of these skills requires consciousness and sustained commitment. In-house training programs and firm support for professional development activities can strengthen existing skill sets and build those where needed.

The role HR plays in cultivating a sense of community is in sponsoring group events and creating policies or practices that encourage such activities. Many firms have in-house lunch-and-learn sessions, where research or best practices from projects are presented to the entire firm, or there may be more social gatherings, such as a weekly happy hour.

Technology Tools

There are a number of tools that have been demonstrated to increase the efficiency, communication, and cohesion of project teams. BIM has been discussed previously with regard to its technical impact. However, the social aspects of BIM should also be considered (Deutsch, 2011). "We are designing in a somewhat revolutionary era of data and analytics," according to Gordon Gill and Alejandro Stochetti of Adrian Smith + Gordon Gill Architecture, "where very few things are taken for granted and almost everything is challenged. This leads to great opportunity to effect change. The increasing ability to customize and tweak things, including software, technologies, materials, and even master plans, will allow us to achieve the highest performance for every object, building, and city" (Lau, 2016).

As with any technology, BIM is social before it is technical. Social need drives the development of a new technology to meet that need, creating a better outcome for the user and for society than if that technology had not been used. Additionally, BIM tools can be used in different ways and to different extents by each office and project team. As such, when employing BIM, industry and owner standards, project-specific implementation plans, and users' technical expertise need to be carefully considered (Smith, 2011).

Industry-wide standards exist that indicate the various levels of development for BIM models, while methods of establishing model tactics such as objects, families, and associated information are often developed by firm and project teams. These standards are intended to establish interoperability requirements and methods of ensuring open access to all team members as well as the data's longevity and usefulness for downstream commissioning and facilities management. Industry and trade associations developed BIM standards so that stakeholders in a project delivery team could have a common language to build a project-specific implementation plan. An example of such a document is the National BIM Standard, which codifies and references existing industry standards.[1] Project standards can also be developed based on project type—health care, education, multifamily housing, and other building type knowledge communities have developed such standards. Owners may adapt their project BIM standard from these aforementioned sources,

[1] National BIM Standard-United States® (NBIMS-US™), available at www.nationalbimstandard.org/.

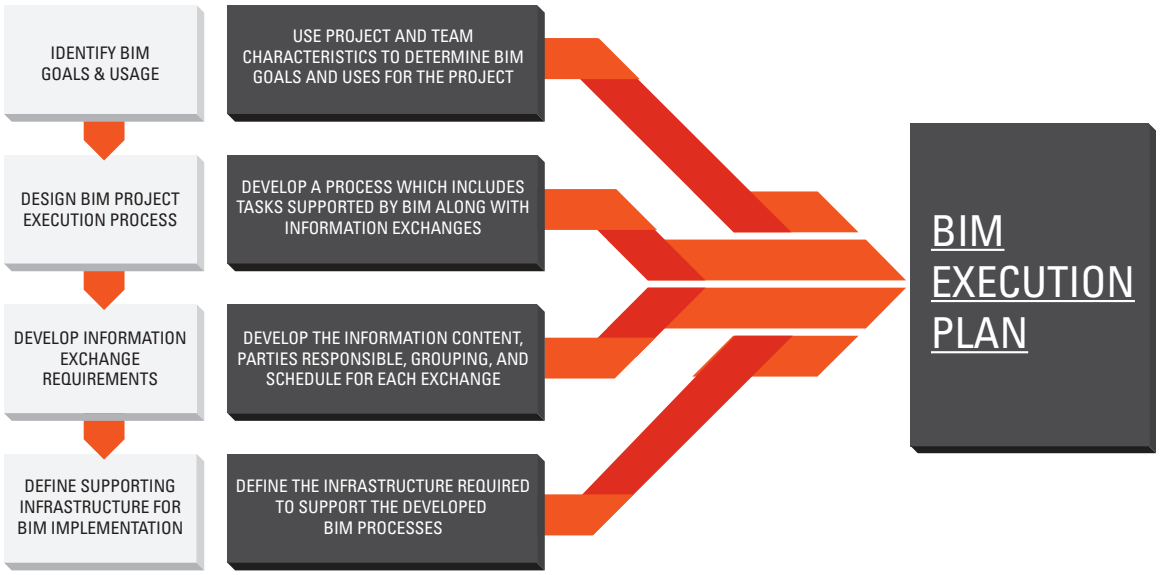

Figure 3-6 BIM execution plan

or develop their own depending on their experience with a project's type and size. Owners often work with the project team and BIM specialists from the stakeholder firms to determine whether to wholly adopt an existing standard, modify an existing template, or develop project-specific criteria (New York City Dept. of Design and Construction, 2012).

BIM standards are directly related to BIM execution plans (Figure 3-6), which are project-specific documents that further describe how the standards will be deployed, the roles of each stakeholder, and the responsibilities, order of operations, and functions of the common BIM model (CIC, 2013). The BIM standard establishes an overview of what is to be done. The BIM execution plan considers why the team is engaging with the technology, how the stated project goals are going to be accomplished (using what software and what means and methods at each stage of design and construction), who will do the work (what are the stakeholders' relationships and how will their content be integrated), and when the work will be completed (turnaround times, real-time modeling, and information sharing). This type of document is different from a collaboration agreement or even an integrated project delivery contract that establishes how stakeholders will integrate. Though it also requires buy-in from all team members, the BIM execution plan is technology-specific.

Developing such a plan can be more difficult than it may seem. Stakeholders come from different firms and companies that may have their own internal standards and workflows. The project delivery team at the core and cross-functional levels will therefore need to develop a unique BIM execution plan that incorporates the standards from all firms. Though time-consuming, this initial investment will pay off over the course of the project in a more efficient workflow.

BIM is not just a documentation tool, but also a communication tool. As such, it should add value to the project delivery process, not additional layers of bureaucracy or management. Architects, acting on behalf of owners and in the interest of

the project, should take the lead, using the BIM standard for planning and execution processes, expediting project delivery timelines, establishing clear communication channels, and defining coordination tactics. As with any tool, architects should consider how BIM can best be used in each project based on its stakeholders, their prior experience with BIM, and the size, scale, and complexity of the project, rather than forcing a common approach across all projects.

The open versus closed nature of technology—open source LINUX versus black-box Mac operating systems, for example—parallels the nature of collaboration. Barriers to interoperability created by translation from one software platform to another, which have long contributed to ineffective collaboration when using digital files, are being broken down through the use of industry standards and manufacturer-specific plugins. Though progress is being made through such tools, the industry as a whole still has a way to go before market value supports their full integration and application (Smith et al., 2015).

Aside from BIM, other technologies facilitate collaboration on both technical and social fronts. Video conferencing has long been used to help provide nonverbal communication to distance-based meetings. Additional applications are being appropriated from other disciplines and retrofitted to serve architecture-specific needs, and in-house social media tools are cropping up in many firms to help support collegiality and dialogue across generations and geographies.

In-house social networks foster open dialogue among firms, overcoming hierarchical and geographic boundaries and responding to the changing demands of a collaborative workforce. "Driven by a desire to respond to the changing preference of the workforce to have instant access to information and promote cross-functional collaboration [in house social media platforms] engage people by helping them connect, learn, share and grow" (Rossi, 2015). Firms are also utilizing blogs more and more frequently as integral or supplemental resources to traditional portfolio-style websites to promote the dissemination of content related to firm culture and research initiatives.

Digital fabrication tools are no longer seen as novel devices and are expanding in scale and accessibility through the development of better design-to-fabrication tools and advances in interoperability between designers and fabricators. Innovative explorations of computational and robotic processes, by firms such as Gramazio and Kohler and academic research centers, such as the Institute for Computational Design at the University of Stuttgart led by Achim Menges, are being realized in full-scale applications. These tools allow firms to explore working with composite materials, creating custom assemblies, and developing innovative workflows by prototyping in-house to produce proof of concept.

The integration of augmented and virtual reality will become a platform for both modeling and simulation (Lau, 2016). Recent advances have lowered the cost of hardware that enables augmented and virtual reality visualizations. The advent of smartphone apps that allow standard phones to be transformed into 3D goggles through the use of headset mounts has democratized the ability to engage clients in the interactive visualization of buildings. Previously, such systems used gaming engines or costly immersive infrastructure. Through their greater proliferation, augmented and virtual reality tools have begun to move past the novel stage and become ways for project teams to enrich the design process itself. Speaking about VR and AR technology, KieranTimberlake

partners Billie Faicloth and Matthew Krissel promote the potential for novel applications of the tools to challenge long-held practices. "We should be driving these tools to non-normative outcomes; they can support deep querying in ways we've only begun to imagine, form ideation and information sharing, to client engagement and even building management" (Lau, 2016).

In a 2016 article looking at emerging technology trends in architectural practice, Scott Marble, chair of the Georgia Tech School of Architecture and founding partner of Marble Fairbanks, states: "Custom design tools will become more prevalent due to an incoming generation of architects well versed in scripting and because more vendors are releasing Web-based software customized to their product lines and manufacturing workflows" (Lau, 2016).

Leaders' Roles

"At the most basic level, a team's success or failure at collaborating reflects the philosophy of top executives in the organization" (Gratton and Erickson, 2007). One of the most important ways in which leaders demonstrate their commitment to collaboration is by modeling best practices in visible ways. Their investment in face-to-face interaction, while costly in terms of the time and money it takes to travel regularly to project sites and branch offices, pays off exponentially as it radiates out through the entire team.

Mentoring and coaching, whether through formal or informal structures, are also effective at increasing collaborative behavior. Formal structures often work well to connect people who would not otherwise be likely to cross paths—firm principles and new interns for example—or when focused on a particular goal such as supporting a team member when transitioning to a new position within the organization. Informal structures work well when integrated into daily processes to reinforce collaborative practices already in place and to make micro-adjustments when needed.

Leaders must be situationally aware in order to identify and implement the appropriate leadership styles depending on the context. Adaptive leaders foster a responsive environment. Rather than dogmatically adhering to an outcome-focused (task-oriented) or a person-centric (relationship-oriented) approach, an adaptive leader understands the need to choose from a number of different approaches depending on the situation. For example, a leader may be more task-oriented at the early stages of a project when it is necessary to establish clear goals, responsibilities, and timelines, and then shift to a more relationship-oriented approach should tensions arise among team members over a particular design decision (Gratton and Erickson, 2007).

Finally, leaders must ensure that the roles and responsibilities of each team member are clearly defined so that they understand what they are expected to do independently, how their work relates to the larger project, when it is appropriate to collaborate, and when they need to focus on individual tasks (Figure 3-7). "Without such clarity, team members are likely to waste too much energy negotiating roles or protecting turf, rather than focus[ing] on the task. In addition, team members are more likely to want to collaborate if the path to achieving the team's goals is left somewhat ambiguous. If a team perceives the task as one that requires creativity, where the approach is not yet well known or predefined, its members are more likely to invest time and energy in collaboration" (Gratton and Erickson, 2007).

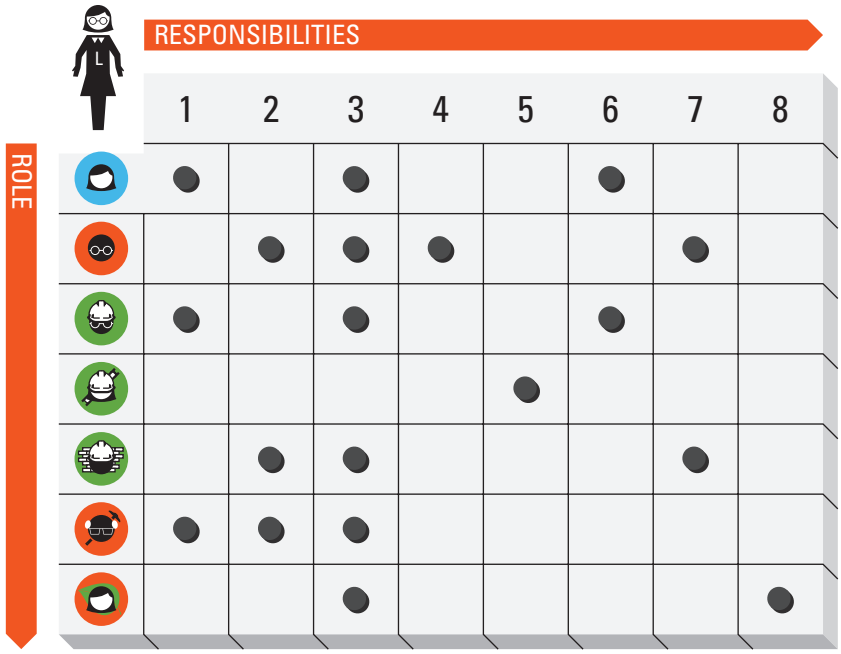

Figure 3-7 Clear definition of team member roles

COLLABORATION TAKES COMMITMENT, NOT CONTRACTS—INTERVIEW WITH STEPHEN VAN DYCK

Stephen Van Dyck, AIA LEED AP, is a partner at LMN Architects in Seattle—the 2016 AIA Firm of the Year—where he leads the design and delivery of public assembly, performing arts, transportation, higher education, and mixed-use projects. Prior to joining LMN, Stephen worked at Venturi-Scott Brown and SHoP Architects and served as a lecturer and studio critic at Yale University, where he received his master's degree in architecture.

A recognized industry authority on design technology, Stephen pioneered LMN's in-house research and development lab called Tech Studio. The group was created to address industry challenges and the increasingly digital and complex needs of contemporary practice and brings together a variety of specialists and designers to explore new working methodologies and test the limits of advanced fabrication and material science.

Van Dyck spoke with us about the roles of technology and research in developing smarter, better buildings, the transition to a partner position within the firm, and the challenges of maintaining a cohesive and collaborative culture in a rapidly growing practice.

Erin Carraher: LMN's Tech Studio seems to allow the firm to incorporate questions and research into a number of projects. I know the studio also works on independent questions. Do you see technology as a way of enabling leadership in practice?

Stephen Van Dyck: Yes absolutely. And I will say it's evolved pretty organically that way. Over

the years we've learned that R+D shouldn't be confined to the office in which it happened. For us that means sharing our results and process online with a broader community. Then a cool thing happens; that community becomes an important part of driving the research forward.

We believe in sharing our research, which runs counter to the popular myth of 'R+D' or the Skunkworks approach, where the results of research are proprietary and the process is top secret. But we now see research as process-driven, which in some of the work we have been undertaking demands a shared approach.

Many of our research efforts have produced customized solutions to software or hardware issues. In this sphere, harnessing the power of a broad user base to test and de-bug your work becomes a great part of improving it. We're solving problems that we believe will be solved one day by someone eventually. So they're somewhat inconsequential in the big picture but very significant in the short term, saving our project teams huge amounts of time and making their process easier and more streamlined, and of course also driving better design solutions. When we share that work we gain and the community gains, we hope. So the great benefit of this way of working—and one could say our original intent—is that we do research which ultimately benefits the profession.

Carraher: How has the firm's investment in an in-house fabrication shop and the types of large-scale prototypes and models you build for many of your projects affected your ability to have conversations with owners and fabricators about new forms and assemblies you are interested in exploring?

Van Dyck: The moment you sit down with a builder and show them how you've tried to make something, it may not be exactly how they would have gone about it but all of a sudden there is this empathy on both sides. It's no longer a relationship where the architect is saying, "Hey look, I drew these lines on paper and this is how it needs to go together. You need to figure it out." It's now a conversation of, "I'm trying to do something new. Will you work with me to help me figure out how to make this happen?" All of a sudden, you're speaking in their terms; you're touching the material that they understand pretty intimately and it becomes a completely different discussion. You've broken the barrier of what was traditionally considered the role of an architect in their minds.

When that happens, you get this wonderful thing that we call "trust." And that's huge because the moment you have trust between the people making something and the people coming up with an idea, there is often an acceptance for entirely new means of transmitting information. For instance, fabricators are much more likely to trust the data you are giving them when they've sat down in a meeting or in the shop and looked at stuff we've made. Since the craftsmen have informed our model and mockups, we can essentially go direct-to-fabrication with our data.

I think that's the big breakthrough for us with in-house fabrication technology. It allows us to operate differently and without the constraints of needing a whole new contract structure or full IDP arrangements of teams, which heretofore has been the default way of revolutionizing construction in our industry. If you ask anybody who is really smart about the issues of contracts and creativity in architecture, they'll tell you exactly the same thing; if you need a contract to allow for a team to work better, you're already way behind.

Like everything in our profession, at the end of the day, it just comes down to people. If you can get people to collaborate together in a nice

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reasonable way and trust each other the way we all should, then you can do extraordinary things, and it doesn't matter what the contract says.

It's easy to make the conversation about digital fabrication or digital design. But really, those are the means to the larger end. The larger end is to build better project teams and better buildings by engaging with experts who are way better at putting things together than we are. For us, the start of that conversation sometimes requires dabbling in their space to prove to them that we care and that we empathize with the art that they undertake in making our buildings. We believe the key to that is better collaboration with people.

Demonstrating ideas through mockups and prototypes is one way. Just as effective, we have found, has been beer.

Carraher: [*laughs*]

Van Dyck: I'm not kidding. I try my hardest whenever I can to take our construction managers and builders out for drinks to get to know each other and care about the project outcome and about each other. Once you do that, you earn the respect and trust of people so that then they're not so freaked out when you bring them a new idea. They're much less inclined to default to an adversarial relationship, which is essentially legally how our profession is set up. The end here is to try to overcome the de facto relationships that have evolved over years because of these legal bindings.

Just as important as the digital is the personal. This is all in support of that great vision of delivering better value, being better architects, and providing the best buildings we possibly can to our clients and our cities. It's interesting that it can actually come down to having the right tools, knowing how to work with them, and then collaborating with people over physical things.

Carraher: Meaningful collaboration needs the support of strong leaders. You are now in a leadership position within your firm. Can you talk a bit about your path to partnership?

Van Dyck: That's an interesting question. We have a pretty unique culture here, which is not terribly hierarchical. A lot of very young people provide a huge amount of value to the office. I came up through that environment.

When I was at SHoP, it was the same thing. The idea was that we were all just thinkers together in a place, and we were all there for a good reason and had really good things to share. One of the great things I learned from Gregg [Pasquarelli] was that when you go to these big important meetings where people are talking about building big important stuff, at the end of the day, no one really knows what they're talking about. That's a gross generalization, but the reality is that everyone works from a limited set of experiences. There's no way in hell on the scale of projects that we all work on that any one person knows it all. I think once you understand and recognize that, it's really empowering as a young professional.

I never sought out a leadership role at LMN from an ownership standpoint. Knowing what a partner needs to do is a daunting thing. When the partners first approached me about joining, I asked them how they thought I was going to get the experience I needed to pitch in and save us if things weren't going well. Their answer was, "You had enough experience to do the other stuff you've done, so what's different?"

What I'm excited about now is thinking strategically about our firm's future as a design problem. What is it that we could be doing to be better designers? To provide better service? To be the best firm that we can be? And to have fun? To be excited to be going to work and doing something great for our city, for our clients,

and ultimately for ourselves while enjoying the process? It's a complicated set of equations, and it's a big part of this new role I'm in.

Carraher: What do you see as some of the challenges the profession will face in the coming years?

Van Dyck: Over the next decade, and already right now for many firms, the challenge will be to be nimble—being able to quickly identify strategic moves and change how you think and work to make you a better, more competitive service provider.

I like to say that LMN is a big enough office to be incredibly powerful and skilled in delivering very complicated large civic projects, but we're also small enough to be really nimble and agile in new ways of working and thinking that help us address very complex, ever-changing cities and client needs.

The ability to adapt quickly in our industry is more important than ever. We know you can apply Moore's law of the future of computation to our culture. We are so connected now; knowledge and ideas are transferred so quickly that the advancement of culture—how we are as a people and how we make buildings—is going to continue to change so fast. If you can't adapt quickly, you're going to be a dinosaur.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

PART 2

COLLABORATION TOOLS AND TACTICS

Part 2, "Collaboration Tools and Tactics," outlines the roles and responsibilities of team members and the processes used to assemble, develop, and maintain collaborative teams. Team performance is discussed, including positive and negative behaviors, and tools that enable collaboration are demonstrated.

Leading Collaborative Architectural Practice
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CHAPTER 4

Building Collaborative Teams

Assembling and Organizing Teams

The agency that the core team leadership has to select team members and influence team organization varies from project to project. Team structures are determined relative to project size, scale, and location, and are most often variations on a few common models (Figure 4-1). These models have been developed in projects that are structured to have low risk to the project stakeholders and demonstrate successful outcomes relative to cost, schedule, scope, and quality. Though many of the common models are based on design-build and integrated project delivery types, the principles apply to all forms of project delivery teams.

The key to successful collaborative project delivery is assembling a team that is committed to collaborative processes and is capable of working together effectively. Clarity in the project structure and stakeholder roles is key to fostering an environment of open dialogue and collaboration. To accomplish this, participants in project teams should:

- Identify, at the earliest possible time, the roles that are most important to the project.
- Prequalify members, both individuals and firms, for the team to ensure they are committed and have the technical and interpersonal skills necessary to be effective collaborators.
- Consider the interests and seek the early involvement of outside stakeholders, such as building officials, local utility companies, insurers, and community groups.
- Define a shared working method that values the individual goals, interests, and objectives of the participating stakeholders.
- Identify or adapt an organizational model, business structure, and project delivery method best suited to integrated project delivery that

This chapter includes excerpts from *IPD Teams: Creation, Organization, and Management* (Ashcraft, 2011a). Available at www.hansonbridgett.com/Publications/pdf/~/media/Files/Publications/IPD-Teams.pdf. Thank you to Howard Ashcraft for permission to repurpose this content.

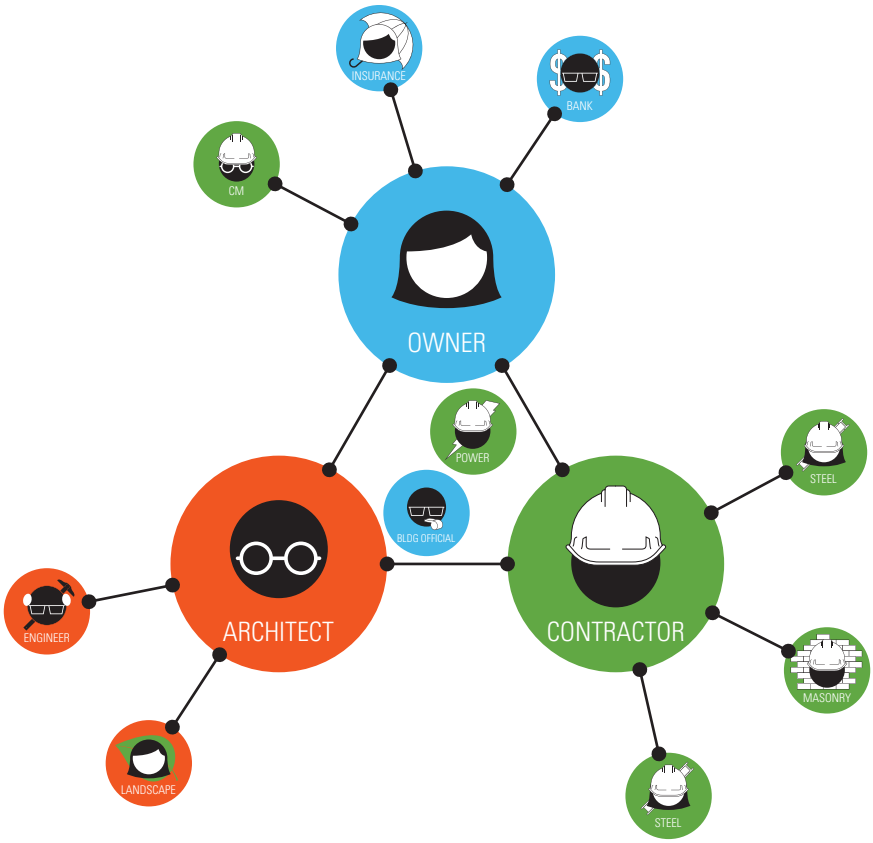

Figure 4-1 Collaborative project team

is consistent with the participants' needs and constraints.

- Develop project agreements to consistently define the roles and responsibilities of all participants and clearly outline key provisions regarding compensation, obligation, and risk allocation (AIA/AIA CC, 2007).

Although the selection of build team members in traditional forms of project delivery such as DBB will come after the design phase is completed, the steps outlined above can still be used during the initial design team assembly and then again when the build team is brought on board. Reiterating this process may be repetitive for the design team but will increase project communication by putting team members on equal footing from the bid award on.

Selection of Team Members

"Well-composed teams . . . have a good mix of members, people who are neither so similar to one another that they duplicate one another's resources nor so different that they are unable to communicate or coordinate well" (Hackman, 2011). Building a culture of collaboration takes place over time

at both the highest levels of leadership—where firm partners model collaborative behavior—and with the assembly of project- or task-based teams. Practices that work well at one scale or in one type of project do not necessarily translate when changing context or complexity (Gratton and Erickson, 2007).

Project delivery teams should be assembled before defining the day-to-day methods for moving the project forward to allow those who will be doing the work to have a say in how the work will be done rather than having working styles imposed on them (Collins, 2001). Each of the unique individuals that comprise a project team will bring his or her own strengths and weaknesses. Fundamental to any team's success is the leader's ability to match personnel and assignments (Amabile, 1996).

The adage, "You go to war with the army you have, not the army you want," proves true often enough in project delivery teams. In many instances, individuals are assigned to a team based on availability and not necessarily appropriateness; this should be strongly resisted when possible but is inevitable to some extent in most teams (Hackman, 2011). "Finding the right balance between reality and expediency in forming a team requires thought, initiative, and occasionally a bit of political maneuvering" (Hackman, 2011). In addition to technical ability, leaders should also factor in each person's communication abilities and willingness to be a team player when making staffing decisions. Positive past professional experience among team members and existing social connections are also benefits to consider.

Whether working with a hand-picked team with strong existing social bonds or one that is made up of entirely new players, the leader's job is to make each member's responsibility clear and to help them understand their role relative to achieving the larger project objectives. Clarity on this fundamental level allows team members to focus on higher-level collaborative practices to achieve those goals.

Oftentimes, teams addressing complex projects will be made up of subteams from a number of firms that bring unique areas of expertise to the project. Even if firm leaders have the ability to carefully curate the team members selected within their own company, they may have no say in those assigned to the project from the partnering organization. If possible, the contract should give the team leaders flexibility in selecting team members and authorize them to remove a disruptive team member and request a replacement if necessary. In all cases, team leaders should monitor the team's early interactions to identify, train, and potentially replace personnel that are undermining team effectiveness (Ashcraft, 2011a).

Teams should be assembled with the recognition that each potential member has a variety of skills and abilities that should not be considered in isolation but in relation to the overall composition. A well-balanced team needs members with technical expertise, problem solving and decision-making capabilities, and interpersonal skills such as the ability to listen effectively, provide feedback, and resolve conflict (Katzenbach and Smith, 1992; Robbins and Judge, 2011). Because few if any individuals demonstrate all of these capabilities, team members should be chosen in part based on how they complement others' strengths and weaknesses (Ashcraft, 2011a) (Figure 4-2).

A good strategy for assembling a team is to choose two or three core members who excel in the technical skills needed to address the problem at hand, assess their leadership and interpersonal skills, and build the remainder of the team with members that fill any areas that are lacking. Conscientiousness, or attentiveness to doing a task well, is another key attribute for effective team performance; the more members who monitor the team's technical

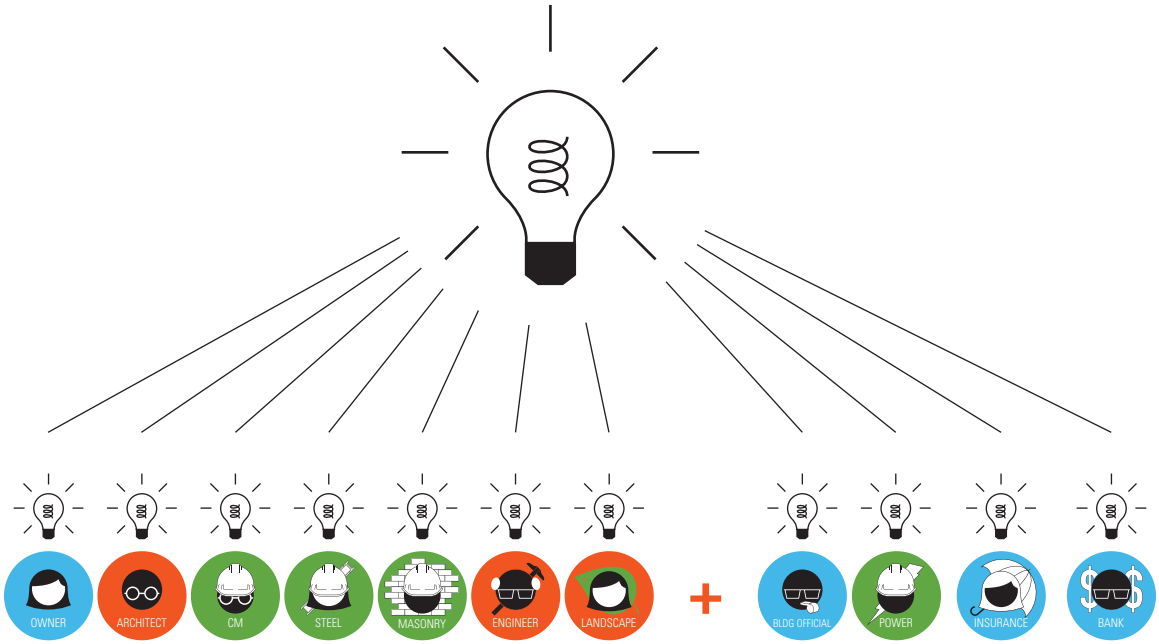

Figure 4-2 Team composition

performance and interpersonal relations, the more effective the team will be (Robbins and Judge, 2011). Because a team's work may change focus as a project progresses, team leadership must be sensitive to the changing requirements and readjust the team composition accordingly over the course of the project (Ashcraft, 2011a).

The type of work being done is also a factor in making choices regarding team composition. If a team faces novel, complex problems, members need to be chosen based on their intelligence and creativity as well as their technical expertise. Such high-ability teams are more adaptable to changing situations and can effectively apply existing knowledge to new problems (Robbins and Judge, 2011). However, this same team will be less successful on routine tasks, often trying to reinvent the wheel when there is no need, whereas teams with strengths in organization and logistics will remain focused and productive. High-ability teams tend to work best when led by equally high-ability leaders who allow the team to self-organize and self-manage rather than prescribing working methods or attempting to control every aspect of the project (Robbins and Judge, 2011; Ashcraft, 2011a).

The final factor that plays in to the selection of the core project team is the history of interaction between members. There are significant advantages in performance, time saving, and productivity that come as the result of positive past experience; the opposite is true where past experiences have been negative. As has been said, trust is critical to successful collaboration. In newly formed teams where trust has not yet been established or in situations where it needs to be rebuilt, teams will need to invest the time and effort needed to build these relationships before being expected to operate collaboratively (Gratton and Erickson, 2007).

Research shows that when 20 to 40 percent of members have existing relationships, the team

demonstrates strong collaboration from the start. This does not necessarily mean that having worked together in the past precludes the need to continue strengthening relationships or that the more previous experience team members have, the better the team will perform. In some instances, such relationships can actually disrupt collaboration. Subgroups can form within the team based on existing social ties. Leaders should monitor these cliques and break up the subgroups if their behavior becomes disruptive or begins negatively impacting the larger group (Gratton and Erickson, 2007).

Core Team

The most common model that is applicable for smaller projects is an interdisciplinary team comprised of the key core participants that remain consistent throughout the project. Rather than creating multiple, discrete teams to address individual issues, a stable core team will be augmented by other disciplines at appropriate times in the project. This approach is more effective because it allows for the core team to house the collective experience of all project stages, issues, and disciplines, which creates a more comprehensive project and cohesive process overall (Ashcraft, 2011a).

The core team usually includes the owner or owner's project representative, the project architect, and the contractor's project manager or superintendent. As the project advances, additional stakeholders, such as engineers, suppliers, and fabricators, will cycle in and out of the team as needed. This approach keeps the active size of the core team at a manageable level and doesn't waste supporting team members' time on issues unrelated to their area of expertise (Ashcraft, 2011a) (Figure 4-3).

The core team will decide which team members are needed over the entire course of the project, what level of involvement is appropriate for them in what areas or phases, and which stakeholders should be brought into the process at what time. The core team will also introduce team members to one another, define project culture, assign roles and responsibilities, and establish project goals. Project goals should challenge achievement expectations and may be assigned to a subgroup or to the team as a whole. Tasks should be assigned to the best person or team for the job (AIA CC/AIA, 2009:1).

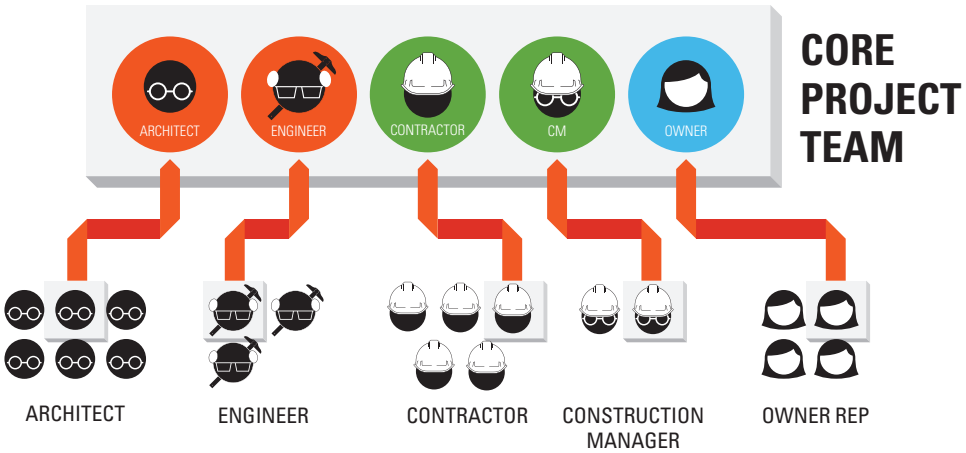

Figure 4-3 Core team composition

Key Supporters

Key supporting team members, such as consultants and engineers, as well as subcontractors, manufacturers, suppliers, end users, building managers, agency officials, local utility company representatives, the local fire authority, or any other entity that may have a vested interest in the outcome, play equally vital roles in the project's overall success, but often perform more discrete tasks within the design and construction process. Those who are contractually bound to one of the core team members or to a combined, project-specific entity agree to support the core team member's responsibilities to the collaborative team but may establish alternative approaches with their primary contracted partner (AIA/AIA CC, 2007).

Team Personas

Product design firm IDEO has identified what general manager, Tom Kelley, calls the "faces of innovation" or personas that team members take on in order to tackle new or wicked problems (Kelley and Littman, 2005). In the same way that a director may cast a play, Kelley defines each team member as fulfilling a critical role in the learning, organizing, and building stages of creative, collaborative teams (Figure 4-4).

These personas are a different way of describing a core team than the traditional owner, architect, and contractor roles and may be filled by any member of a project delivery team. In addition, members of the team may take on different personas as the project progresses in order to ensure that a balance of people, tasks, and progress is achieved. They include:

- Anthropologist. Solves problems by understanding the culture of the project users and client through observation and without judgment.
- Experimenter. Relentless in problem solving, is resourceful, tests ideas within the project scope for constant opportunities for improvement.
- Cross-pollinator. Connects the disparate pieces and seemingly unrelated aspects of a project to find a solution.
- Hurdler. Solves issues by expertly overcoming barriers and breaking new ground; never says "we can't," instead, says "we will"; breaks the rules when required.

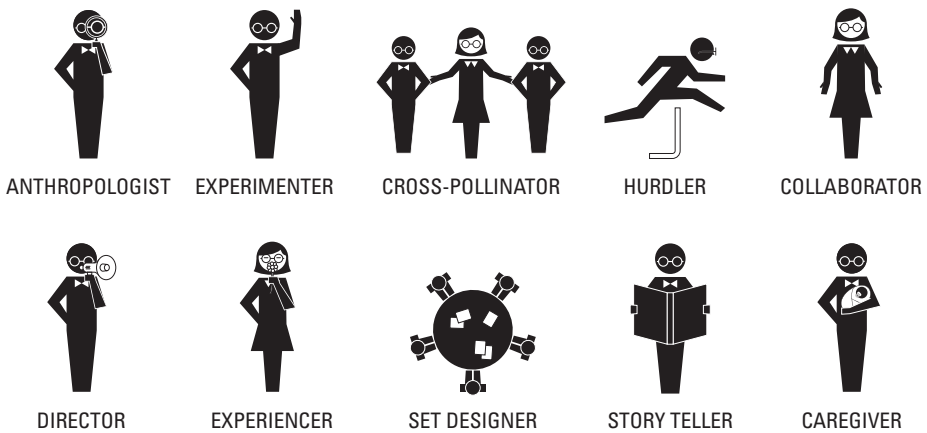

Figure 4-4 Types of team personas

- Collaborator. Understands that teams are the essence of problem solving and constantly acts as facilitator, mediator, and connector of people and process.
- Director. An honest, fearless, and committed individual who provides clear, direct vision and focus through foresight, leadership, and control management.
- Experiencer. Attempts to understand people and their environments through an aesthetic emphasis on how the five senses affect the human experience.
- Set designer. Designs, organizes, and creates the working spaces that allow creativity and innovation to thrive and productivity to emerge with a focus on results.
- Storyteller. Creates order out of chaos and captures the imagination by constantly weaving the team members' roles and the project elements into a narrative of how initiative and innovation can overcome project challenges (Kelley and Littman, 2005).
- Caregiver. Caring, fostering, and mentoring; by providing a personal touch and friendship builds a happy environment where people are open, feel welcome, and unthreatened.

Diversity and Inclusion in Teams

Team effectiveness is increased through team diversity, which doesn't just refer to the range of skillsets of team members but also to their range of backgrounds (gender, age, race, culture, and experience). Inclusion is the process of leveraging this richness to capture its full potential (Tapia and Lange, 2016). Though building a diverse team may require additional time in the initial stages of a project in order to create a common understanding of each team member's expertise and preferred working methods, over time it creates more productive and effective teams by bringing a greater range of viewpoints and skillsets to the table.

Diversity of experience and expertise has been proven to lead to more effective decision making and greater innovation in teams because it provides multiple perspectives on the same problem and fosters constructive debate prior to decision making (West, 2012). Where such diversity is lacking and team members' expertise unbalanced, the team may become divided and/or counterproductive.

While homogeneous teams composed of members with similar backgrounds and types of experience may perform effectively initially, they often quickly fall into patterns of conformity and groupthink and have been proven to be ultimately less effective overall than their more diverse counterparts, who are slower out of the gate but more productive long term (West, 2012). Like-minded groups are also more likely to move to more extreme viewpoints over time, regardless of their original orientation or input from outliers (Hackman, 2011).

Leaders play a crucial role in both building teams with the right balance of diversity and in managing the interpersonal relationships of the team members over time. "The challenge is to create sufficient diversity within the team without threatening their shared view of their task and their ability to communicate and work effectively together. Where diversity is very low, the group pressures will be towards conformity rather than integration" (West, 2012).

The more traditional definition of diversity, having to do with gender, race, age, and cultural background, is also of benefit to teams. Over time, such differences have been shown to help equalize the extreme characteristics of each group—for example,

in teams comprised of members from collectivist cultures as well as individualist cultures—and provide more comprehensive and balanced decision-making overall. "Greater diversity of people offers more information—broadening the pool of task-relevant information, knowledge, and perspectives available to the team. This in turn increases problem solving, decision quality, creativity and innovation" (West, 2012).

The process of harnessing the creative and collaborative potential of diverse teams is not easy. To draw from such a range of experiences and expertise, a team leader needs to have an awareness of each team member's background, skillset, and experience in order to foster a framework of inclusion that utilizes such knowledge. Heterogeneous groups work and communicate differently, sometimes leading to disagreements and interpersonal and intergroup conflict that can alienate outliers if not managed properly. Additionally, team leaders are responsible for promoting the value of diversity to all team members in order to engage overall buy-in on the team composition and develop a collective identity for such a diverse team (Hackman, 2011). "Only when group members personally believe in the value of diversity are they likely to identify strongly with a diversely composed team" (Hackman, 2011).

Too much diversity can lead to a lack of productivity, however, if team members have no common point of departure or language and are unable to develop a way of working together toward a common goal. A productive balance, then, is one that provides sufficient diversity to aid team performance and innovation with the least amount of loss due to disagreements, misunderstandings, and suspicion (West, 2012). Cultural diversity can also lead to a lack of productivity as the team struggles to determine which of many possible processes—more democratic versus more authoritarian decision making approaches, for example—to utilize. The necessary organization and management skills to address these concerns and help the team determine the best process to move forward are the responsibility of the team leadership.

Organizing Teams

There are multiple ways to organize teams depending on the project size and scope. Most often, particularly on smaller projects, the core team of architect-owner-contractor remains consistent throughout a project and is augmented with key stakeholders when their expertise is needed. "This provides continuity, and keeps the active size of the team at manageable levels while allowing representation of the key participants without requiring their participation before they will be fully engaged" (Ashcraft, 2011a: 6).

The core team may choose to engage key stakeholders simultaneously whose work is interdependent—MEP and structural subcontractors, for example. Another approach focuses on building teams around problematic issues at anticipated trade–contractor intersections. For example, a team could be assembled to focus on the slab edge conditions including structural and framing subcontractors along with the curtain wall supplier to suggest sequencing alternatives that would streamline installation and minimize cost (Ashcraft, 2011a: 6).

Predesign charrettes that involve all of the team members who will eventually participate in the project can be used to solicit feedback and incorporate expertise as early as possible in the design phase even if some team members won't have an active role until later in the project (Figure 4-5). Design charrettes focus on the basic systems that will be used, identify opportunities that may exist for improving design and construction outcomes, and provide designers with information and advice from the larger consultant and subcontractor team before decisions are made that may impact cost and scope.

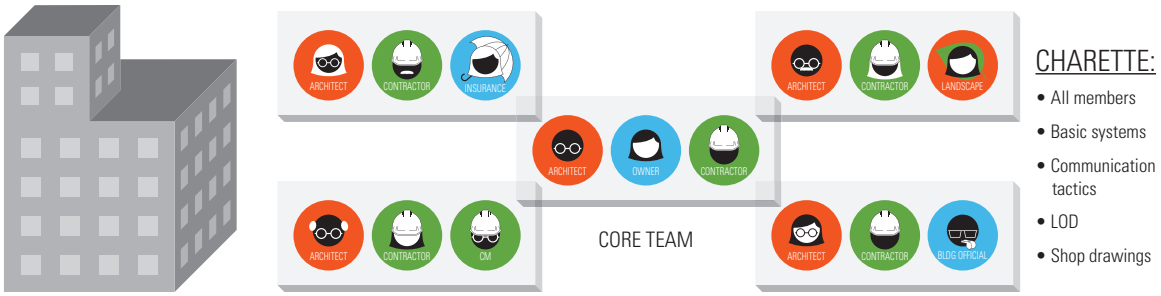

Figure 4-5 Predesign charrette

These charrettes also set the tone for a project culture that does not divide the design and fabrication stages chronologically, but one in which contractor and fabricator/installer collaboration and feedback is valued and utilized at the earliest stages to reduce redundancy and rework (Ashcraft, 2011a: 7).

In projects where programmatic and special systems such as acoustics, aquatics, or information graphics are identified as critical to the project's overall success, the core team should involve representatives from these disciplines in the project team early in design process rather than waiting until schematic designs have been developed. This allows for their expertise to benefit and help shape the overall project direction rather than requiring redesign to initial schemes that do not meet technical or functional requirements (Ashcraft, 2011a: 6).

Subcontractors and consultants who do not have experience with collaborative delivery models may be reluctant to participate in the early design stages before decisions involving their work are made. They may feel they are spinning their wheels if they help analyze approaches that may not be used or lay the foundations for work that may be awarded to other vendors in a competitive process. But the early stage of a design is precisely where their construction and technical expertise may be most creatively and effectively integrated. Core teams should challenge such reluctance and closely question the prospective participants to determine when their engagement will be most beneficial (Ashcraft, 2011a: 7).

As project size increases, this basic approach to team organization—though not the basic theory—must change in order to keep working teams at a size that is effective, often resulting in sub-groups. As noted previously, work assignments should be structured to fit the team rather than the team being enlarged to fit the work. This means that the core team, which is now focused on management, must create a structure that keeps working teams reasonably compact, does not have responsibility gaps among teams, allows contemporaneous coordination, and provides alignment to overall project goals. Several structures are commonly used to divide work scope (Ashcraft, 2011a: 7).

If the project is suitable for division into discrete physical areas, a basic team approach can be used within multiple subteams, in which each subteam is responsible for all functions and disciplines within a physical area of the project (Figure 4-6). For example, work can be divided by building wing, floor, phase, or by individual structures within a complex. Subteams will need to be provided an overall approach by the core team and will need to coordinate with other subteams to ensure project cohesion and continuity (Ashcraft, 2011a: 7).

A systems approach, which is usually most effective on large, complex projects, structures teams

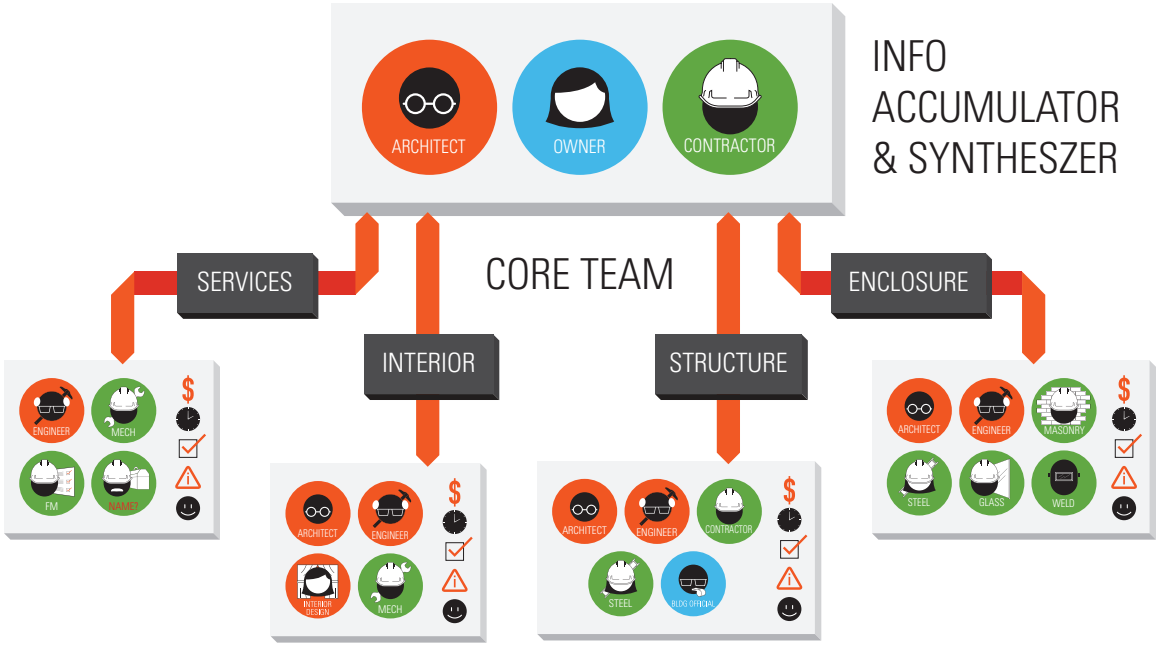

Figure 4-6 Subteam organization with division by area

around building systems. In this approach, the core team looks at a building as an ecosystem with an understanding of how each individual system (ventilation, structure, waterproofing, etc.) is interrelated with and dependent on the others (Figure 4-7). This approach allows for greater subject matter expertise within the subteam but also creates greater coordination issues in order to fully integrate the system elements. A separate team that evaluates options and provides diagrammatic directions to the area teams develops the overall systems approach (Ashcraft, 2011a: 7).

Coordination among Subteams

Coordination among project subteams can be handled in three ways. First, the core team can have coordination responsibility. This is not preferred as it releases the area teams from coordination responsibility and violates the rule of designing coordination into the process rather than testing for coordination after work has been performed (Ashcraft, 2011a: 7–8).

A second, better approach is to assign coordination responsibility to task-oriented teams. Tools to facilitate the coordination of these multidisciplinary teams within larger projects include team member overlap between teams, regular big room meetings, and colocation to assure that the design being developed is properly coordinated. Big room meetings should not only focus on reviewing the work that has been completed from multiple perspectives, but should also engage in discussions of what design work will be done by each subteam in the interval before the next meeting. Task lists should be developed and sufficiently detailed to allow teams to identify and solve future coordination issues before they arise (Ashcraft, 2011a: 8).

A third approach to coordination in larger-scale projects is to divide the work on a systems basis,

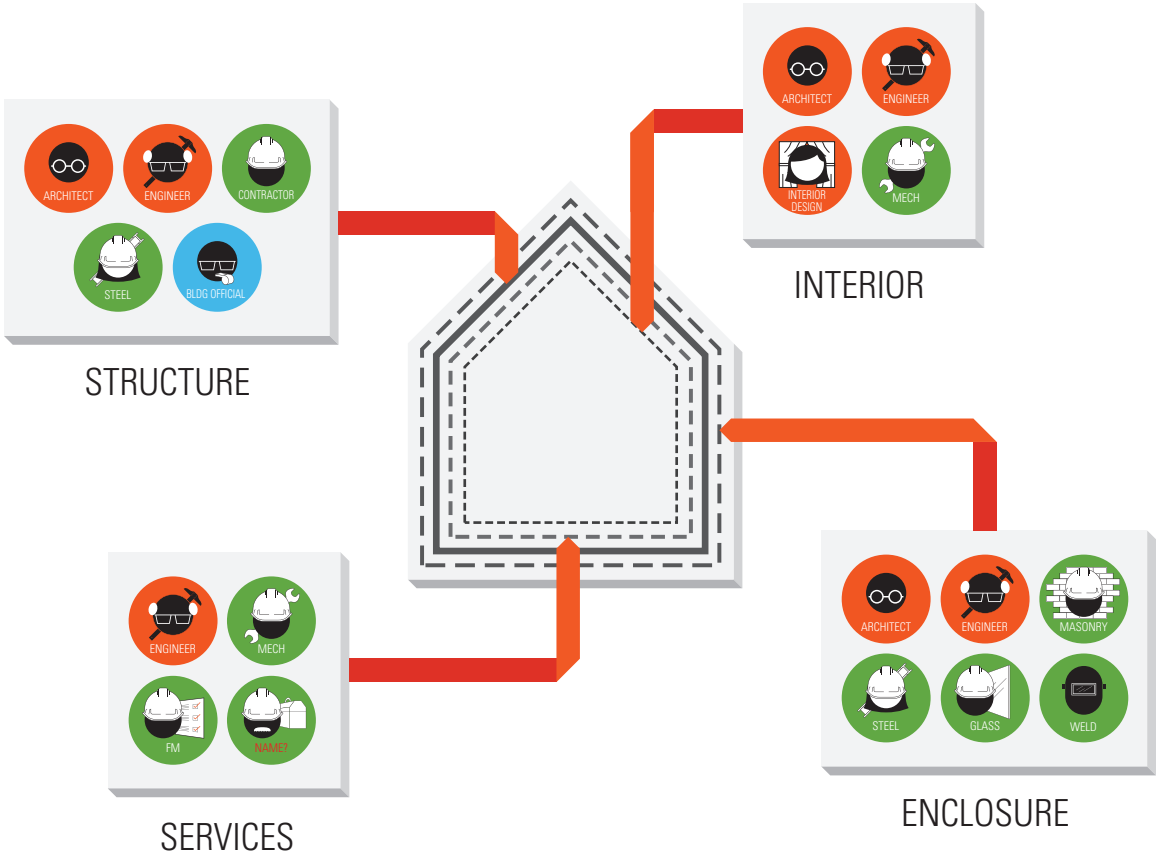

Figure 4-7 Systems approach to team organization

such as dry or wet mechanical systems, and examine their impact on all areas of the project. This has the advantage of providing an overall view of the specific system and involving team members with high levels of subject matter expertise to conduct the specific review. It has the potential disadvantage of reducing diversity of expertise in the team conducting the review, resulting in potential overlooking of coordination issues between functional systems and physical elements (Ashcraft, 2011a: 8).

Systems-based teams can utilize big room coordination meetings to review interrelated work, analyze problem issues, check for clash detection, explain what work they plan to accomplish before the next joint meeting, and create the list of decisions and deliverables each system-based team requires of the other to move forward (Ashcraft, 2011a: 8).

Team coordination can be enhanced by regularly posting design information in visible locations, such as corridors and walls. Although this information may be available digitally on servers, having the information present where it is regularly seen by other teams is a more effective tool. It may be worthwhile within the office to create a prominent physical area where each team posts their current work such that other team members can see at a glance where each team is going (Ashcraft, 2011a: 8).

Regular pull planning (discussed further in chapter 8) is a useful coordination exercise because it focuses on the decision interchanges between teams. In order to pull plan to a milestone, the teams must request and promise information and deliverables from each other, which exposes coordination issues (Ashcraft, 2011a: 8).

Information management can become a significant obstacle on any project where data is shared between offices and translated from one software platform to another. Even if software systems are adequately interoperable, the information embedded in digital models needs to be appropriately categorized, labeled, tracked, and archived to ensure it is valuable and useful to all parties. This requires that project standards and procedures be established by the core team. In addition, if any project information will be repurposed, the parties that create and use the information must agree on how design and construction elements will be represented in the shared model. On larger projects with specialized needs such as high-performance energy modeling, technical programmatic elements, and crucial acoustic or information display aspects, the information requirements are often sufficiently challenging to require a separate team focused on establishing information standards and requirements in these areas (Ashcraft, 2011a: 8–9).

Developing Team Culture

Our culture is what is familiar, recognizable, habitual—
It is "what goes without saying."

(Van Maanen and Laurent, 1993)

Team Mergers

Project delivery teams are different from the types of teams that might be found within a discrete organization such as a single design firm or a construction company. They are assembled for the specific task of delivering a building for an owner. Therefore, project delivery teams may be called purpose-built teams, meaning they serve a function for a specific project and duration of time and are often dissolved after the function is completed (Clark, 1997).

Project delivery team members represent different companies that have unique management styles, incentives, and working cultures. In this way, the establishment of a project delivery team is not unlike a corporate merger, and often undergoes many of the same challenges. When the process is successful, what results is a well-structured, high-functioning team that shares a common culture (Figure 4-8). But mergers often fail because of

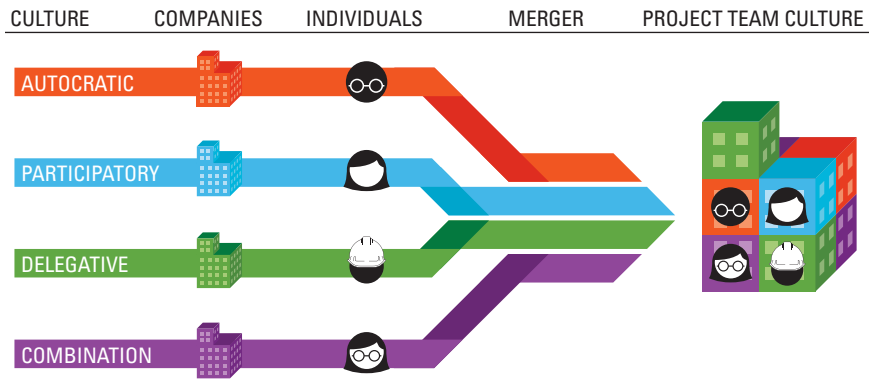

Figure 4-8 Team mergers

cultural incompatibility. The success of the team will depend on how well these cultural issues are addressed (Ashcraft, 2011a:3).

If team leaders don't have influence over choosing partner firms based on their level of compatibility with regard to a firm-wide commitment to collaborative practices—and likely some of the partner firms will not have a sympathetic culture—they will need to spend time building a project-based culture. This approach is not ideal.

If project and corporate cultures differ, employees are placed in an awkward position where they feel the need to comply with inconsistent norms. Therefore, in order to thrive, collaborative project teams need to create project cultures that include the diverse characteristics of the individual personnel and companies that merge. Not only does this diversity provide more information to inform the design, but also the tension between perspectives stimulates greater creativity in individual team members (Ashcraft, 2011a: 5; Schein, 2010).

Cultural Leadership

A firm's culture reinforces the behavioral norms and beliefs that may have attracted like-minded employees to join the firm in the first place. This combination of self-selection and reinforcement is often resistant to change and can affect performance because most employees act in accordance with their corporate culture. In some instances, this strengthens the team. In other instances, it will hamper team effectiveness (Ashcraft, 2011a: 3).

One way to combat some of the difficulties in developing project delivery team culture is through cultural leadership. Team leaders must help facilitate the change from old cultures into the one new cultural identity. This is done through cultural innovation, followed by cultural maintenance.

Cultural innovation includes creating a new culture by recognizing past cultural differences and setting realistic expectations for change. Then the leaders adapt former corporate cultures by weakening and replacing the old cultures (Figure 4-9).

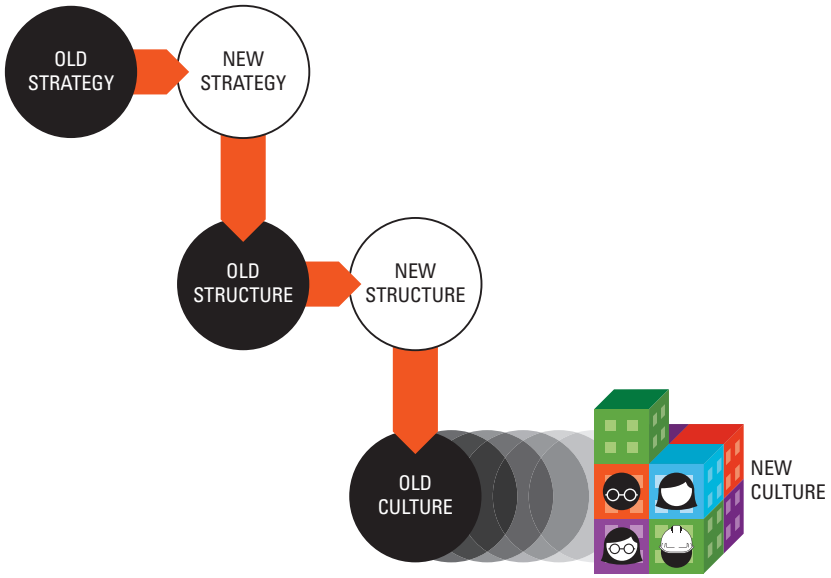

Figure 4-9 Changes in culture

Finally, leaders maintain unique project team cultures by integrating the skills and behaviors of the project team members. This includes establishing, affirming, and keeping the new culture in the forefront of team members' minds (Schein, 2010; Weiner, 1988).

In collaborative delivery, traditional forms of segmented project phases are abandoned, leading to a new opportunity to structure integrated teams. This approach requires a supportive culture that fosters information sharing, transparency, and constant feedback. Unlike old strategies and structures that can be implemented by leadership intervention and contractual adjustments, the cultural shift toward more collaborative practices requires continuous negotiation by leaders and teams.

Effective leaders recognize that culture is built on the collective beliefs, values, and behaviors of individuals. Beliefs of individuals inform the values of an organization, and the values of the organization grow to become the corporate culture. Sometimes it is difficult to distinguish the beliefs and values of the individual team members from the firm culture that fostered them. However, behavior is an outward manifestation of inward underpinnings—a telltale sign of a collaborative, or conversely, a closed operational state (Hofstede, 1997).

CASE STUDY EXCERPT: ODEGAARD LIBRARY RENOVATION

Oftentimes teams do not have influence over the type of procurement method used in public projects. In projects where such structures work against collaboration among stakeholders, teams can overcome these barriers through communication, trust, and commitment. Sometimes this is accomplished through contract addenda or nonbinding project documents that define the roles and responsibilities of all participants and outline collectively defined procedures that all team members agree to comply with throughout the project.

Project Details

Architect: The Miller Hull Partnership

Owner: University of Washington

Contractor: Mortenson Construction

Key subcontractors:

- Mechanical—Hermanson
- Casework—ISEC
- Electrical—VECA
- Structural engineering—Coughlin, Porter, Lundeen
- MEP engineering—AEI Affiliated Engineers
- Signage and graphics—Mayer/Reed

Location: Seattle, WA

Type: Institutional—renovation

Project duration: August 2011–June 2013

Cost: $10.7 M

Size: 165,000 GSF total; 56, 000 SF renovated

Project delivery: CM at-risk

Introduction

The Miller Hull Partnership is a 55-person firm based in downtown Seattle, Washington, with offices in San Diego, California. Founded in 1977 based on the principles of socially responsible and humane public architecture, the firm works

Figure 4-10 Odegaard Library interior *Image courtesy of The Miller Hull Partnership*

on a broad range of project types and scales with an emphasis on simple, innovative, and authentic designs.

Headquartered in Minneapolis, Minnesota, Mortenson Construction is one of the United States' top builders, providing a complete range of services, including planning, program management, preconstruction, and general contracting since 1954. For over a decade, Mortenson has applied lean principles both inside the organization and on projects in order to enhance the economy, efficiency, and quality of each project as well as the overall experience of each team member.

In 2011, Miller Hull partnered with the University of Washington's Capital Projects Office and Mortenson Construction on the interior renovation of the Odegaard Undergraduate Library (Figures 4-10 and 4-11)—one of the most utilized study and research spaces on the university's campus—to better serve students by creating individual and group study spaces, innovative and interactive classrooms, and a highly efficient building.

The UW Capital Projects Office selected CM-at-risk as the project delivery structure from the state-approved methods (which did not include IPD as an option). Miller Hull was chosen as the architect from a short list and helped choose Mortenson Construction as the GC/CM, both contracted separately under traditional two-party agreements. State funding stipulated a compressed two-year timeline for both design and construction, so the core team was challenged to rethink the way a traditional project was structured in order to meet the project deadline (Figure 4-12).

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Figure 4-11 Odegaard Library interior prior to renovation *Image courtesy of The Miller Hull Partnership*

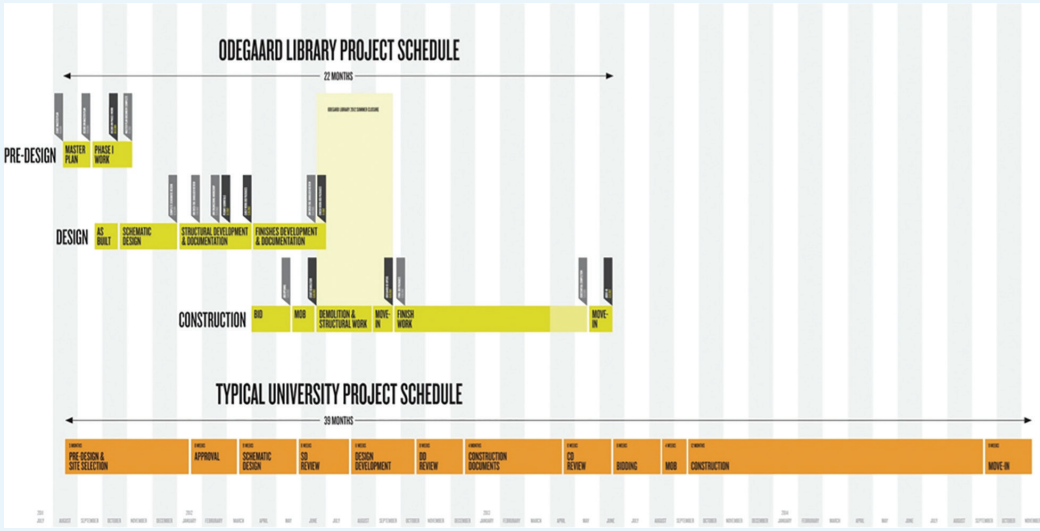

Figure 4-12 Project timeline compared with typical university project schedule *Image courtesy of The Miller Hull Partnership*

Collaboration and Culture

UW Capital Projects Office Director Eric Smith and Assistant Director Steve Tatge addressed the particular scheduling challenges of the project and the need for a collaborative approach in the initial project RFQ. The willingness of Miller Hull and Mortenson to engage in this process and the support from the leadership in each organization was key to their respective selection.

Thanks to their early involvement, Mortenson participated in initial visioning workshops, which were able to address design as well as construction. For the design team, the GC's early input on constructability and pricing helped to quickly vet the conceptual and schematic designs and was critical in determining what scope could be afforded in this first phase of the multiphase project.

According to Sian Roberts, partner at Miller Hull, "The team was really interested in trying to push the idea of how close we could get to an integrated design process within the CM-at-risk project delivery structure we had been given by the state. That was the goal that was set out: How can we make this a model of how we do projects going forward?"

With this goal in mind, the core team utilized lean design tools and wrote the project *Collaboration Guide* (Figure 4-14), which was a nonbinding document that grew out of executive level meetings between Smith, Roberts, and Jim Yowan, the Seattle head of Mortenson Construction. The guide established the team's shared goals and desired means and methods of communication and collaboration. "I am sure if I had asked our contracts office, or the attorney general's office at the university, 'Is it okay to do this?' they would have probably told me, 'No'," said Tatge. "We didn't ask."

Examples of goals that were tracked via an online dashboard (Figure 4-13) ranged from

Figure 4-13 Project goal tracker *Image courtesy of Mortenson Construction*

(*continued*)

(*continued*)

Integrated Project Delivery Charter for GCCM Public Delivery
Odegaard Learning Center Phase 1 Renovation
University of Washington

Collaboration Guide

Executive Summary

This Guide is intended to align the Parties and their interests toward achievement of a successful Project through the practice of Integrated Project Delivery (IPD) techniques, while conforming to the requirements of GCCM public contracting delivery. This guide in no way alters the contractual obligations set forth in agreements between Owner and Contractor, and Owner and Architect.

Desired outcomes which shall determine project success are:

1. Completing the project in two years
2. Providing for seamless transition from design to construction to occupancy
3. Maximizing scope and value
4. Recording no OSHA reportable safety incidents
5. Producing higher-quality work
6. Executing the project in lean fashion to eliminate waste
7. Showcasing this project to UW and the building industry
8. Having fun

This Guide provides for these outcomes through:

- Rewarding desired behaviors within boundaries of RCW 39.10;
- Alignment of risk and reward with each Party's ability to control risk in separate contracts between Owner and Architect and Owner and Contractor;
- Creating a culture of partnership among Parties;
- Creating an open environment for information-sharing;
- Integrating operating, design, and construction knowledge;
- Early selection and involvement of key subcontractors and consultants;
- Building virtually before building physically through the use of computer modeling and other available technologies for design and construction planning, with focus on:
  - o Reducing redundant efforts and conflicts,
  - o Improving means and methods, and
  - o Increasing opportunities for the use of pre-fabrication and off-site construction; and
- Creating relationships at the beginning of the design phase with the intention that the relationships and associated commitments will continue through the construction phase and the turnover of the building for occupancy.
- Taking time for each of the parties to learn about and understand the other's business.

Figure 4-14 Collaboration guide cover page *Image courtesy of Mortenson Construction*

completing the project in the allotted time to maximizing scope and value, producing higher quality work, and having fun. Processes included rewarding desired behaviors, aligning risk with reward for all parties, creating a culture of partnership and information-sharing, early selection and involvement of key subcontractors and consultants, and utilizing BIM to reduce conflicts and increase opportunities for offsite construction and prefabrication. Additionally, the guide prescribed a commitment to relationship building and dedicated an entire section to trust:

> The parties accept the relationship of mutual trust and confidences established with each other by these principles, promise to furnish their best skill and judgment, and to collaborate and cooperate with each other and with other Project participants in actively pursuing an integrated project and furthering the interests of the Project. The parties recognize that each of their opportunities to succeed on the Project is directly tied to the performance of other Project participants. The parties shall therefore work together in the spirit of cooperation, collaboration, and mutual respect for the benefit of the Project and within the limits of their professional expertise and abilities.

Collaborative Working Environments

Because the core team members were all local to Seattle, regular face-to-face communication and coordination meetings were possible. Rob Warnaca from Mortenson Construction was based out of Miller Hull's office a few days a week during design to ensure the GC/CM and architect were working together effectively. During construction, a representative from Miller Hull was located on site for the year, which is common on major projects at the university. This is a cost the owner incurs because they recognized the value of having the architect immediately available to address issues that arise during construction.

The *Collaboration Guide* outlined how IPD principles would form the basis of the team's approach. Examples of such principles included: reliable promising, or the willingness and ability of all team members to make and secure reliable promises as the basis for planning and executing the project and utilizing BIM as a tool for collaboration, communication, cost estimating, and understanding and visualizing the design.

The team used lean design techniques of pull planning, target value design, value stream mapping, scorecards, and project goals to help them proceed efficiently through the design and construction process (Figures 4-15, 4-16).

Figure 4-15 Colocation and pull planning exercises *Image courtesy of Mortenson Construction*

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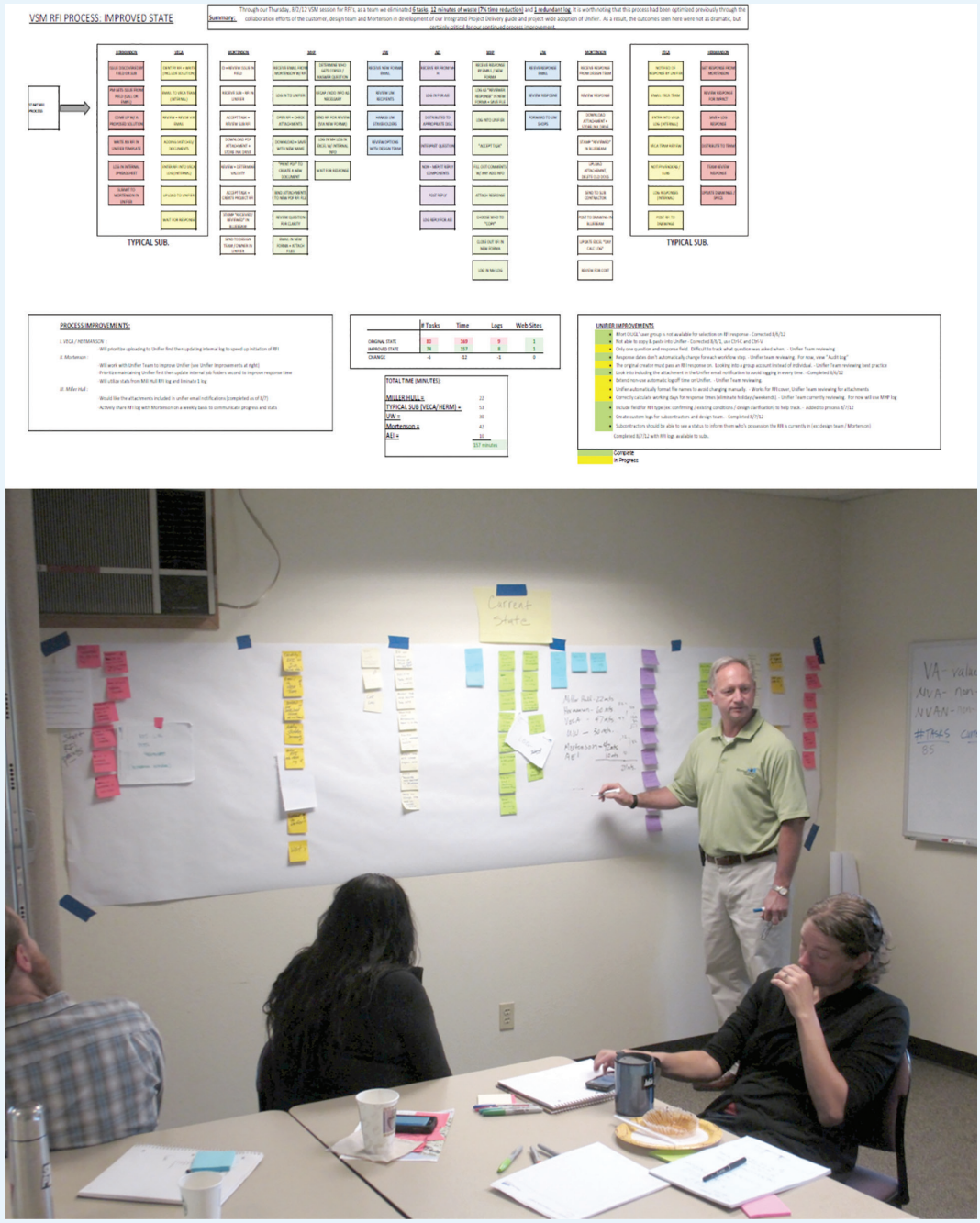

Figure 4-16 Value stream mapping process *Image courtesy of Mortenson Construction*

Mortenson led the implementation of these tools, having past success with their implementation on projects, and managed a project dashboard for project coordination and tracking project goals. Additionally, a BIM execution plan helped establish guidelines and procedures for the technological implementation.

According to Roberts, the pull planning exercises were most successful on the design process side for the architects. Though all members of the architecture team had participated in pull planning exercises in the past, the use of these tools by the contractor to streamline the design process in order to expedite critical information related to construction sequencing was of unique benefit. "Our design team needed to know right away what they needed to be focusing on," said Roberts. "If they hadn't, they would have been looking at the design in a typical way, trying to bring everything up at the same level. It also allowed us to establish quantifiable goals right away by setting project milestones."

Members of the team colocated both during the design phase and during the construction phase, which all team members identified as adding value to the project (Figure 4-17). "This sort of interaction is really powerful. It creates a mutual ownership of the design; it is not as though the design team designed it and the contractor is trying to build it. They both own all aspects of the project because they had input in it. It also builds a personal rapport," said Tatge.

The collaborative process developed by the team is an example of how each team can

Figure 4-17 Completed library interior Image courtesy of The Miller Hull Partnership (*continued*)

(*continued*)

customize their working methods regardless of contract structures. "I don't necessarily think the process of putting together a collaboration guide is always the right approach, especially if you have people who aren't as excited about collaboration," said Roberts. In these cases, she suggested a better approach might be less direct—demonstrating an openness and willingness to explore nontraditional ways of solving problems, listening, and being interested in others' perspectives. "Start by being the person who is going to be accepting of collaboration, and you will get other people to follow you."

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 5

Maintaining Collaborative Teams

Project Team Size

A team's size should match its purpose. Large teams of twelve or more are better at developing alternative project solutions but are less effective in accomplishing more detailed tasks. Smaller teams of three to four participants may have limited skill sets and a lack of diversity that limits their collective knowledge and creativity. Research has shown that the most effective teams are neither large nor small. A good rule of thumb is to keep working teams between five and nine members (Figure 5-1) (Ashcraft, 2011a; Robbins and Judge, 2011).

Appropriate team size is maintained by assembling a team no larger than necessary to accomplish its assigned task (Hackman, 2011; Larman and Vodde, 2008). Larger teams have trouble coordinating with one another, especially under time pressures. If the task is too large for one efficient team, the task should be broken into subtasks or subteams (or both) (Figure 5-2). Keeping teams small reduces the information loss among members and creates greater individual accountability. Because the members of smaller teams know what each member is doing, it is hard for anyone to reduce his or her efforts without other team members noticing the imbalance (Ashcraft, 2011a).

Unless a project is quite small, no team can do everything by itself, and unless a project is developed and funded internally, no team can do so without an owner or developer to financially back the project. Thus, a key element of team organization is structuring teams to achieve both large-scale objectives and fine-grain focus (Figure 5-3) (Ashcraft, 2011a).

In most projects, specific teams are created that handle the design and eventually the construction of specific elements, systems, or physical areas of the project. A team working to specify

This chapter includes excerpts from *IPD Teams: Creation, Organization, and Management* (Ashcraft, 2011a). Available at www.hansonbridgett.com/Publications/pdf/~/media/Files/Publications/IPD-Teams.pdf. Thank you to Howard Ashcraft for permission to repurpose this content.

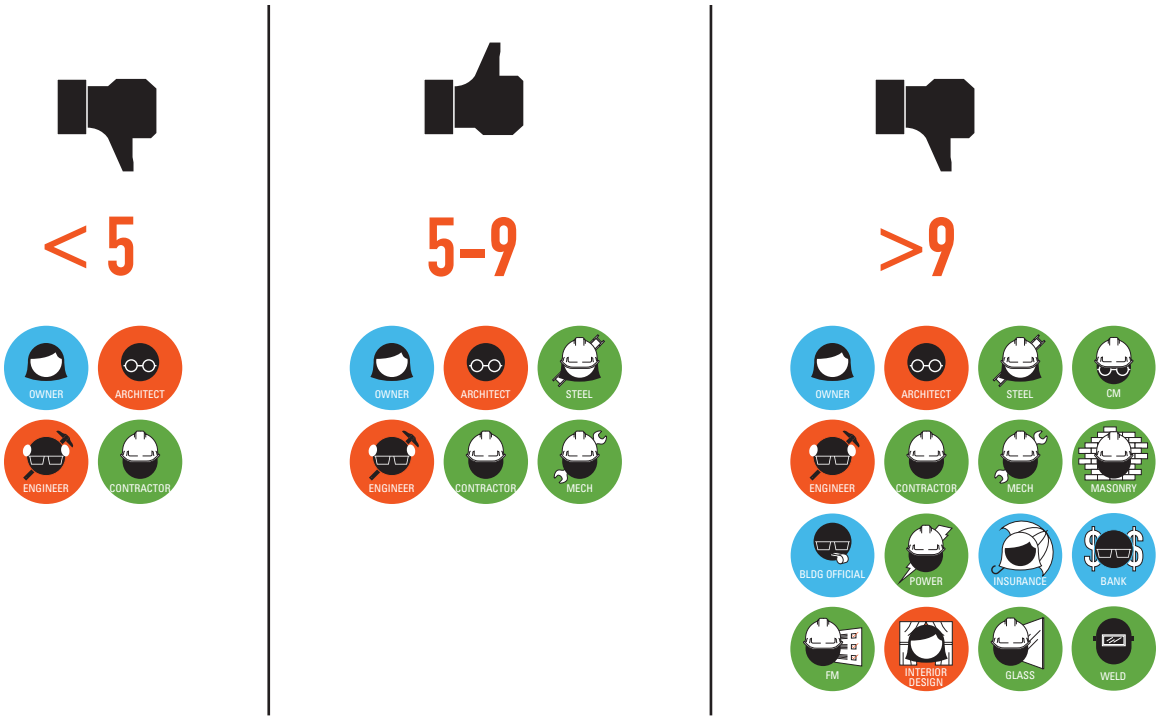

Figure 5-1 Project team size

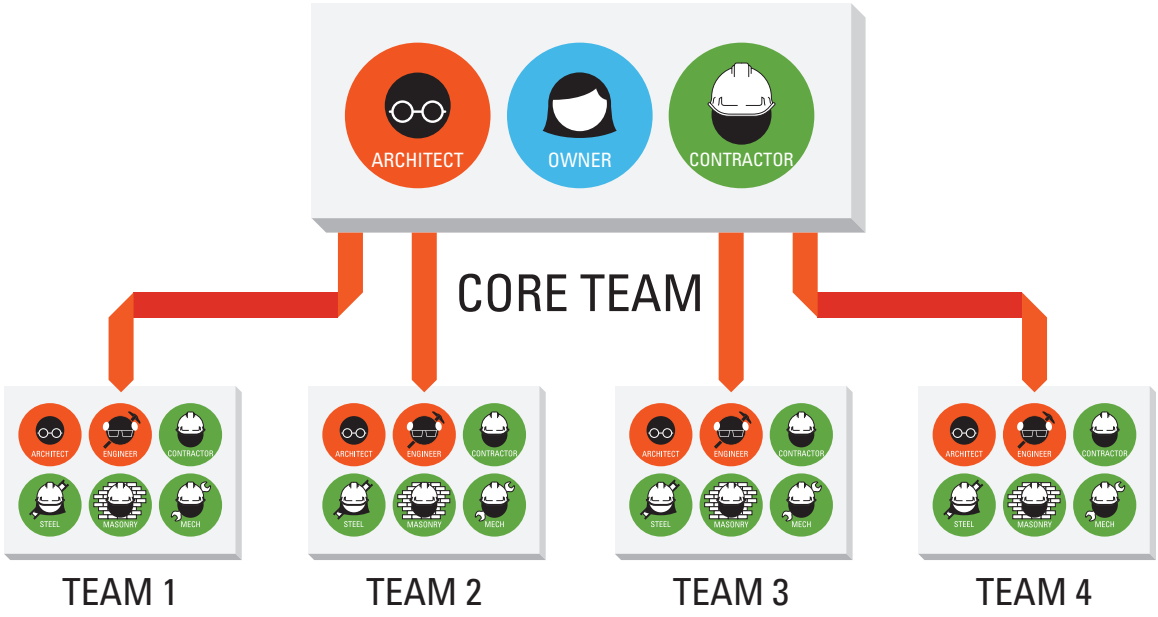

Figure 5-2 Subdivided tasks

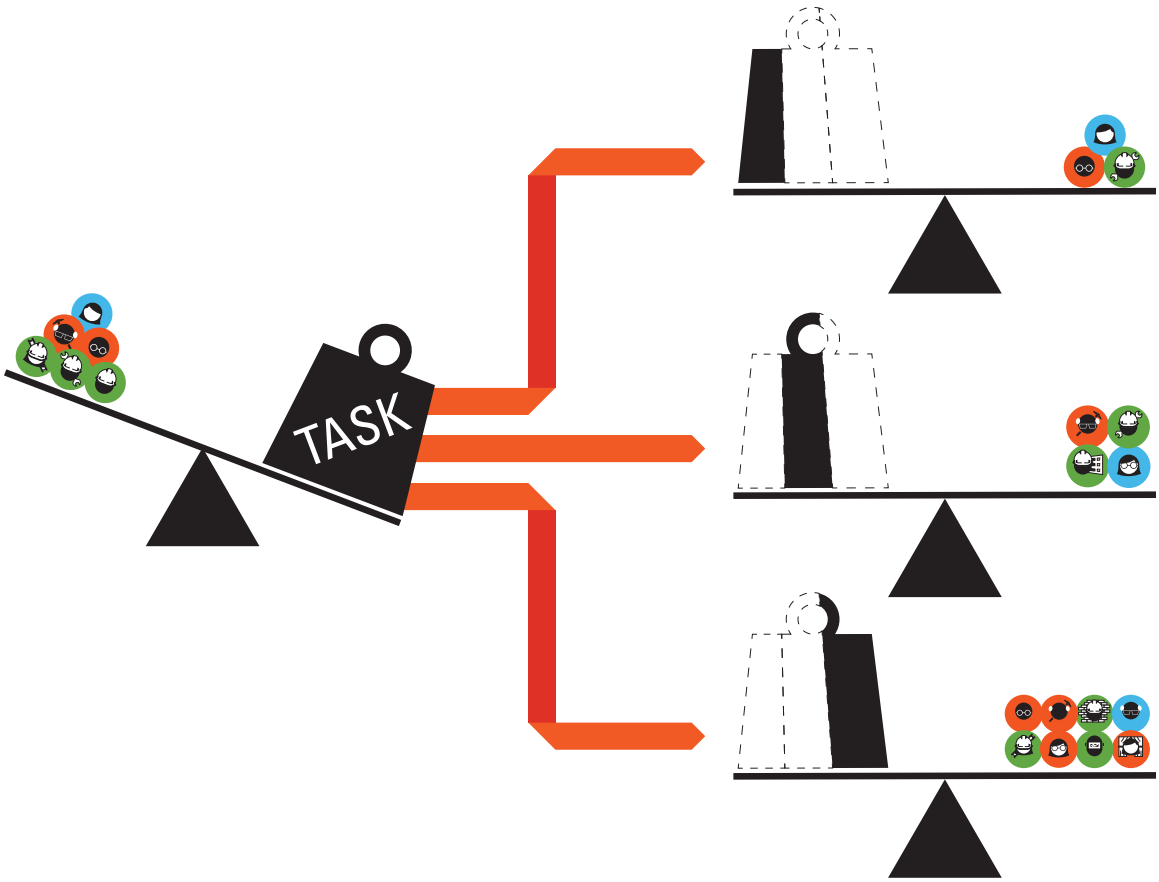

Figure 5-3 Subdivided team

the mechanical equipment for a floor of a large hospital, for example, would generally report to a team responsible for overall MEP system coordination for the entire building. Similar approaches could be used for foundations and structures, framing and exterior skin, and other building systems. One strategy for establishing team boundaries is to assess areas of historical failure, such as intersections at slab edges between primary enclosure systems and fundamental waterproofing systems, and assure that the team contains personnel with responsibility for both sides of a problem interface (Ashcraft, 2011a).

Cross-Functional Teams

Ideally, teams should be interdisciplinary and cross-functional (Figure 5-4). Interdisciplinary teams are composed of members with different training and experience. For example, a design phase team composed of an architect, mechanical engineer, mechanical contractor, and general contractor is interdisciplinary. However, all team members may be focused on design during that phase (Ashcraft, 2011a).

Cross-functional teams are composed of members with differing responsibilities. Their functions

Figure 5-4 Cross-functional team

vary, as well as their backgrounds. For example, a cross-functional collaborative team should jointly design a portion of the project and should also be responsible for managing the cost, meeting the schedule, constructing, and commissioning the work. Scope, schedule, and budget should be tightly bound within the team and not delegated to separate departments (Ashcraft, 2011a).

Cross-functional team structures have been highly successful in manufacturing and software design industries. Boeing, Toyota, IBM, and others have formed teams made up of members from different internal groups that have the sole responsibility for a product or a portion of a product from conception through creation, including sales and marketing (Demming, 1982). The tendency is to allow the core management team to be cross-functional, but research demonstrates that true cross-functional team effectiveness occurs at the working level (Larman and Vodde, 2008).

Whenever possible, the team should have responsibility for all components necessary to achieve the project goals and should be responsible for coordinating with other teams. Responsibility for a discrete, complete portion of the project reduces errors at the interface between disciplines and promotes ownership and pride in the whole (Demming, 1982).

Functional teams are generally assembled around related systems, such as MEP or foundations and structural systems. These teams then provide their recommendations or pass along their work to a higher-level team with broader responsibilities. The higher-level team operates as an information accumulator, a coordination team, and a group that passes work down to the functional teams. Evidence from software development indicates that teams should take direct responsibility for coordination rather than relying on an outside supervisor, though self-coordination may become difficult in larger projects (Larman and Vodde, 2008).

Stability of Teams

Time is clearly an important factor when building long-term relationships. In an architecture firm setting, this might mean that a team member can be trusted to

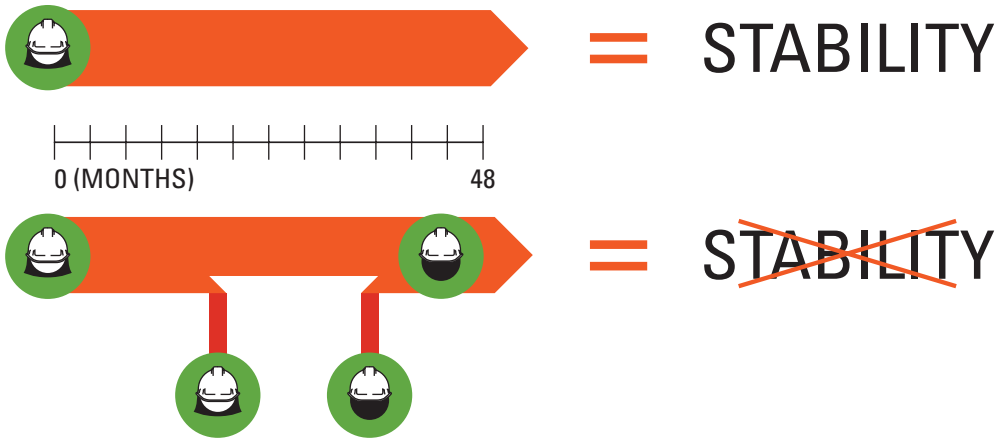

Figure 5-5 Team stability

deliver at a high level of performance on time because they have consistently done so in the past. Without a shared history, team members have a harder time building relationships, and thus the firm has a harder time building a culture of trust and collaboration.

In project teams, personnel turnover can increase waste and limit team effectiveness. Construction teams are often short-lived, with members moving in and out of the team as work increases or decreases. This practice is contrary to research that suggests healthy dynamics and higher performance are a direct result of team member stability. Research has shown that consistent teams have a common lifecycle of productivity: They increase their effectiveness for a period of three to four years, decline in productivity for a time as they become comfortable and fall into routine practices, and then rebound again (Ashcraft, 2011a).

Many construction projects are completed in less time than it takes to develop optimal team dynamics. Even in longer-term projects, handoffs in primary responsibility between phases from one core group to another increase project turnover and shorten interaction time. However, there are several strategies to counteract this effect and improve knowledge transfer and performance in both stable and transitory teams (Katz, 1982; Ashcraft, 2011a).

First, the design team should be the same as the working team, with as little change as possible to the core personnel (Figure 5-5). Not only is less information lost in transition, but a shared history is established, so the team does not need to duplicate time rebuilding relationships and trust. Second, if an owner has multiple projects planned, engaging the same team will increased effectiveness overall because of their shared experience, assuming the team shows continuous improvement and utilizes substantially the same personnel (Figure 5-6). Third, firms should identify employees who are skilled in building relationships and have experience in collaborative project delivery. These in-house experts should be deployed as consultants to work with each new project team to implement lessons learned as well as best practices (Ashcraft, 2011a).

If firms do not yet have such expertise in-house, they should consider hiring a consultant to work with them and project leaders to build this capacity or identify this as a skill set to seek out in future hires. Outside consultants, sometimes referred to as facilitators, help to create a cohesive project culture from the merger of unique companies involved in the project (Figure 5-7) and aid teams in implementing and establishing best practices during the

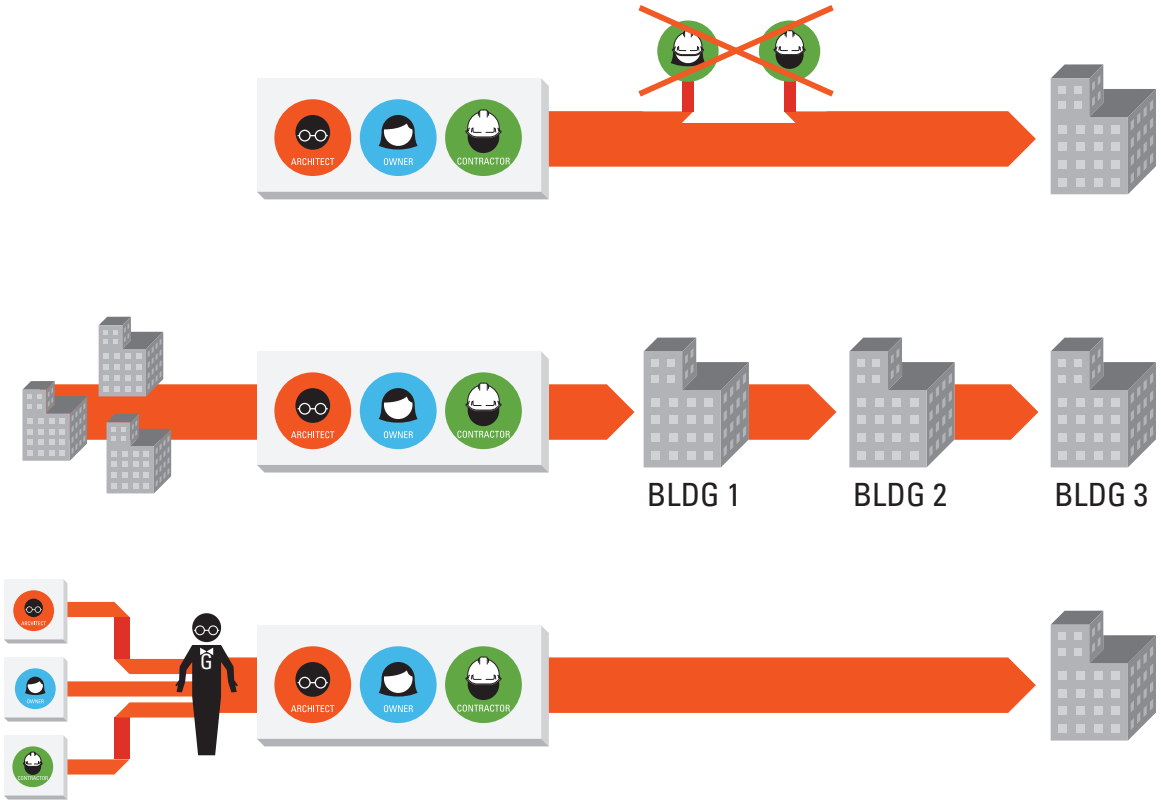

Figure 5-6 Increasing team effectiveness

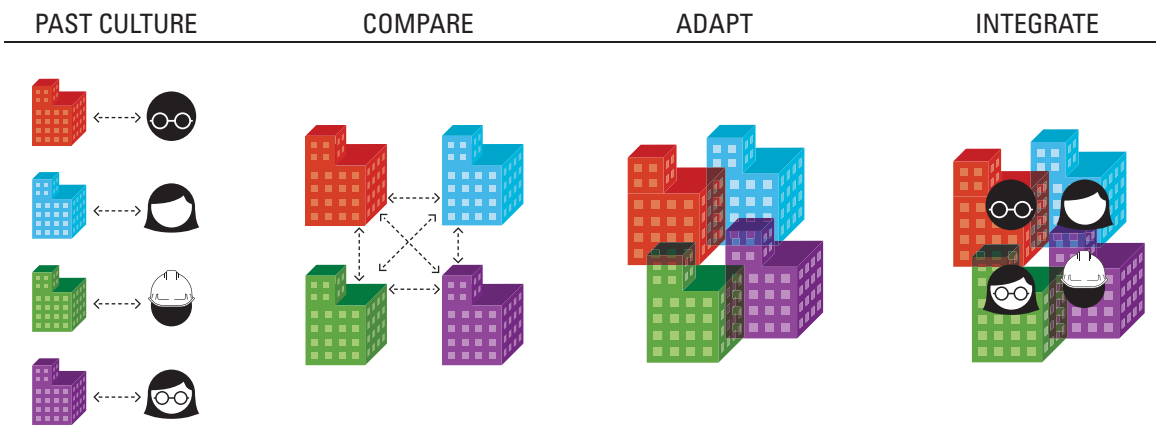

Figure 5-7 Developing shared culture

initial team-building stages in order to achieve high performance over the course of the project.

Finally, firms should actively reflect on and adjust interteam dynamics during projects and institutionalize the knowledge of how to establish collaborative workflows in their training programs and project standards. If a firm has teams that are stable for long periods of time, it may be wise to begin mixing in new members or have the team engage in "creative disruption," or an intentional departure from team norms, to counteract the performance slump associated with long-term team lifecycles (Ashcraft, 2011a).

Assessment

A study of high-performance collaborative research teams found that a common characteristic was frequent assessment of team functioning to promote continued adherence to the goals and processes agreed upon in the initial team-building phase. During this reflection, team members evaluate what is working, what is not, and what can be done to make necessary adjustments. Methods of evaluation range from informal surveys that are collated by a team member and shared with the group to more formal online feedback tools that allow each team member to respond to questions as well as provide individual peer reviews (Cheruvelil et al., 2014).

Other common forms of assessment include 360-degree surveys that provide feedback not only from supervisors but also from peers and subordinates regarding a person's technical and interpersonal competencies (Biech, 2010). Assessment center evaluation is a type of feedback that assesses future potential rather than past performance through a series of role-play interactions, judgment-based problems, strategic plan development, verbal communication skill assessment, and personality inventories. "The experience is job-relevant, realistic, and covers a broad range of leadership challenges so that leaders can be observed using their entire repertoire of skills" (Biech, 2010).

Research in sociometrics, which are measures of how people interact with one another, is being conducted at MIT to identify quantifiable scientific data regarding how teams communicate with one another. Through the development of discrete sensors, researchers are able to collect data on team members' tone of voice, position relative to other team members when talking, body language, how much they talk versus how much they listen, how much they interrupt, and levels of extroversion and empathy. They have determined that up to 35 percent of the delta in team performance is related to effective communication (Pentland, 2012).

The sensors have been deployed in high-performing teams and have identified the following common characteristics related to effective communication:

- Everyone on the team talks and listens in roughly equal measure, keeping contributions concise.
- Team members face one another when communicating, and their conversations and gestures are energetic.
- Team members connect with one another—not just with the team leader.
- Members carry on back-channel or side conversations within the team.
- Members periodically break, go exploring outside the team, and bring information back (Pentland, 2012).

Through feedback based on clear graphic visualizations, the researchers are able to provide regular tracking of communication metrics that help teams adjust their behavior to become more collaborative (Pentland, 2012).

Coaching and Feedback

Coaching, the process of providing specific, descriptive, positive feedback intended to maintain and improve performance, is a mechanism that leaders and teams can use not only to evaluate each other's performance but also to implement strategic change when needed. Coaching requires a supportive relationship be established previously between parties to allow feedback to be perceived as constructive rather than critical. Research shows that providing coaching strategies for making positive change in addition to feedback (objective observations about behavior) increases subsequent performance, particularly in situations where team members have fallen below expected performance levels (Lussier and Achua, 2013).

Coaching works best between people who have an established relationship and when provided in a consistent manner. The fundamentals of coaching are simple in theory but require nuanced application in practice. They include the following:

- Give positive feedback in addition to addressing concerns.
- Avoid blame and embarrassment.
- Focus feedback on behavior, not on people.
- Encourage self-assessment.
- Be specific and descriptive.
- Suggest tactics for addressing concerns.
- Model best practices.
- Provide training where needed.
- Follow up on progress (Lussier and Achua, 2013).

Leaders must understand that people almost always respond negatively to aggressive or public admonishment and when critique of actions is conflated with critique of the person performing the actions—all of which are forms of criticism. This leads to demotivation—defensiveness, disengagement, embarrassment, and/or discontent. The opposite of motivation, this mindset results in team members doing the minimum required, not taking risks, covering up errors, and avoiding contact with other team members. By focusing on the process rather than the person and on positive alternatives rather than negative actions, team members are much more receptive to feedback. This has an overall positive effect on people, behavior, and performance (Lussier and Achua, 2013).

COLLABORATIVE FROM THE START—A CONVERSATION WITH CLARE OLSEN AND CARYN BRAUSE

Caryn Brause, AIA LEED AP, is an assistant professor at the University of Massachusetts–Amherst and author of The Designer's Field Guide to Collaboration. *Clare Olsen, RA, is an associate professor at Cal Poly–San Luis Obispo and coauthor of* Collaborations in Architecture and Engineering. *The two engaged in a discussion about their research on collaborative teams in practice as well as the need for architecture education to respond to—or potentially lead—the development of leadership and collaboration skills in architects.*

Caryn Brause: Architectural educators frequently talk about collaboration, but we don't always give students specific tools to identify when to collaborate, why to do it, and even when not to collaborate. In practice, I collaborate daily with many different types of

people—clients, consultants, fabricators, and many others. When I considered the individually based nature of architectural education, I realized that this model was not actually how design takes place in daily practice. I wanted to engage students by simulating the experience of collaborative practice while encouraging these beginning designers to gain confidence in the iterative design process.

So I started to experiment with different structures that ultimately led to the development of my book, which explores various collaborations including community engagement, partnerships with a broad range of consultants and clients, and current practices such as IPD and BIM. Many of us are interested in these topics because we care about design. I felt that much of the discussion concerning collaboration doesn't foreground design, which I wanted to emphasize. The case studies in the book are good examples of projects where working with somebody else has led to a design transformation that they would not have been able to achieve working by themselves.

Erin Carraher: It's curious that in each of our research, a large focus is on case studies. Do you think this is because there isn't yet enough codified knowledge about the topic of collaboration in practice for there to be frameworks or models in place?

Clare Olsen: We found there is no set formula. There are so many ways in which practitioners collaborate. Part of the goal of doing the case studies for our book was that we would learn about the various methods and combinations of practices that lead to innovation. It's through these discoveries that Sinead MacNamara [co-author of *Collaborations in Architecure and Engineering*] and I were hoping to learn things that could inform what we're teaching our students. Some of that was structural, having to do with contracts, while other aspects had to do with working methods and basic communication.

I think the current move to a more collaborative approach represents a major cultural shift in the way we practice and the way we teach students. It will likely take some time to bring the conversation—and existing and emerging education models and best practices—to the national dialog.

Carraher: It seems like at the least there needs to be some sort of common foundation—a shared discourse. But I imagine the best way to get every architect to rail against the idea of collaboration would be to put forward a theory or process for how to do it. Do you think there could ever be any sort of centralized model or commonly accepted approach to teaching collaboration skills to architects or collaborating in practice, or is this a fruitless endeavor because every project and project team is so different?

Brause: This is an excellent question—could there be a unified theory, or at least a set of unified methods? The essential issue is whether we could develop a minimum set of practices for students that could stand up against the incredible variety of situations encountered in the diverse types of practice? We should endeavor to establish a set of basic methods and a shared vocabulary that emerging practitioners would understand so that within ten years everyone would be out in the field knowing these basic practices. If so, how would that transform practice? Practice itself is already transforming; it's just that some people who enter the profession better at collaborative practices are moving more quickly.

Carraher: I think there is such a lack of information in our profession about these fundamentals that are so thoroughly addressed in other disciplines like business and marketing. It might be that it needs to start with a common understanding of language and basic

(*continued*)

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empathy. Maybe there is a communication and collaboration fundamentals class that then leads into more tools and techniques.

Olsen: Because of the way in which we are trained as architects—and hopefully this is changing—ego inevitably contributes to the lack of collaborative behavior. Egos can get in the way, and not everyone wants to share credit. There's a quote in our book from an Arup engineer that I really like: "You have to know when to share credit and when to give credit where it's due." There are different occasions for each, and it takes a certain kind of savvy to distinguish between the two that is very difficult to teach.

Brause: One of the challenges to teaching collaboration in the academy is the lack of hierarchy, because in the real world hierarchy is everywhere. In a simulated academic model, how do we establish leadership? For example, do we wait for leadership to emerge or do we assign and rotate leaders? A second challenge concerns teaching design projects to interdisciplinary groups of students such as architects, landscape architects, and engineers. While we appreciate that these specific groups each have clearly defined roles, educators must help these diverse students establish a common language, determine a shared vision, and create a mutually beneficial working method.

Carraher: We've been developing a model where students have assigned roles not in the design process but in the collaboration process. Students have specific roles in terms of establishing graphic standards, determining schedules, keeping up communication, etc.

Olsen: In our collaborative course with architecture and engineering students, I found myself needing to describe what architects value, which was incredibly challenging to do. I put together a series of presentations about contemporary practice that may not have been comprehensive but seemed to help establish common understanding. Describing the experience of a space and all the factors that contribute to it allowed the engineers to relate, and that value became shared. On the flip side, we were talking about geometry as a critical factor in designing efficient structural form, which helped the architecture students understand the value of geometry as a parameter. So it was interesting that bringing the students together in this collaborative course actually helped us to articulate what's valued in each discipline—that was a benefit I didn't expect and helped establish common ground.

Brause: I'd like us to move beyond the appreciation for disciplinary expertise and recognize that no one can know everything. With this realization, we can teach an appreciation for what our diverse partners bring to the collaborative process, regardless of their disciplinary expertise. If we understand that no single person can know everything, and appreciate that all of our partners bring their unique talents and approaches to the project, then we can achieve a genuine sense of empathy in our work. Instead of insisting, "I want my way! Why are you getting in my way?" we can ask, "What are you bringing that I couldn't possibly bring to this endeavor?"

I also think that we need to reposition these social, emotional, and communication skills as professional skills. How do we teach students to be curious about what another collaborator is bringing to the project, and how can that transform the endeavor? This approach can help whether an architect is working with a community group, engineers, contractors, code enforcers, or people from other cultures. If one can become more curious, then we can learn something truly valuable that we can apply to our projects.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 6

Development Stages

Stages of Team Development

When teams are initially formed and begin working together on a project, there is a period of time in which they are less than efficient. As members become more comfortable with each other, teams become more productive. By investing in the communication and trust-building activities described previously, teams may also become more collaborative. In any case, there is no guarantee that they will become high-performing, meaning they achieve exceptional results by establishing a strong, cohesive culture in which teams operate based on an explicit set of principles and where values are widely shared (Lussier and Achua, 2013). High-performing teams are beneficial to firms in terms of efficiency and profitability as well as excellence in design outcomes, so it is important to understand how they develop over time.

In 1965, Bruce Tuckman developed a model to describe the stages of development teams go through on the way to becoming high-performing. He refers to the stages as *forming*, *storming*, *norming*, *performing*, and *adjourning* (Tuckman, 1965). Tuckman's stages (Figure 6-1) provide a framework for understanding team effectiveness over time, a way of appropriately evaluating team behavior during each stage, and a way of providing feedback to improve behavior when necessary. Leaders need to be keenly aware of these stages to gauge their level of involvement and adjust their leadership style with the team as it changes over time.

Forming

In this stage, team members are introduced to one another. They state why they were chosen or why they volunteered for the team and what they hope to accomplish. Members cautiously explore the boundaries of acceptable group behavior. This is a stage of transition from individual to member status and for testing the leader's guidance, both formally and informally.

Common feelings and behaviors at this stage include excitement, anticipation, and optimism. There might also be pride in being selected for the project team, a tentative attachment to the team while searching for individual and group identity, or even suspicion and anxiety about the project team and the process. It is at this stage that teams determine what needs to be done in relation to who is on the team. As this structuring occurs, team members learn first-hand what is acceptable team behavior.

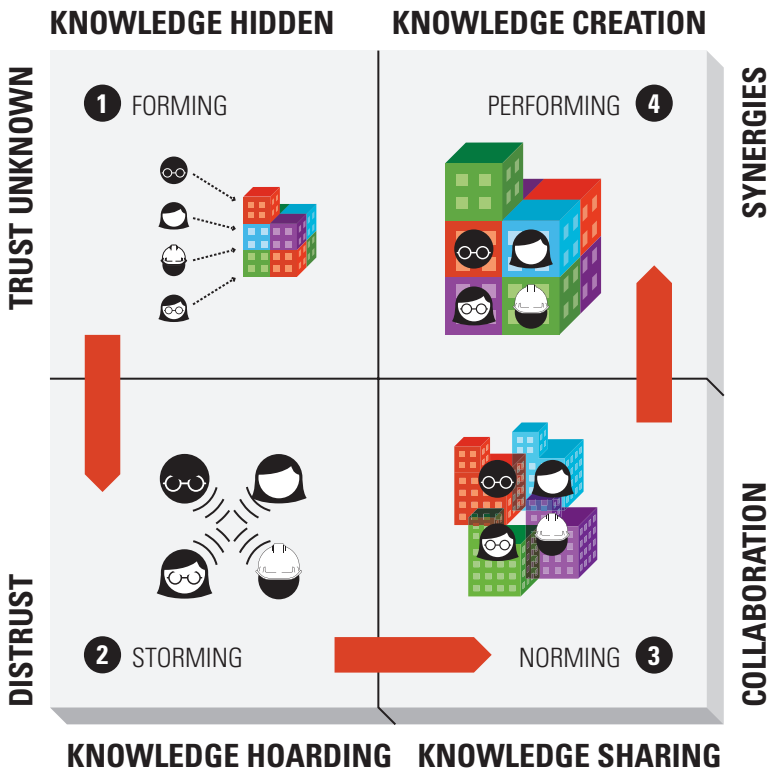

Figure 6-1 Team development stages

During the forming stage, abstract discussions of concepts and issues related to the project are often introduced and questions are raised. For some members, the time spent on this stage may be onerous, and they may experience frustration with the amount of energy expended with no quantifiable result. There is often difficulty in identifying some of the relevant problems at this early stage, when all aspects of the project seem to be in flux. The team's productivity is low during this stage, often accomplishing little relative to its overall project goals (Clark, 1997).

At the forming stage, teams depend on the leader for guidance and direction more than during any other stage. There is little direction on the team aim other than that provided by the leader. Therefore, the leader must be prepared to answer many questions about the team's purpose, objectives, and team members' relationships to one another. As collaborative project delivery is new to many stakeholders in the design and construction practices, leaders need to pay special attention to creating a climate of tolerance and patience with the process, understanding that this stage is necessary in order to achieve greater productivity later in the project and should not be rushed.

Storming

All members have their own ideas about how the process should proceed, and personal agendas are often rampant during the storming stage. Storming

is probably the most difficult stage for a team. Members begin to realize the tasks ahead are different and potentially more difficult than they had previously imagined. Impatient about the lack of progress, members argue about just what actions the team should take. They try to rely solely on their personal and professional experience and may resist collaborating with other team members whom they do not yet see eye-to-eye with on matters.

Often, teams in the storming stage experience the following symptoms: resistance from certain members to assigned tasks, resistance to quality improvements suggested by others, sharp fluctuations in attitude about the team's future success, and arguments over tactics even when the strategic goals of the project are clear. This conflict can lead to defensiveness, competition, and even the formation of factions within the team.

The storming stage can provoke questioning the wisdom of the owner or the qualifications of those who have been given leadership responsibility, as well as second-guessing the assignment of people to the team. In short, storming can be a time of disunity, increased tension, and territorial behavior, especially when members of the team are accustomed to more traditional delivery methods and communication channels. During the storming stage, decisions are not made easily or quickly (if they are made at all).

This phase is not necessary, but often occurs in newly formed teams. Leaders should note that it may take three to four meetings to move past negative storming behaviors. They should focus on reinforcing team goals during this time and keep team members from becoming distracted by interpersonal relationships, power struggles, emotional issues, or politics. Often, compromise is required to enable the team to move beyond this stage into a more productive working model (Clark, 1997).

Norming

The norming phase occurs when a team reaches consensus on a common process and shares a newfound focus. Enthusiasm is high, and the team is often tempted to go beyond the original scope of the project and tackle larger related issues. During this stage, team members reconcile competing loyalties and responsibilities and become a cohesive unit. They accept the team members, ground rules, assigned roles, as well as the individual characteristics and strengths of each member. Emotional conflicts are reduced as previously competitive relationships become more cooperative.

In the norming stage, team members are better able to express criticism constructively, are more accepting of other team members and their individual contributions, attempt to achieve harmony by actively avoiding conflict for the good of the team, and are more willing to confide feelings and challenges about the project with others. A sense of cohesion emerges in the norming phase, which is the sign of a shared spirit of true collaboration. This does not, however, mean the team's internal work is complete. The team must continue to establish and maintain boundaries and rules of engagement. As personal relationships solidify and team members are better able to understand how to work with one another, they have more time and energy to spend on the project. The team begins to become more and more efficient during this stage.

Agreement and consensus among team members—often as a result of meetings facilitated by the team leaders—are the hallmark of the norming stage, as opposed to the storming stage, which is characterized by compromise. With roles and responsibilities clearly defined and understood, teams can address larger issues collectively and delegate smaller issues to individuals or subteams. Often, social activities hosted by the team leadership

help keep morale high and further reinforce social ties. Finally, a unique team culture is developed as the leader transitions to more of a facilitator role than a director role, enabling teams to become more self-regulated through delegation and encouragement (Clark, 1997).

Performing

A team that is performing has firmly established relationships and clear goals and expectations. Teams transition into this phase when they begin diagnosing, problem solving, and implementing changes independently rather than waiting for leaders to direct their actions. Members of such teams have fully discovered and accepted each other's strengths and weaknesses and have developed a close attachment to the team.

The performing stage includes members having insights into personal and group processes, understanding one another's strengths and weaknesses, and reflecting or self-evaluating constructively on group and individual behavior. The team is now an effective, cohesive unit that is high-performing and able to expeditiously address challenges that arise within the process.

At this stage, the team is more strategically aware, clearly knowing why it is doing what it is doing and focusing on overarching goals—lower cost, faster schedule, higher performance—that are set by the team to deliver the best possible product and process. The team has a shared vision and is able to stand alone without much interference or participation from an external leader, as members step up to lead from within the team. When disagreements arise, they are resolved within the team, and team members are supportive of each other both in and outside of the team setting. The role of leaders during this stage is more managerial than directorial, ensuring that the team stays on task and has the resources needed to do so. Leaders can then focus on coaching and mentoring individual team members in order to support their professional development.

As the team matures, the need for direct engagement by leaders diminishes. The level of leadership oversight and management needed in early team stages is counterproductive in later stages, transitioning from one of direction to facilitation and ultimately delegation or even independence. If the leader is also a member of the production team, then he or she will have to account for more time spent leading and facilitating early in the project and more availability for production once he or she has moved into a management role.

The selection of a leader of the overall project delivery team is unique to every project. This person may be external to the design and construction firms or very much involved in the daily process. Construction managers or owner's representatives may manage project delivery teams for the owner, or the architect or contractor may lead, depending the delivery method and contract structure. It is therefore critical to understand the difference between participating as a team member and participating as a team leader. Often an individual will have to alternate between the two throughout the various stages of a project (Clark, 1997).

Adjourning

At the time of project close out, there may be both a sense of accomplishment as well as a reluctance to move on within collaborative teams. Many relationships formed within these teams continue long after the team disbands. At the adjourning stage, leaders recognize the vulnerability among teams and understand that an abrupt shift in staffing assignments may be disheartening or bring about feelings

of insecurity. It is at this stage when leaders should take advantage, if possible, of teams' cohesion when shifting members to a new project where they will more likely be able to remain or become high-performing in less time (Clark, 1997).

Team Development Model

Collaborative project delivery teams can use Tuckman's stages as a framework to move quickly through the necessary foundational stages of team development toward the end goal of high performance (Figure 6-2). This model begins with the individual and moves toward the collective, the goal being a level of cohesion and unity that results in high team performance. Team members each begin by asking, "Who am I?"

It is necessary for individuals to be fully aware of their own position, skills, and behaviors before they can be functional members of a collaborative team. Once individuals have cataloged what value they bring to a team enterprise, they can better engage with other self-aware individuals. If team members are fearful or unsure of their role within the team, the team dynamics will reflect this uncertainty.

Negative and irrational behavior and anger are often the result of fear, or the feeling of being threatened or compromised. In positive situations, teams begin from a place of trust and acceptance, ready for the second step of team development that has them asking, "Who are you?" Because project delivery teams often do not have the time needed to gradually build trust, this model suggests that high performance can be achieved quickly when team members choose to begin from a place of trust rather than one of suspicion. "I accept you" and "I trust you" are the next steps in the model.

Authenticity is important because if team members become cautious and polite, putting on a façade and hiding their true feelings about the project and their team members, positive team dynamics will never truly develop. A better solution is to create an environment where all team members feel comfortable sharing feedback. When trust is present, constructive feedback thrives. Within the time frame of each project, feedback loops where authentic and straightforward information is shared are critical.

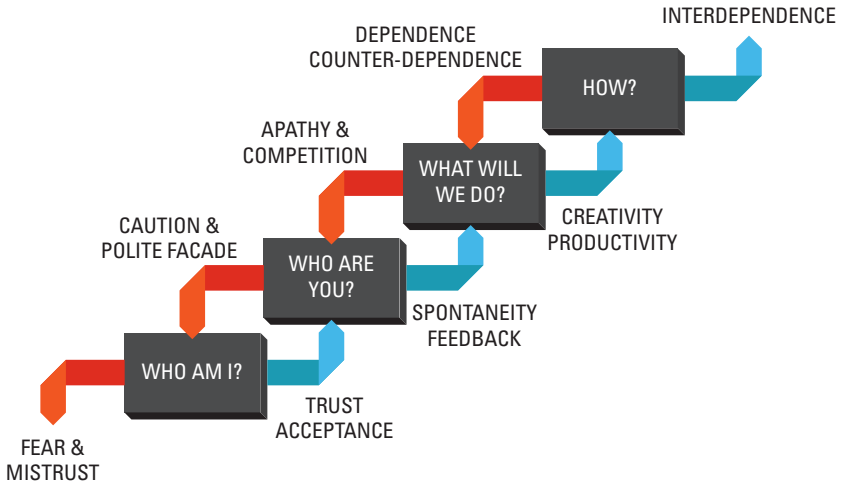

Figure 6-2 Team development over time

Spontaneous constructive feedback leads to the next step in team development, wherein the team strategically questions, "What will we do?" If not properly led, a team can fall into apathy and competition, especially when the goals and roles are not clearly defined. The individuals on the team may show up, offer their opinion, and appear to be participating, but they may never fully be capable of engaging in the process with full purpose and commitment until trust and acceptance are present and feedback loops are developed to establish continuity of ideas. Once the team goals and responsibilities are clearly defined, creativity and productivity begin to flourish.

In the final stage of team development, the team establishes a goal and then asks, "How are we going to do it?" Because the team members have laid the foundation by being aware of each other's individual strengths, they can easily identify how the members can work productively together to accomplish the defined tasks. This model uses interdependence, as opposed to dependence or counterdependence, as the fundamental personal relationship. Dependence places too much reliance on another person in the team, which inhibits personal growth and effectiveness. Counterdependence, or the unwillingness to rely on any other person, leads to individualism. Interdependence recognizes and supports individual strengths as well as their value to a collective, coordinated effort.

The expedited model of team building that leads quickly from forming a team to a highly performing team thus includes building blocks of trust, acceptance, spontaneous feedback, creativity, productivity, and (finally) interdependence (DeLisle, 2009, 2011).

CASE STUDY EXCERPT: GLOBAL CENTER FOR HEALTH AND INNOVATION

To achieve a state of interdependence—where each team member's individual strengths and contribution to a collective, coordinated effort are recognized and supported—team members must trust one another, accept their own and others' roles, openly communicate, and provide feedback. In doing so, teams are able to quickly adapt and evolve when new team members join to maintain a state of high creativity and productivity. This is best fostered within a larger culture of collaboration supported by leaders and appropriate structures and resources.

Project Details

Design architect (overall building) and design oversight (facade): LMN Architects

Architect of record: URS Corporation

Owner: Cuyahoga County and Merchandise Mart Properties, Inc.

Design-builder: Turner Construction

Key subcontractors:

- Envelope—Harmon
- Precast panels—Sidley Precast Group
- Formliners—Architectural Polymers

Location: Cleveland, OH

Type: Health care—new construction

Project duration: February 2012—June 2013

Size: 235,000 SF over four floors

Project delivery: bridging documents, prime contract to owner through DD, retained for design oversight through CD-CA

Introduction

Seattle-based LMN Architects, 2016 AIA Firm of the Year, is a 150-person firm recognized for its civic

Figure 6-3 Global Center for Health and Innovation facade *Image courtesy of LMN Architects*

work that aims to transform and strengthen urban neighborhoods and communities. Noteworthy in terms of team dynamics is the firm's Tech Studio, an internal research and development group dedicated to applying digital technologies to support individual project teams and enhance the firm's offering of services. The development of a custom facade system for the Global Center for Health and Innovation (GCHI) in Cleveland, OH, is an example of how effective collaboration can help a team overcome barriers in complex situations (Figures 6-3 and 6-4).

The building, completed in the fall of 2013, is a four-story collection of showrooms for medical device and furnishing suppliers. LMN's involvement in the project began with a decade-long master planning process for the new Cleveland Convention Center. Before issuing the RFP for the convention center, the city expanded the overall project scope

Figure 6-4 View of Global Center for Health and Innovation southwest corner *Image courtesy of LMN Architects © LaCasse Photography*

(*continued*)

(*continued*)

through a public-private partnership to include the adjacent GCHI in order to support Cleveland's goal of becoming an international destination for medical industry conventions.

LMN developed a strong relationship with the city of Cleveland during the early stages of studying site feasibility. After being awarded the design phase for the project, the trust established between the client and architect during the early planning stages helped the project team transcend the complex delivery contract for the convention center and GCHI and achieve a high level of quality and execution in the final project.

Team Dynamics

The project called for a bridging document process in which the design architects were contracted through the end of design development. The construction documents were then to be completed by the design-build team led by Turner Construction Company. "This, historically, is a difficult model for design excellence to occur in because there is a really big divide between the design and the execution of the design," said LMN Partner Stephen Van Dyck. Under such a model, there is no contractual tie between architect and the design-build team finishing the work, a structure that historically fosters communication breakdowns and a tendency to lose focus on the design intent. To head off such issues, the LMN team knew that documentation and communication would be critical.

At the end of design development, the façade of the GCHI had yet to be finalized because the curtain wall subcontractor had not yet been identified. Due to the trust LMN built throughout the project, the client recognized the value they would contribute to this highly visible element and brought the firm on board to perform design oversight on the GCHI façade (Figures 6-5 and 6-6).

Figure 6-5 View from Lakeside and East Mall Allee, showing convention center entry and Burnham Mall in foreground *© LaCasse Photography*

Collaborative Culture

During the Construction Document phase, LMN acted as a consultant to the owner, guiding the design-build firm and host of subcontractors and consultants through the highly technical process of developing the precast façade system and preparing it for fabrication. The proposed façade was seemingly complex: hundreds of unique precast concrete panels and glazing assemblies composed in a pattern resembling genetic code.

LMN tech studio leader Scott Crawford worked collaboratively with Van Dyck and the project team, and identified collaboration as critical to meeting the tight three-and-a-half-month timeline. "Our role would be to share as much information as possible. We were interested in having an open dialogue with each other, a good relationship and not dictating: 'that's the design, just figure it out,'" Crawford explained.

The LMN team used Rhino as the primary form-generating tool and supplemented it with the parametric plug-in Grasshopper to permit continuous changes in the panel design and organization throughout design development. The resulting forms were then translated into Revit for BIM coordination in preparation for shop drawing generation. To meet time constraints, the Tech Studio devised a custom plugin that enabled changes in the Grasshopper script to automatically update the Revit model. This tool ultimately allowed for a high level of feedback from all team members.

Figure 6-6 Detail view of precast and glass wall system *Image courtesy of LMN Architects*

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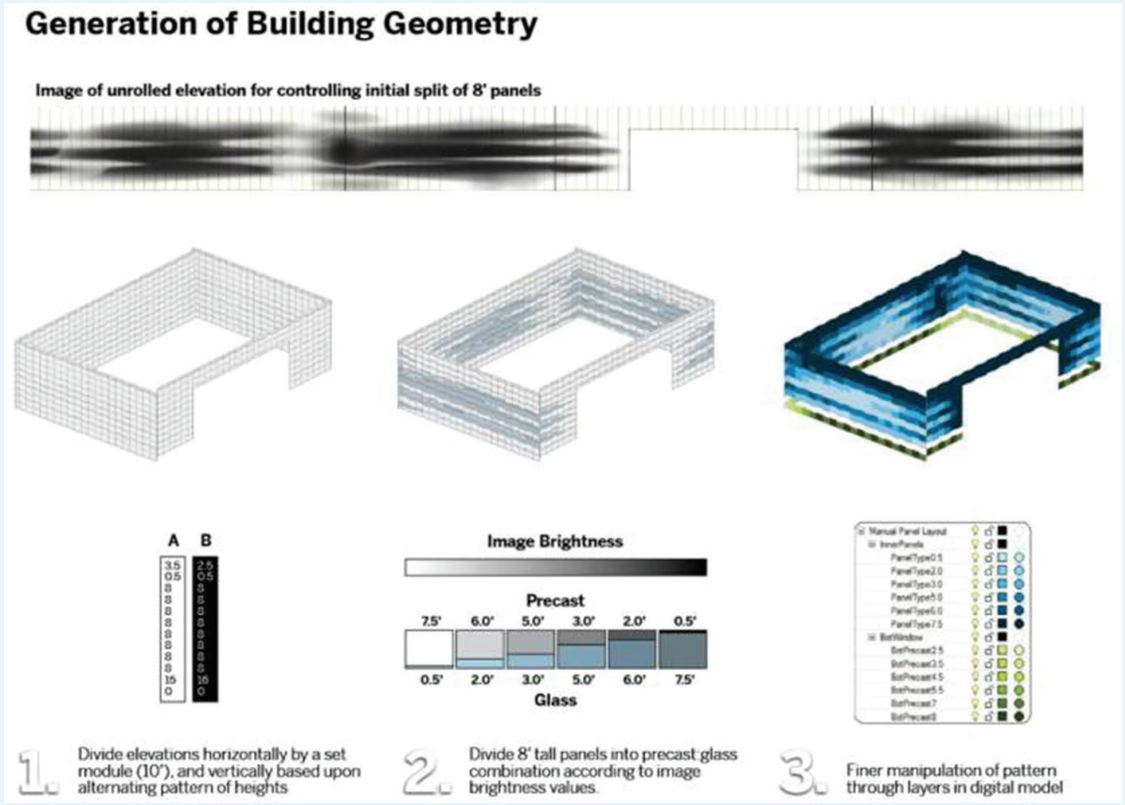

Figure 6-7 Early process diagram showing generative control process at various scales *Image courtesy of LMN Architects*

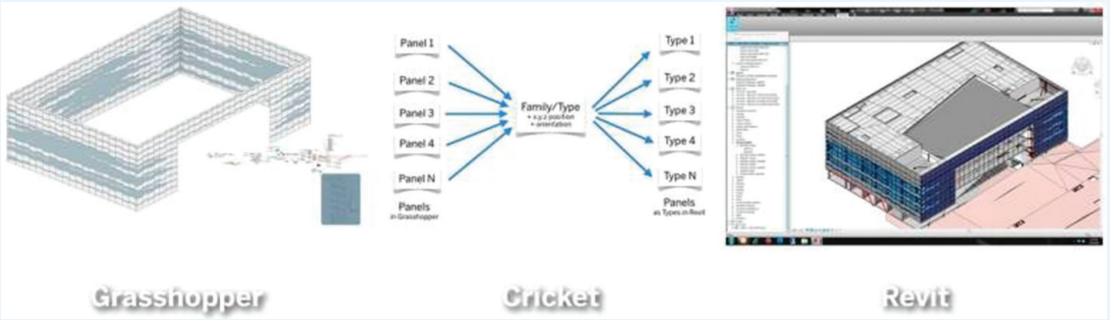

Figure 6-8 Process diagram showing information transfer via custom plugin allowing interoperability *Image courtesy of LMN Architects*

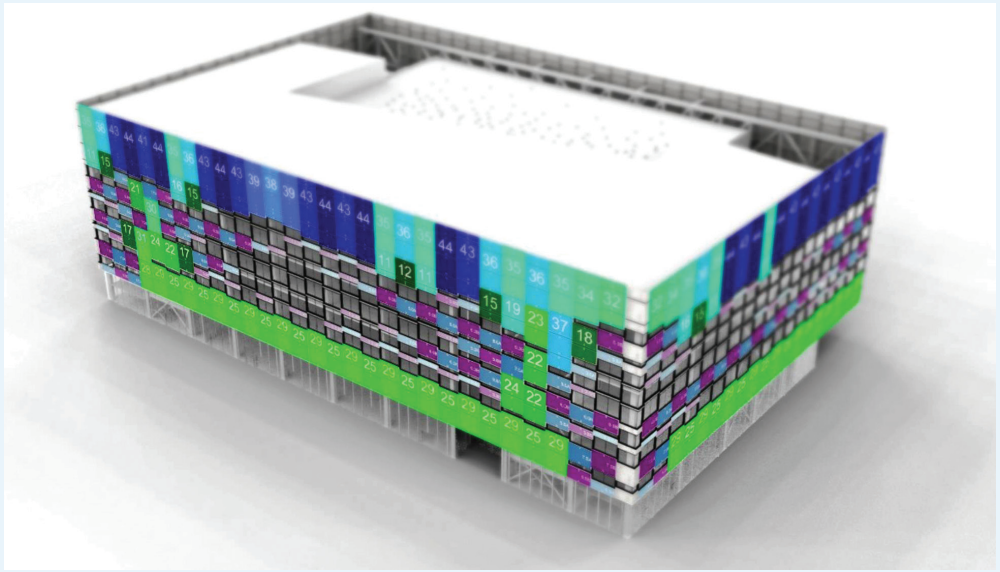

Figure 6-9 Diagram indicating panel grouping methodology as required by precast contractor *Image courtesy of LMN Architects*

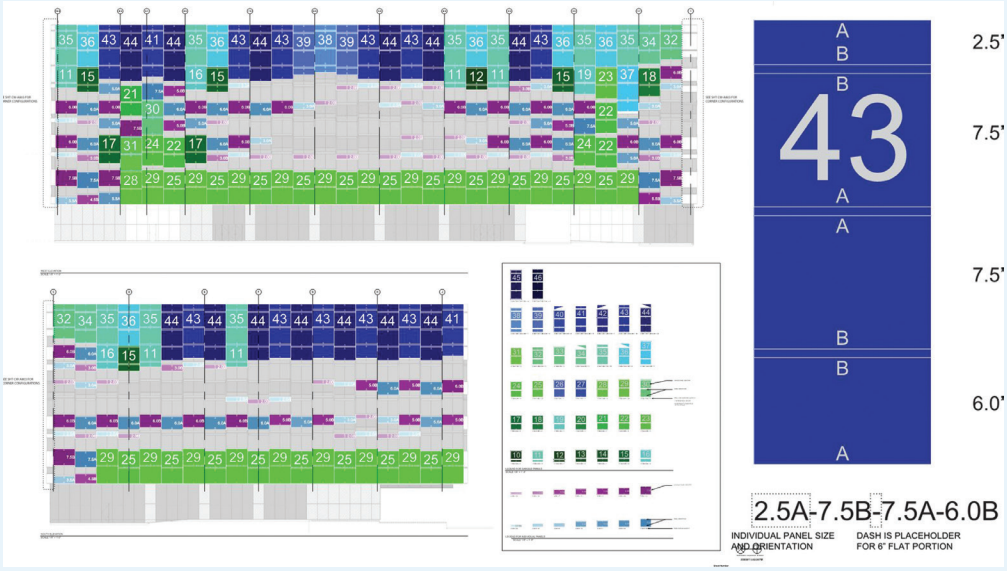

Figure 6-10 Color-coded elevation contract drawing indicating panel typology for precast contractor *Image courtesy of LMN Architects*

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Team Leadership

LMN worked to establish trust with each member of the larger design-build team from day one. In-person meetings were crucial to the coordination efforts, and most centered around the use of the live building model. "There was, initially, some skepticism because the design looks really complex," Crawford recalled, "but when we were able to show them the take-offs that we could get out of our model and explain how we imagined the system as being composed of a limited number of parts, that helped to earn some of the curtain wall subcontractor's trust. They understood that there was some logic in what we were doing."

"In a matter of five minutes," Van Dyck added, "they went from being highly skeptical to being astonished at our mastery of the tool and also excited at being able to engage with an architect who wanted to talk about a building in their language." The curtain wall sub was able to suggest changes to the panel system with regard to constructability and cost that the architects could update in model in real time.

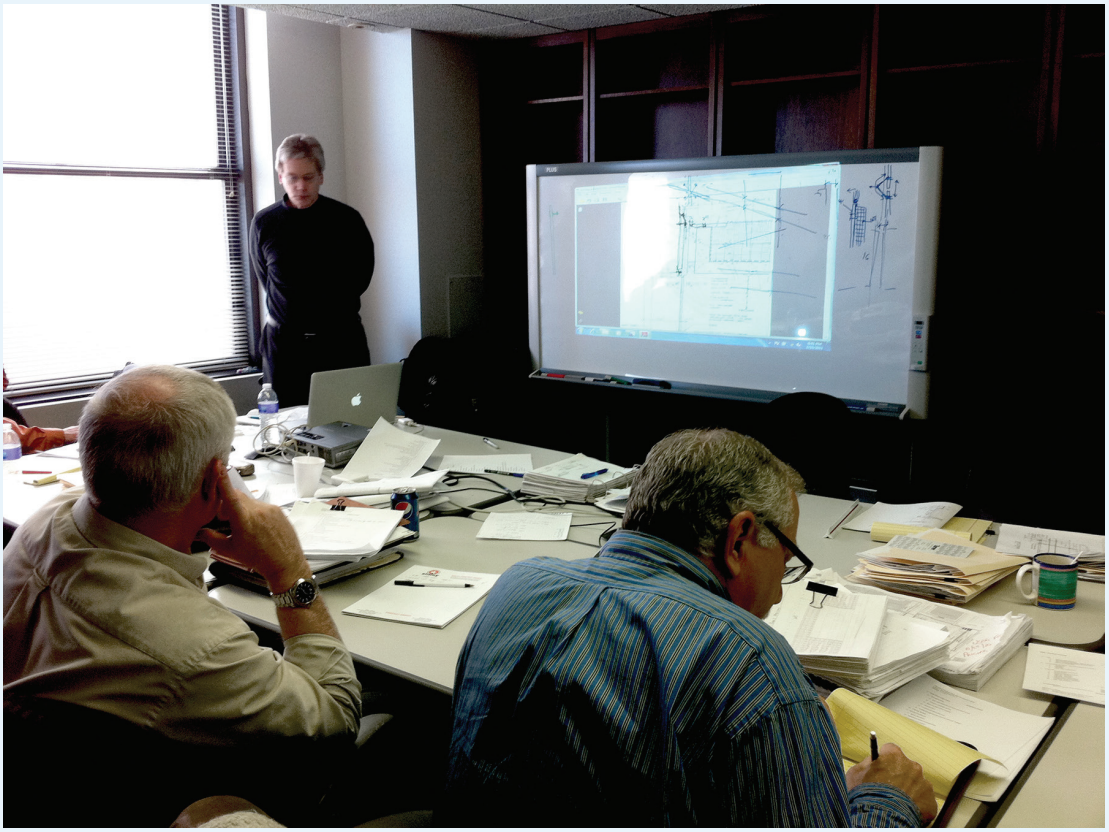

Figure 6-11 Photograph of design and construction team meeting *Image courtesy of LMN Architects*

Communication and Motivation

The LMN team recognized that communication through drawings was most efficient when customized to the individual party. "As the relationships developed," Van Dyck said, "we would learn more and more about what format each party was interested in—a PDF, 3D DWG. Other people were happy to look at our Rhino model." Regardless of the capable software though, "Nothing will ever beat the face-to-face collaborative sessions," according to Van Dyck.

He explained that the team was also able to leverage technology tools to expedite documentation and automatically generate files requested by the fabricator. "On fast-paced projects, the dream of integrating everyone on a single digital platform is impossible. There is no time for training or learning curves. To do anything new or adventuresome, somebody needs to provide appropriately formatted up-to-date information to all parties, whenever necessary, in order to maintain confidence within the team. Having an easy way to translate data is key. As the

Figure 6-12 Photograph of a custom formliner at precast plant, RW Sidley in Thompson, OH *Image courtesy of LMN Architects*

(*continued*)

architect, once you have that translation tool, you become the center point for data management. We see that as opportunity, not liability. In fact, it's crucial for us as architects to manage data in order to mitigate our own liability."

LMN's leadership in implementing technology to support collaboration and communication contributed to the project's overall success.

"People start becoming uncollaborative when they feel they are not involved," Van Dyck reflected. LMN circumvented this by engaging the whole team beginning on day one. "You can actually call upon someone to do more than they might have initially been comfortable with by working with them. They will help you as well, in making something harder, or riskier, actually happen."

Figure 6-13 View of Global Center for Health and Innovation southwest corner *Image courtesy of LMN Architects © LaCasse Photography*

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 7

Team Behaviors

Negative Team Behavior

Most people have had both rewarding experiences in collaborative team settings as well as negative experiences on poorly performing teams with low morale. Such negative experiences are frustrating rather than invigorating and often create an aversion to teamwork in the future. Both team members and leaders must be aware of common forms of negative team behavior, so countermeasures can be taken if and when they appear.

Negative team behavior can be the result of individual or group actions (Figure 7-1). Individual negative behaviors include social loafing, groupthink, pressure to conform, and individualism.

Social loafing is the conscious or unconscious tendency of some team members to shirk responsibilities by withholding effort toward team goals when they are not individually accountable for portions of the work (Karau and Williams, 1993; Sheppard, 1993). Social loafing is related to the "bystander effect" where individuals do not take action because they assume someone else will (Darley and Latané, 1968), which can be overcome by ensuring that members are invested in the team's shared goals and understand what their role is in achieving them.

Groupthink is when members of a team agree on a decision not based on its merit but because they are unwilling to risk rejection by the group for questioning a majority viewpoint or presenting a dissenting opinion (Janis, 1972). Ensuring an environment where constructive conflict and respect for multiple points of view is established helps team members maintain objectivity about their own process. Leaders play a critical role in both establishing such an environment and in providing an outside perspective when needed.

Pressure to conform occurs when there is time or budget constraint on a project or when overachievers are pressured to conform to the lowest common denominator, decreasing the performance of the individual and the whole team. This might take the form of design team members settling for "good enough" solutions rather than using the collective team expertise to find an optimal response, or a contractor finding the quickest path to finish the project without considering the quality of the outcome (Cialdini and Goldstein, 2004).

Individualism, or the need for agency and autonomy, is another negative behavior that is common in creative types such as architects. The culturally-driven need for sole authorship is slowly being overturned by proof that greater engagement of project stakeholders can lead to more depth and quality

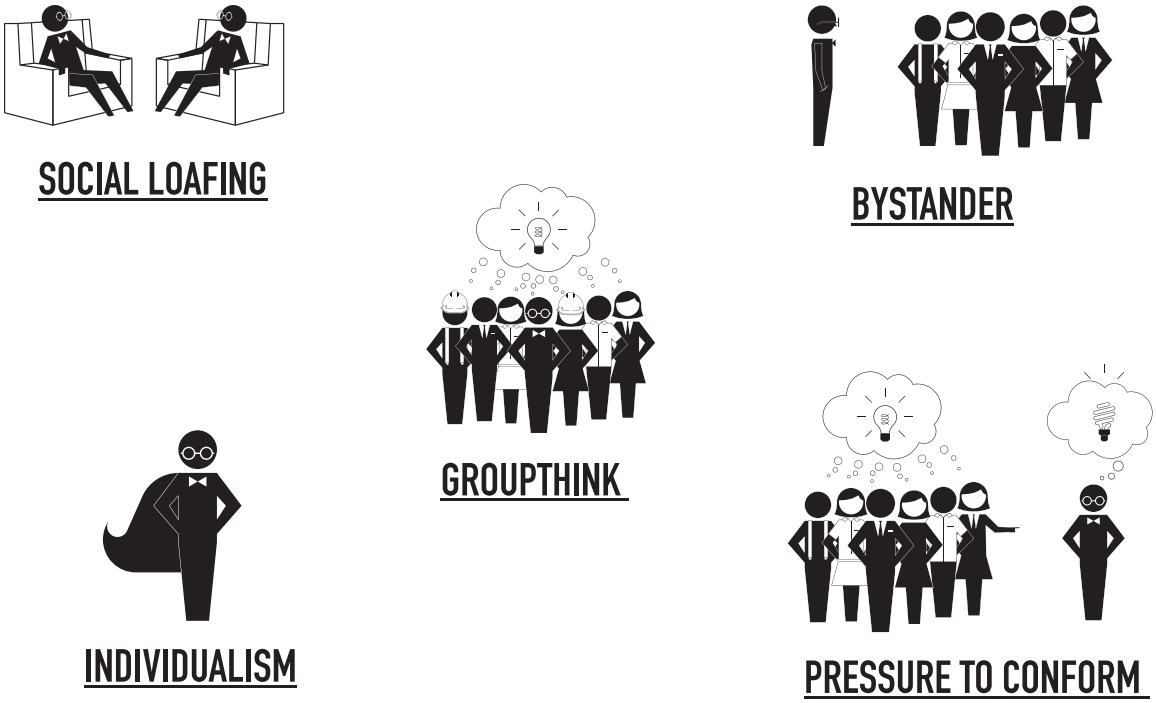

Figure 7-1 Negative team behaviors

in the design response. Individualism, when tempered, can be positive for project teams, but only when connected to the individual strengths of others in a collective effort (Katzenbach and Smith, 1992; Maccoby and Conrad, 2003).

In his book, *Overcoming the Five Dysfunctions of a Team*, Patrick Lencioni identified the most common negative team behaviors as fear of conflict, lack of commitment, lack of accountability, inattention to results, and loss of trust (Figure 7-2). Again, these

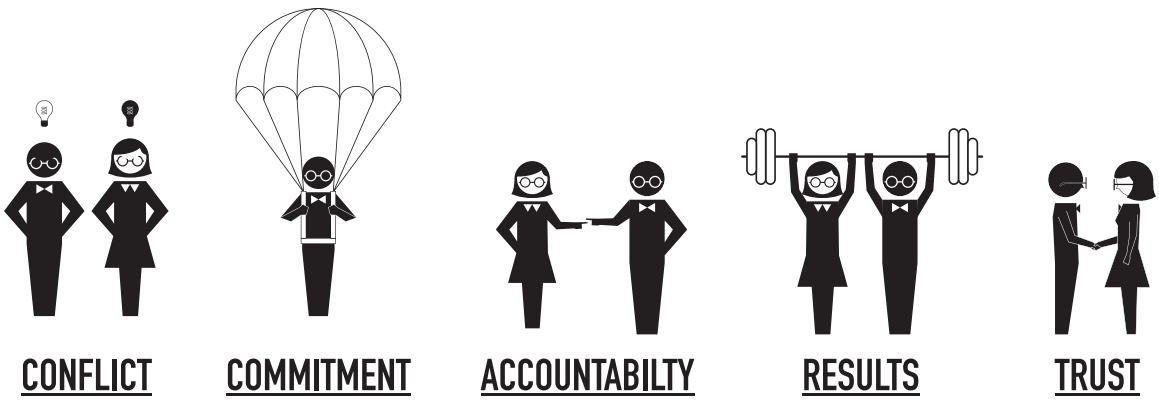

Figure 7-2 Five dysfunctions of teams

must be addressed to avoid long-term detrimental impacts (Lencioni, 2005).

Fear of Conflict

Often conflict is not the issue in suboptimal teams, but rather the *fear* of conflict that causes team members to avoid engaging with each other. Teams must overcome this dysfunction in order to develop and grow. Teams that have overcome the fear of conflict engage in healthy debate, respectfully disagree with one another, and are not afraid to challenge a given condition in the effort to expeditiously arrive at the most effective, efficient, and creative solution to any challenge (Lencioni, 2005:7). In such an environment, the best ideas emerge through conversation and iteration.

Teams that engage in constructive conflict have been shown to resolve issues quickly, completely, and without allowing emotion to negatively affect the process. The dynamic is also healthier after even the most heated conflicts, with no residual hurt feelings or collateral damage to the team's productivity (Lencioni, 2005:203).

Teams that fear conflict:

- Have boring meetings
- Create environments where back-channel politics and personal attacks thrive
- Ignore controversial topics that are critical to the team's success
- Fail to tap into all the opinions and perspectives of team members
- Waste time and energy with posturing and interpersonal risk management.

Conversely, teams that engage in constructive conflict:

- Have lively, interesting meetings
- Extract and utilize the ideas of all team members
- Solve real problems quickly
- Minimize politics
- Focus on discussing important topics (Lencioni, 2005:204).

Lack of Commitment

Commitment in teams is a function of clarity and buy-in. High-performing teams make timely decisions because they are able to consider the options relative to a clear set of project objectives. The team can then move forward quickly and with the confidence that all members will support the decision, even those who may have preferred other directions.

Lack of commitment results most often when teams seek consensus or certainty (Lencioni, 2005:207). No team, regardless of how cohesive it is, will agree on every decision that is made. It is therefore important to establish that the team members are committed to the overall goals and agree that the team will support individual solutions or topics that support these goals. Certainty is an unrealistic expectation in any context due to the complexity and changing nature of architectural projects. No team member, regardless of how much of an expert they may be in their field, can promise with absolute certainty that a decision is correct. Once teams become comfortable with accepting this fact, they can begin trusting that each decision will be made with the best intent based on the best information available at the time by the people best trained to do so.

A team that fails to commit:

- Creates ambiguity among the team about direction and priorities
- Watches windows of opportunity close due to excessive analysis and unnecessary delay
- Breeds lack of confidence and fear of failure

- Revisits discussions and decisions again and again
- Encourages second-guessing among team members

A team that commits:

- Creates clarity around team direction and priorities
- Aligns the entire team around common objectives
- Develops an ability to learn from mistakes
- Takes advantage of opportunities before competitors do
- Moves forward confidently
- Changes direction without hesitation or guilt when new information arises (Lencioni, 2005:209)

Lack of Accountability

In the context of teams, accountability refers to team members' willingness to point out behavior or performance that does not meet their individual expectations or is counter to achieving team goals. Team members are held accountable by project leaders as well as by each other and by themselves (Lencioni, 2005:212). Holding team members accountable does not have the negative impact on morale that one might expect. In fact, when done in the form of positive feedback rather than personal attack, it can be a solidifying act that reinforces the team's collective best interests.

When teams lack accountability, they quickly become inefficient and dysfunctional. The design and construction of buildings is a complex task. Collaborative teams distribute the load among the members of a team who then interdependently deliver the information needed by individual parties in a timely manner. When one team member is not performing as expected, all of the work downstream from them is affected. In addition to the task-based consequences, the lack of accountability also affects interpersonal relationships. Teams become resentful when lazy or underperforming members receive equal recognition for the overall effort despite unequal investment. Without consequences for these poor performers, the invested team members are required to overcompensate for the deficit, leading to burnout, less enthusiasm to achieve excellence, and a higher likelihood of error.

A team that avoids accountability:

- Creates resentment among team members who have different standards of performance
- Encourages mediocrity
- Misses deadlines and key milestones
- Places an undue burden on the team leader to provide discipline

Conversely, a team that holds members accountable:

- Ensures that poor performers feel pressure to improve
- Identifies potential problems quickly
- Establishes respect among team members who are held to the same high standards
- Avoids excessive bureaucracy around performance reviews and feedback (Lencioni, 2005: 214)

Inattention to Results

Project delivery teams are inherently results-oriented, as they are contractually bound to deliver drawings and completed buildings within a specific timeframe. High-performing teams deliver both in terms of efficiency and quality through discipline and consistency. Such teams focus on the objectives and do not let themselves become distracted or mired in superficial issues (Lencioni, 2005:216). To determine whether a result has been achieved and

to what extent it is successful or unsuccessful, the objectives must be clearly stated to provide metrics with which to evaluate the results.

Teams that do not focus on results stagnate and pursue counterproductive tangents. Additionally, teams that do not reflect on their collective results—both their positive and negative aspects—are not able to fully understand the implications of their decisions over time and learn from past experience. Focusing on results does not discount creativity or individuality; it concentrates these energies to benefit the larger group.

A team that is not focused on results:

- Stagnates and fails to grow
- Rarely becomes an industry leader
- Loses achievement-oriented employees
- Encourages team members to instead focus on their own objectives
- Is easily distracted

A team that focuses on collective results:

- Recruits and retains top talent
- Minimizes individualistic behavior
- Enjoys higher levels of success (as well as suffering failure more acutely)
- Benefits from individuals who invest in a collective effort
- Maintains momentum (Lencioni, 2005:218)

Loss of Trust

Trust is a small word with powerful connotations and is a hugely complex factor. The ingredients are a combination of competence, constancy, caring, fairness, candor, and authenticity. Most of all the latter.

(Bennis, 1999)

No other factor has such an impact on a team's ability to succeed as trust. It is the foundation of all interpersonal relationships as well as team culture and behavior. Trust allows team members to rely on one another, have confidence in their leaders, take risks, and leverage individual talent. Trust eliminates political conflict and unspoken issues that plague many teams. Trust makes people feel safe, engenders loyalty, and improves information sharing. Unfortunately, even though it is the most important element in determining team behavior, trust is difficult to win, easy to lose, and time-consuming to regain.

In the context of teams, trust is defined as the level of comfort people have regarding one another's intentions and is directly related to how vulnerable a team member will allow himself or herself to be. Vulnerability is preferable to defensiveness when allowing people to share ideas and challenge one another without fear of recourse or ridicule (Lencioni, 2005:195).

Members of trusting teams:

- Admit weaknesses and mistakes
- Ask for help
- Accept questions about and input on their individual work
- Give one another the benefit of the doubt
- Offer feedback and assistance
- Appreciate and utilize one another's skills and experiences
- Focus time and energy on important issues, not politics
- Offer and accept apologies without hesitation
- Enjoy meetings and social gatherings

Conversely, members of defensive teams:

- Conceal their weaknesses and mistakes
- Hesitate to ask for help or provide constructive feedback

- Focus only on their own areas of responsibility
- Jump to conclusions
- Fail to capitalize on the collective capital
- Waste time and energy managing their behaviors for effect
- Hold grudges
- Find reasons to avoid spending time together (Lencioni, 2005:197)

Trust is sometimes referred to as a "zero multiplier" in relationships. Behaviors that build and maintain trust have binaries that can destroy it. In addition to extreme actions such as lying, cheating, and stealing that clearly destroy trust, more subtle behaviors also have positive and negative impacts on relationships.

To build trust:	To destroy trust:
Be explicit	Be vague
Demonstrate respect	Disregard others
Create transparency	Conceal operations
Right wrongs	Avoid accountability
Show loyalty	Be uncommitted
Continuously improve	Perpetuate mediocrity
Clarify expectations	Assume understanding
Be accountable	Avoid responsibility
Listen first	Speak first
Keep commitments	Be unreliable
Extend trust	Be guarded
Be patient	Be reactionary
(Covey, 2006)	

Trust is also linked to transparency, which is difficult for many who have experience in more competitive environments in which proprietary information and disciplinary knowledge is guarded. In collaborative project delivery, siloed models where information is withheld are counterproductive (Ashcraft, 2011). Transparency is different from clarity and refers to the willingness to share details of project structure, finances, and profits with all members of the team, regardless of rank or discipline, and to be forthcoming with motivations behind decisions and choices.

Effective Team Behaviors

Effective team behaviors are not merely the opposite of negative team behaviors but are a function of internal processes and individual experience and can be evaluated based on the team's results. Effectiveness can be measured by a number of factors, such as innovation, efficiency, quality, and retention. A team's effectiveness can be viewed from a number of perspectives, including:

- Task performance—the degree to which the team's output meets and/or exceeds the needs and expectations of the client
- Group process—the degree to which members interact or relate in ways that allow the team to work increasingly well together over time
- Individual satisfaction—the degree to which the group experience is positive or negative for members (Lussier and Achua, 2013)

Although many of the characteristics that define effective teams have been touched on previously, it bears repeating that effective teams are influenced by past experience working together, the established team culture, and the team composition and structure. Characteristics that effective teams share include:

- Collective standards of behavior
- Shared goals and objectives

- Firm commitment to the team's success
- Strong inter-dependence amongst members
- Diverse experiences and expertise
- Defined roles and responsibilities
- Positive interpersonal relationships
- Clear standards and protocols
- High levels of trust
- Effective conflict management
- Well-developed interpersonal and communication skills
- Resolute institutional support (Lussier and Achua, 2013)

Situational Team Organization

Teams focused on projects that require high levels of creativity tend to be self-organized and self-managed. They define the objectives, establish the metrics for success, and structure the assignment of work. Leadership roles may pass among members based on who has the most appropriate skill set at any given point during a project (Figure 7-3). In collaborative project delivery, team leadership is established based on the stage of a project, initially focusing on the architects and later transferring to the contractors. In other instances, the leaders are selected before the team and are responsible for team selection, management, and training. In all instances, the owner has a critical leadership role. This responsibility should not be delegated to outside consultants because they rarely are empowered to make owner-level decisions, they dilute the owner's understanding of the context in which decisions must be made, and they inevitably slow decision-making processes. Leadership and decision making should be conscious decisions and respond to the changing nature of each project (Ashcraft, 2011:17).

Collective Decision Making

In some instances, decisions will emerge naturally and will require little formal effort—for example, the decision to use one mechanical system over another may be facilitated based on the prioritization of metrics such as lifecycle cost, energy efficiency, and performance. In other instances where many possible options fulfill the same base requirements, it can be much more difficult to reach a collectively supported decision (Ashcraft, 2011).

A number of exercises, such as brainstorming and ideation, may help a team rapidly develop multiple ideas and options and have the added benefit of developing group cohesiveness. However, these techniques are often best for generating rather than refining ideas. Team leaders should watch out for younger team members who may be intimidated to counter ideas of senior colleagues in positions of authority and for dominant personalities that overwhelm the discussion in order to maintain a balanced dialog.

Figure 7-3 Leadership shifts with project phases

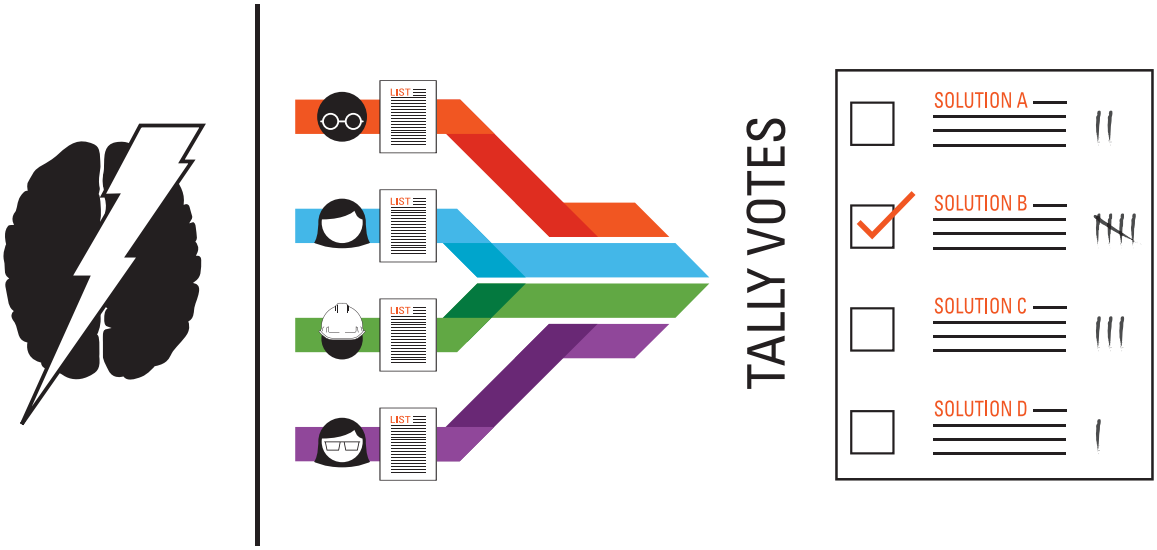

Figure 7-4 Nominal group decision-making processes

Other techniques shown to be more effective at decision making based on the collective expertise include the nominal group technique (Figure 7-4). This approach shares many characteristics with brainstorming, but within a more rigorous and democratic structure. Teams meet and outline a problem. They then individually propose responses that are equally and neutrally presented before the group begins to openly discuss and anonymously rank options based on an established set of criteria (Ashcraft, 2011; Robins, 2011). For maximum value, these techniques may need to be overseen by a trained facilitator in high stakes or highly charged situations, which may or may not be the team leader. Additional formal decision-making tools will be discussed in Chapter 8.

CASE STUDY: ALLEGHENY HEALTH NETWORK HEALTH + WELLNESS PAVILION

This case study was prepared by Ron Dellaria, AIA, CSI - Principal Design-Led Construction at CannonDesign and Brian Skripac, Assoc. AIA, LEED AP BD+C - Director of BIM/VDC at CannonDesign.

Leadership is critical to developing and maintaining a collaborative environment, particularly in project teams that are structured in nonconventional ways. Team members and leaders alike must work together to ensure that each person is assigned an appropriate role and that all team members build relationships so that individual and team effectiveness continues to grow over time.

Figure 7-5 Health + Wellness Pavilion *Image courtesy of CannonDesign*

Project Details

Architect: CannonDesign

Owner: Allegheny Health Network

Contractor: Astorino Development Company

Key subcontractors:

- General contractor—Massaro
- Mechanical/plumbing—Limbach
- Fire protection—SimplexGrinnell
- Electrical—Sargent/Edgewood
- Interior construction—Wyatt

Location: Pittsburgh, PA

Type: Health care—New construction

Project duration: August 2012–June 2014

Size: 174,000 SF over two levels of health care, one slab on grade parking garage

Budget: GMP $54M

Project delivery: Modified collaborative design-build

Introduction

Allegheny Health Network (AHN) identified a need for diverse choices in the Western Pennsylvania healthcare marketplace focusing on coordinated wellness and illness prevention, community enhancement, and the modern lifestyle. In response, AHN set out to create the Health + Wellness Pavilion (Figure 7-5), a centralized location for services including clinical, diagnostic, and supportive services with the convenience and

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accessibility commonly associated with the retail experience. To produce this new model of care, AHN engaged the Pittsburgh office of CannonDesign, an architectural, engineering, and construction firm to provide full design and construction services.

In response to this challenge, the CannonDesign team employed their unique integrated Design-Led Construction approach that delivered the new AHN Health + Wellness Pavilion within an extremely compressed design and construction schedule of just 22 months (Figure 7-6), an achievement that would have been very difficult to accomplish using more traditional and sequential delivery methods.

With a focus on innovation and time-to-market, AHN wanted to mitigate traditional design and construction risks and conflicts where possible. Therefore a modified design-build approach was established using a CM-at-Risk delivery model with a Guaranteed Maximum Price (GMP). The design-build entity was structured with the architect and contractor under the same ownership, allowing the time-tested value of competitive bidding to be realized within a non-traditional fully integrated project delivery method.

The CannonDesign team began by using a design research process that was developed to dig deeply into the needs of the owner, tenant, staff, and other project participants. This essential information was then passed along to team members as they began the design process with the goal to develop multiple design concepts, allowing end users the benefit of selecting the option that best suited their needs.

It was imperative that an integrated project delivery method be employed to ensure that all team members be engaged early on as an integral part of the design and the subsequent decision-making process. The Design-Led Construction team conducted initial project meetings with AHN to validate and explore building form, siting, and orientation options. This vetting measure ensured that the owner's design goals were understood and maintained throughout the process and established the foundation for future collaboration.

"Our primary responsibilities were to set the overall vision, make key decisions, and bring all stakeholders to the table," said a representative of

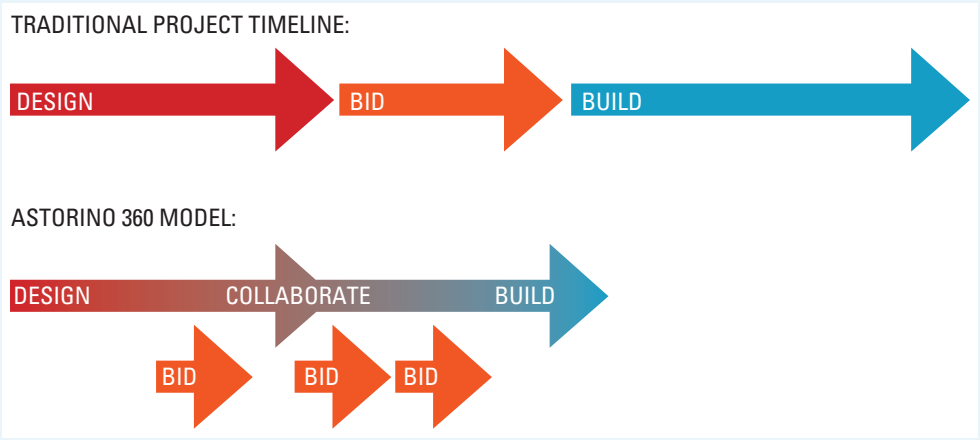

Figure 7-6 Compressed Project Schedule *Image courtesy of CannonDesign*

the ownership team from AHN. "It was imperative that we understood the needs of various end users to ensure the design met their needs as well as our overall vision of patient centered care focused on health and wellness. We relied upon the design and construction team to educate, inform and guide our team of administrators, clinicians and others integral to the patient experience. BIM and other visualization software tools were essential for us to fully understand the design criteria and make timely and informed decisions, enabling the entire team to effectively collaborate. This interactive process, facilitated by the use of BIM technology, ultimately led to a better performing building for our patients and staff."

As soon as the owner determined that the project was within budget, the team developed a "not to exceed" contract, which included the option of bidding the project with incomplete drawings and 100 percent scope narratives. The contract subsequently enabled the design-build team to choose the apparent low bidders that had been prequalified to work with the AE staff to jointly complete the documents before construction began.

In addition to a very aggressive construction schedule, the contract also required the provision of a surety bond to guarantee the performance. The fast-tracked construction schedule allowed beginning construction of the foundations and structural frame as the remaining deliverables were completed (Figure 7-8). This concurrent design and construction process was enhanced with the use of BIM, which enabled the project team to anticipate constructability problems virtually before they became a real issue.

The collaborative 3D BIM-enabled hybrid delivery model, where all team members openly communicated and shared project information, enabled architects and subcontractors to develop multiple bid packages concurrently and collaboratively, essentially combining the completion of CDs with the shop drawing phase (Figure 7-7). The right people were engaged at the right time, streamlining administrative activities by reducing time-consuming redundancies and maintaining the overall design intent.

"The innovative aspects of this project were the design process, delivery method, and comprehensive manner in which the full potential of BIM was realized—down to the level of shop drawings and fabrication," said member of the architectural team from CannonDesign. "The full cycle of information passing from the designer's model, to the fabrication and installation models, and then back to the design model, ultimately becoming the as-built record for the owner's use in building maintenance, exemplified how BIM can bring value to each step of the process. With each team member bringing value and insight, a cultural shift occurred from basic cooperation (sequential handing off of information in a traditional process) to true collaboration (interactive creation of information)."

CannonDesign convinced AHN to bid the project at 100 percent design development documents, which are essentially 50 percent of the construction documentation deliverables, and use technology to allow the sub-trades to offer bids based on their proposed design assist assumptions required to ultimately complete the documents alongside the design team.

Initially, the team built a GMP that included both design and construction contingencies as normal components of fast tracked, not to exceed projects. Once the trade contractors were brought on board based on the best-qualified design assist assumptions of the partial documents, the GMP was adjusted and the design contingency was eliminated, keeping the construction contingency as an incentive pool split evenly between

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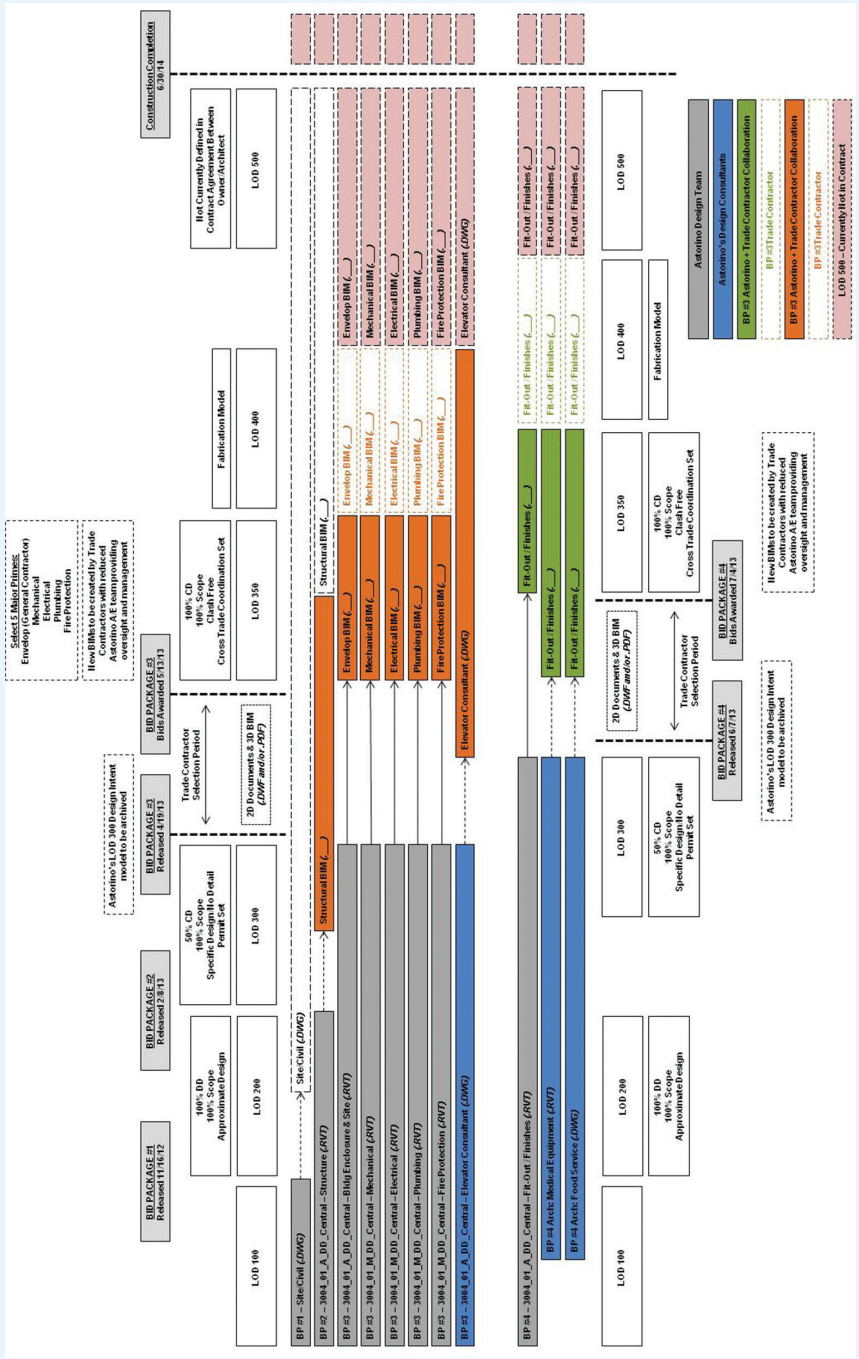

Figure 7-7 Bid package sequencing *Image courtesy of CannonDesign*

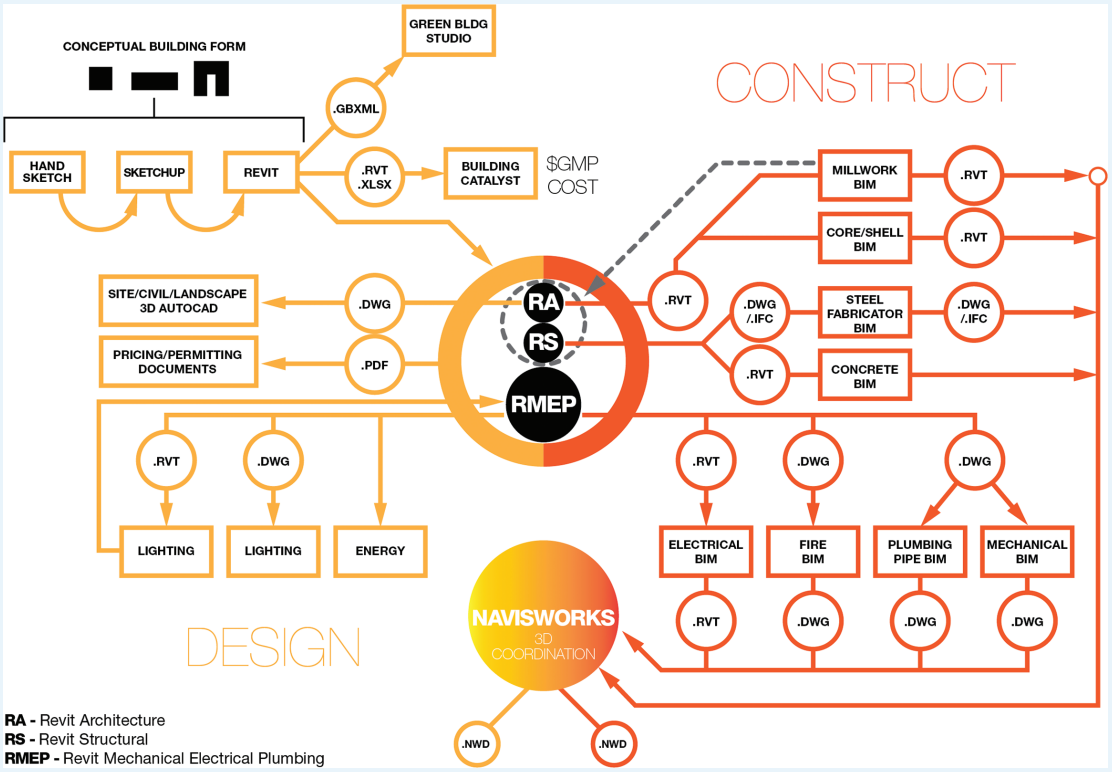

Figure 7-8 BIM Project Execution Plan *Image courtesy of CannonDesign*

design-build team and owner. CannonDesign's team allocated 50 percent of their potential disbursement to incentivize trade contractors to be equally invested in the project's success.

While BIM was utilized throughout the project, the development of the Core & Shell and Interior Build-Out bid packages where the coordination potential of the technology was truly maximized. The teams advanced their respective model elements in accordance with the BIM Project Execution Plan, with consistent auditing of the BIMs for quality control and reliability. The BIM plan also ensured model elements contained relevant information that defined both their scope and design intent, which reduced potential RFIs and change orders during construction (Figures 7-10 and 7-11).

The LOD 300 model elements provided an accurate and complete representation of the project at 100% Scope/50% CDs and enabled prequalified construction team members to offer qualified bid assumptions that allowed for the collaborative completion of the construction documents (Figure 7-9). As a result, the design team avoided wasting time detailing assemblies without trade contractors' expertise. Once engaged, the subcontractors collaborated with the design-build core team to detail the assemblies in the final documents

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Figure 7-9 LOD 400 assembly *Image courtesy of CannonDesign*

and reinforcing a constructible solution that accurately represented the design intent.

According to a member of the construction team from CannonDesign, "BIM enabled a streamlining of the decision-making process, allowing the entire design and construction team to take advantage of a wide range of model-based visualization opportunities. The models allowed us to lead the trade coordination process, avoid coordination issues in the field, and ultimately meet the aggressive construction schedule. Both major trade contractors and their subcontractors were able to provide expertise early in the design process. Certainty of outcome and trust in the model was achieved. Subcontractors were able to clearly visualize what they were constructing, along with when and where they were going to do it."

The benefit of having the right team members engaged at the right time became clear as the respective trade contractors further developed the model elements to an LOD 350, ensuring coordinated means and methods, and an LOD 400, providing shop drawing/fabrication precision. This advanced development allowed for the construction team to develop a detailed 3D construction coordination process to detect clashes between building components, assemblies, and systems (Figure 7-13). Coordinated LOD 400 elements were sent directly to computerized numeric control (CNC) machines, eliminating waste while driving accuracy and efficiency in the production-fabrication-installation process (Figures 7-14, 7-15).

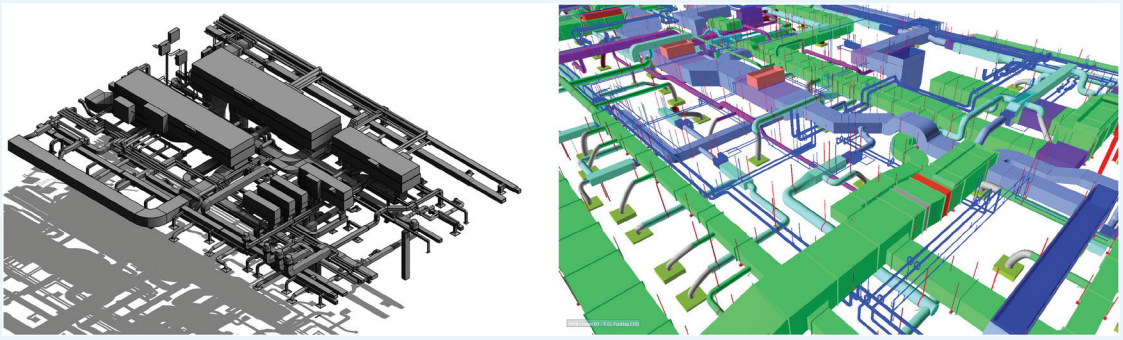

Figure 7-10 Breakdown of ductwork for sequencing *Image courtesy of CannonDesign*

Figure 7-11 Comparison of model and installed assembly *Image courtesy of CannonDesign*

The creation of a collaborative environment through an integrated, co-located, design team generated synergetic feedback that led to informed decision making by team members up to date on project developments. The culture of coordination and collaboration allowed the project team to ultimately expedite fabrication and installation of systems. The model was the end-all source for information, generating an environment of trust. Not surprisingly, the higher level of development of the BIMs resulted in enhanced predictability of outcome and increased value: fabricators could begin off-site production immediately after details were finalized in the model because the collaborative environment permitted immediate consensus. Trade contractors were on board with the process, because, obviously, the faster they got their work done the more profit they were able to realize.

Architects, engineers, and contractors were invested in the project's overall success, assisting each other when problems arose rather than taking self-serving positions (Figure 7-12). They knew that within the contract structure, the success of one team member was predicated on the success of the others and reinforcing the opportunities inherent in the shared incentive model. Despite the shared understanding of technical and financial models, collaboration did not always come easy. Mentoring from leadership helped develop and bolster the collaborative culture, which was a significant shift for many who were accustomed to more self-serving and contentious project environments.

While BIM was the technical cornerstone of this delivery model, heightened communication and collaboration were critical social components to its successful implementation. Other emerging technical tools such as Newforma, a Project Information Management program, enabled accessibility of important project information and provided a single platform for communication for the design-build team and owner. All team members worked with iPads throughout construction (Figure 7-13). These tablets supported BIM and document access, allowing team members to stay up-to-date with project information while documenting field reports, task lists, and punch list items on site.

Ultimately, the AEC team used a BIM workflow to not only design and document the 174,000 SF facility but also to extend the

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Figure 7-12 Project team coordination meeting *Image courtesy of CannonDesign*

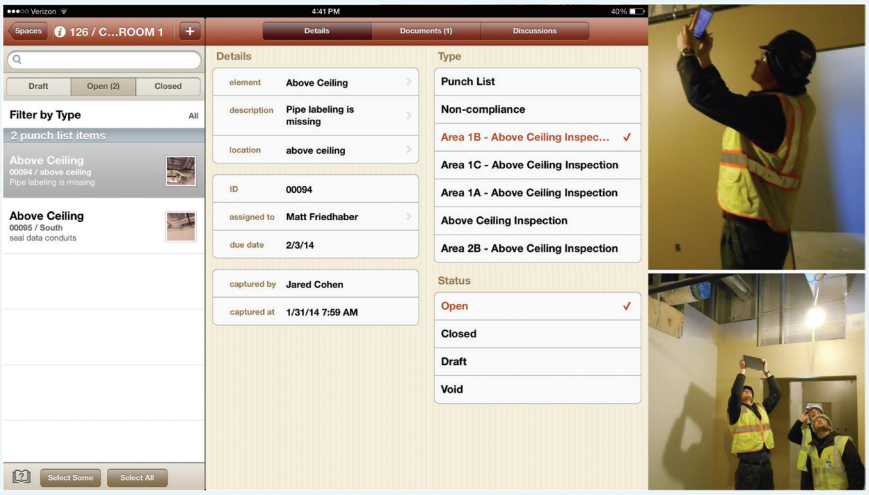

Figure 7-13 Field verification of model data using technology *Image courtesy of CannonDesign*

usefulness of the BIM to other areas of the design and construction process. The project incurred $0 in Error & Omission change orders as a result of improved coordination, validating the Design-Led Construction model. The project team credits the streamlined project delivery model with enabling the on-time and on-budget delivery of a complex, fast tracked project. "We are able to deliver architecturally significant structures more efficiently and effectively, while greatly reducing the risk to our clients," said a CannonDesign architect of the Design-Led Construction approach. "We are demonstrating the opportunity for the architect to take the lead in project delivery on complex buildings and strongly believe that design and construction are one and the same, requiring an all-encompassing concurrent integrated process for delivery."

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 8

Collaboration Tools

Rational versus Intuitive Processes

Tools and processes such as those described in this chapter are valuable resources for collaborative project delivery teams when making decisions, particularly with regard to preventing the process from becoming adversarial. However, the tools should be understood as strategies for facilitating conversations rather than automatically producing definitive, practical results.

Most significant decisions are made using judgment rather than a prescriptive model because intuition has been shown to produce more accurate decisions than those based on prescription alone (Ashcraft, 2011). "Intuition is a highly complex and highly developed form of reasoning that is based on years of experience and learning. It appears that rational analysis has been overemphasized, and in certain instances, relying on intuition can improve decision making" (Ashcraft, 2011; Robbins and Judge, 2011). The best approach, therefore, is to use a combination of tools that facilitate an iterative process that balances rational and intuitive factors (Ashcraft, 2011).

Lean Strategies

In the 1950s, the founder of Toyota, Eiji Toyoda, visited Ford's manufacturing plant in the United States, which dwarfed the scale of Toyota's manufacturing capabilities in Japan. He returned home with a mission to extend his company's impact globally and overtake the competition by creating a more efficient production process than he observed in the United States. Toyoda determined that the best way to increase his company's scope and streamline production capabilities was to remove waste and add value to the system. The principles he developed define a variety of "lean" strategies and have become known as the Toyota Production System. Lean principles have been adapted by many other industries interested in improving their efficiency, including building construction (Liker, 2004).

Glenn Ballard with Greg Howell developed the *lean project delivery system* for the construction industry as a more streamlined way to manage projects by first determining and then aligning the project's goals, means and methods, and constraints. There are thirteen elements in the model, eleven of which are

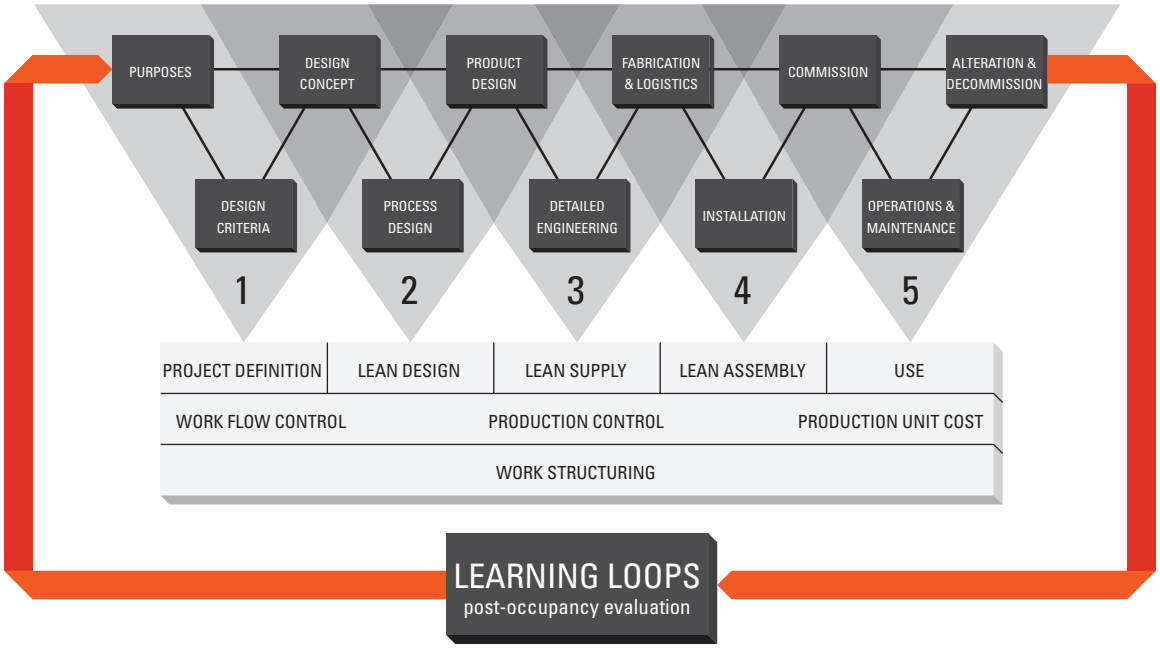

Figure 8-1 Lean project delivery system, adapted from Ballard 2000a

organized in five interconnecting triads representing project management phases extending from project definition to design to supply and assembly (Figure 8-1). The remaining two elements are overarching production control and work structuring modules that extend across all the project phases. The goal of the system is to combine both the linear and iterative nature of design and construction through a series of parallel processes and "learning loops" rather than the traditional model of sequential, disconnected phases (Ballard, 2000a, 2000b).

Collaborative project delivery seeks to align stakeholder interests, objectives, and practices by reconceiving the organization, operating system, and commercial terms governing the project. The primary team members include the architect, key technical consultants, general contractor, and key specialty contractors. Project delivery models such as integrated project delivery (IPD) align well with lean strategies and offer an opportunity for

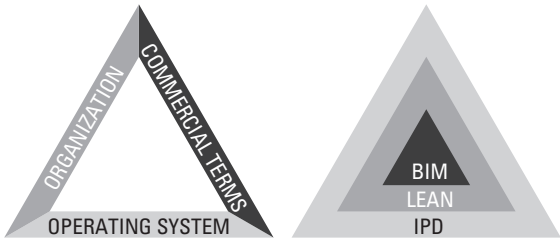

Figure 8-2 Collaborative delivery, lean principles, and BIM, adapted from Smith, 2011

its principles and practices to be enacted (Smith, 2011). IPD is the contractual framework, lean is the strategy, and BIM is the tool that collectively best support collaborative project delivery (Figure 8-2).

Lean Tools

The foundation of a lean construction approach is people. It works when individuals on project delivery teams make and keep commitments. Lean

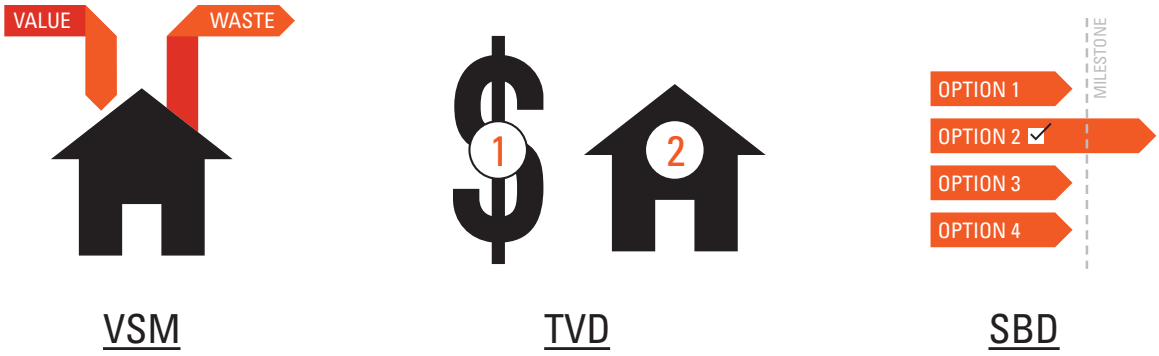

Figure 8-3 Lean tools

construction takes the controlled process of manufacturing and translates it into the more variable process of construction as a series of production strategies. Lean tactics that have proven useful to collaborative project delivery teams include (Figure 8-3):

Value Stream Mapping (VSM): Businesses use the process of mapping existing "value streams" of products and processes to identify areas of redundancy and inefficiency in order to remove the waste and continually improve the efficiency of the process through iteration. When applied to project delivery, the VSM process can be used, for example, to examine the RFP process and identify ways in which the team can reduce delays this process causes in the contractor's workflow and increase efficiency. This process requires teams to constantly work to refine and optimize the design of the project delivery process in order to ensure the best possible outcome, rather than reworking components of the process at a later date (Salem and Zimmer, 2005; Yu et al., 2009).

Target Value Design (TVD): TVD brings designers together with makers at the start of a project to identify how the value required by the owner can best be achieved within the allowable cost. The process does not begin until there is agreement among all parties that the owner's request is reasonable, which follows a detailed validation of the project scope. TVD requires early and intensive collaboration and integrated knowledge sharing and decision-making, as it is designing to a price rather than pricing a design (Ballard, 2009; Long et al., 2007).

Set Based Design (SBD): This process enables a range of disciplines to develop a set of possible solutions to design and process problems and then to decide at the last responsible moment which combination of options will be pursued. Deciding at the last responsible moment (as differentiated from the last possible moment) allows the project team time to develop a number of options in parallel and then choose between them with agreement among stakeholders. This process also reduces the need for later rework (Morgan and Liker, 2006; Sobek, Ward, and Liker, 1999).

Pull Planning: A unique project management feature that has grown out of lean

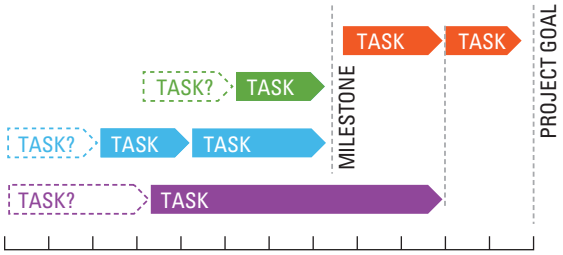

Figure 8-4 Pull planning process

construction practices (Figure 8-4). In traditional project delivery, the overall schedule is planned to fill the given time. The resulting workflow tends to be unreliable, production is sporadic rather than steady, and deliverable dates are determined by a few people who often do not have an understanding of whether or not the schedule is possible. Pull planning, on the other hand, works back from a target completion date or a milestone, determines tasks required to achieve those ends, and schedules them accordingly. Typically, a pull plan is prepared by the team actually responsible for doing the work—engineers, architects, owners, and designers for the design phase and designers, specialty contractors, and the GC for the construction phase. It is performed oftentimes by breaking down a larger objective into discrete tasks, posting these on a wall, establishing durations and efficient work flow patterns and milestones to achieve those subtasks, and then refining the final schedule in a project management software program (Tiwari and Sarathy, 2012).

Some of the particulars of pull planning include:

- Work tasks, information flow, and deliverables are planned based on the need (or "pull") of downstream tasks.
- The process often exposes the need for smaller batches of work rather than one deliverable for a phase.
- The specificity that can result from the process allows teams to have the confidence to employ just-in-time delivery, establish an improved level of resources, and reduce lead times—in all cases, saving time and money.
- The project workflow becomes more reliable and efficient as the waste of waiting, redundancy, and overprocessing are eliminated.

Percent Plan Complete (PPC): A metric that serves as a basic measure of how well the planning system is working. It is determined by calculating the weekly number of assignments completed on time divided by the total number of assignments made (Figure 8-5). In many cases, the PPC will be less than 50 percent when a project starts and will rise to 80 or 90 percent as the team becomes conscious of the impact of not performing the work as planned. PPC is not a form of project management; rather it tracks the percentage of assignments that are 100 percent complete and calculates planning effectiveness (Ballard, 1999).

Choosing by Advantages

A key characteristic of collaborative project delivery teams is collective decision-making on significant issues. There will rarely be times that all team members agree on one solution; therefore, a systemic

Figure 8-5 Percent plan complete principles

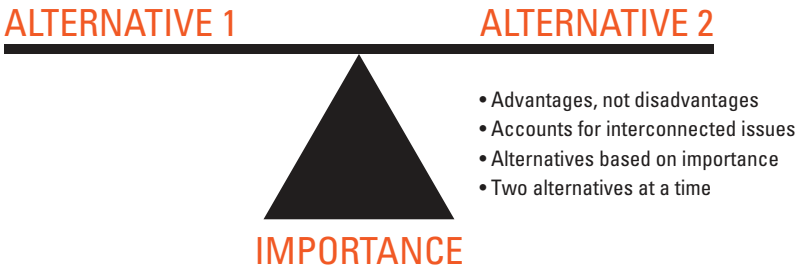

Figure 8-6 Choosing-by-advantages structure

approach to making well-considered, team-based decisions is needed. Since 1969, Jim Suhr has been developing and refining basic principles of sound decision-making in the *choosing by advantages* (CBA) system (Figure 8-6). This approach might also be called sound decision-making, reality-based decision-making, or congruent or effective decision-making. It is based on the premise that decisions must be made based on a prioritized ranking of their advantages.

When using CBA, teams should base their decisions on the ranking of differences between options and never on counterarguments regarding their disadvantages. Assigning numerical weights, ratings, or scores to criteria, goals, roles, and objectives is also counterproductive to effective decision-making as they do not allow for the inherent nuanced and interconnected nature of any decision in the design and construction process and most often encourage adversarial environments.

Another tenant of CBA is that the evaluation of alternatives is based on differences, not value judgments. Rather, various stakeholders present advantages to exactly two alternatives at a time, and the core team then chooses the option that is associated with the most important set of advantages. The process is as important as the rigor with which the ultimate decision is made and should be based as much as possible on hard data. Because decisions also guide a team's actions and ultimately the outcomes of those actions, it is critical that the team follows a consistent process, as history has shown that decisions in project delivery made using unsound methods often have disastrous results (Suhr, 1999).

A3 Reports

Typically in organizations, problems that arise are addressed in default ways using a superficial "first-order problem-solving approach," where teams work around the problem to provide a solution that addresses the immediate issue but does not address the root cause. The medical equivalent is where a cure addresses a patient's symptoms but does not diagnose the underlying disease. Though it may be appropriate in some instances, this "Band-Aid" approach prevents operational performance improvements and identification of systemic issues that may lead to frequent recurrences of the same problem type. More in-depth and systematic tools such as A3 reports can aid collaborative teams in adopting a more meaningful and effective problem-solving approach (Sobek, 2008).

An A3 *report* is a lean tool that is so named because it is structured as a one-page report prepared on a single 11 × 17 (or A3 size) page (Figure 8-7). Through the report, "Plan–Do–Check–Act" thinking is applied to problems. The report is structured as a subdivided form that includes areas for the relevant background, problem statement, preparer's

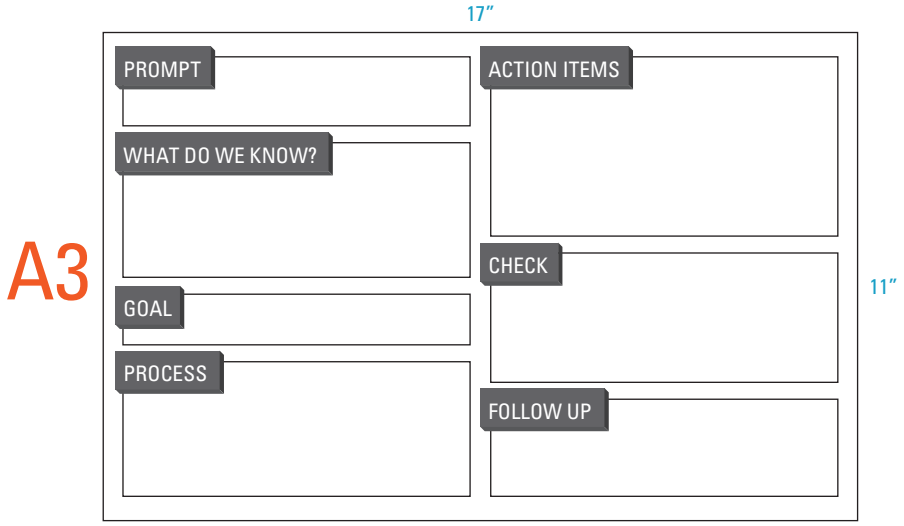

Figure 8-7 Typical A3 report structure

analysis, proposed action plan, and the anticipated results. The standardized format of A3 reports allows for much flexibility in the topic being summarized, the content of which often includes graphic as well as text information. A project that integrates lean principles may use the reports as a method for summarizing and documenting an important decision, a way to analyze TVD options, a format for standardized status reports, and a way to conduct analysis exercises. Research demonstrates that when A3 reports are used properly (i.e., all of the steps are followed and completed), the chances of the decision-making process resulting in success improve dramatically (Sobek and Smalley, 2008).

Decision Matrix

A *decision matrix* is a chart that allows teams to identify, analyze, evaluate, and prioritize a series of options relative to a list of weighted criteria (Figure 8-8). Decision matrixes are useful when multiple criteria are factors in the decision-making process and after the alternatives have been reduced to a manageable number. Teams rate the strength of relationships between sets of information criteria and assess their relative importance.

The process of creating a decision matrix includes identifying alternatives that are listed along the horizontal axis. These key criteria may come from previous brainstorming sessions or the project brief, and all team members should have a clear understanding of what the criteria mean. If some decision criteria are more important than others, the team should review and agree

ALTERNATIVES	COST	SCHEDULE	QUALITY	SAFETY	TOTAL
BASELINE	5	6	8	14	33
OPTION 1	4	7	12	18	41
OPTION 2	3	8	9	11	31
OPTION 3	4	3	14	15	36

Figure 8-8 Sample decision matrix

on appropriate weights to assign to each. Before rating the alternatives, the team must agree on a scoring system and scoring range to produce parity for all options.

For each alternative, the team will assign a consensus rating for each criterion. The ratings are either an average of individual scores or one based on broader team consensus. Once the matrix is filled out, the team multiplies the score for each decision criterion by its weighting factor, totals each score, and compares the results. Matrices in general have been criticized for being biased based on team member preferences and not actual data; the decision matrix approach attempts to address this bias by allowing the team to determine the ultimate decision based on an objective evaluation of each interrelated criteria (Pugh, 1991; Tague, 2004:219–223).

Decision Tree

A *decision tree* is used to map the possible consequences of alternate decisions based on cost, schedule, personnel, and impact. It is essentially a scenario-based flow chart that aids in helping to identify the strategy that is most likely to reach the team's stated objectives. Decision trees generally consist of three types of nodes: decision nodes represented by squares, chance nodes as circles, and end nodes represented by triangles, making them simple to read, understand, and apply (Figure 8-9). They are flexible and can be added to or taken from to test different scenarios. Decision trees can also be added to other methods of analysis such as choosing by advantages, because the tree is a tool for mapping, and can be applied to many types of information. Disadvantages of decision trees include the ambiguity of human perception in decision making (i.e., not accounting for relativity with "more" or "less" qualifications) and the graphic bias we have toward options that address more levels of complexity (Yuan and Shaw, 1995).

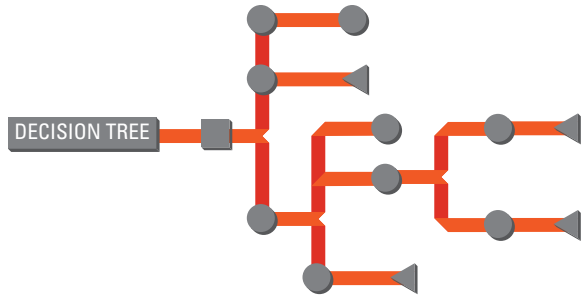

Figure 8-9 Decision tree structure

Ishikawa (Fishbone) Diagram

A similar method to the decision tree, the Ishikawa or *fishbone diagram* (Figure 8-10), which has been used in lean processes, product design, and other practices that desire to identify and examine the root causes that contribute to a particular effect. These causes vary according to the project as well as the personalities and expertise of the members of the team (Ishikawa, 1976). However, some standard cause categories have emerged over time:

- People—anyone involved with the process
- Methods—how the process is performed and the specific requirements for doing it such as policies, procedures, rules, regulations, and laws
- Technology—any equipment, computers, tools, etc. required to accomplish the job
- Materials—raw materials used to produce the final product
- Measurements—data generated from the process that are used to evaluate its quality

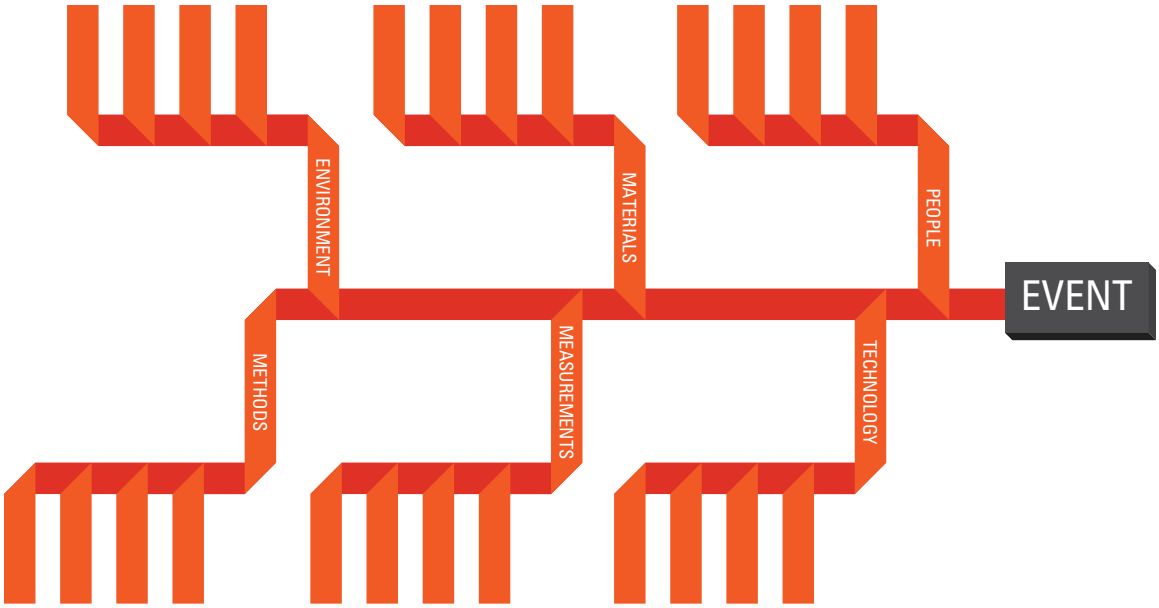

Figure 8-10 Ishikawa (fishbone) diagram

- Environment—the conditions, such as location, time, temperature, and culture in which the process operates

Other industries have identified their own discipline-specific causes and contexts. Likewise, project delivery teams utilizing the Ishikawa method will have to determine the primary causes for an event or decision. The most widely criticized element of the fishbone diagramming method is the absence of a distinction between causes that are necessary, meaning they must exist for the event or decision to take place or occur in the first place, versus sufficient causes that may or may not exist (Copi, 1968: 322).

BIM Scorecard

After establishing a BIM standard and execution plan, the team should track the progress and return on investment (ROI) of implementing BIM during delivery and post occupancy. The *BIM scorecard* was developed by researchers at the Center for Integrated Facilities Engineering (CIFE) at Stanford University to provide an objective and systematic method of evaluating project team performance using BIM (Figure 8-11). The scorecard has four broad areas relative to five tiers of practice. The areas include planning (addressing the objectives, standards, and preparation required to meet goals), adoption (the organization and process used in following the plan), technology (the maturity, coverage, and integration of tools used to accomplish project goals), and performance (the quantitative and qualitative measures of success for outcomes). The tiers include conventional practice, typical practice, advanced practice, best practice, and innovative practice (Kam, 2013, Kam et al., 2013).

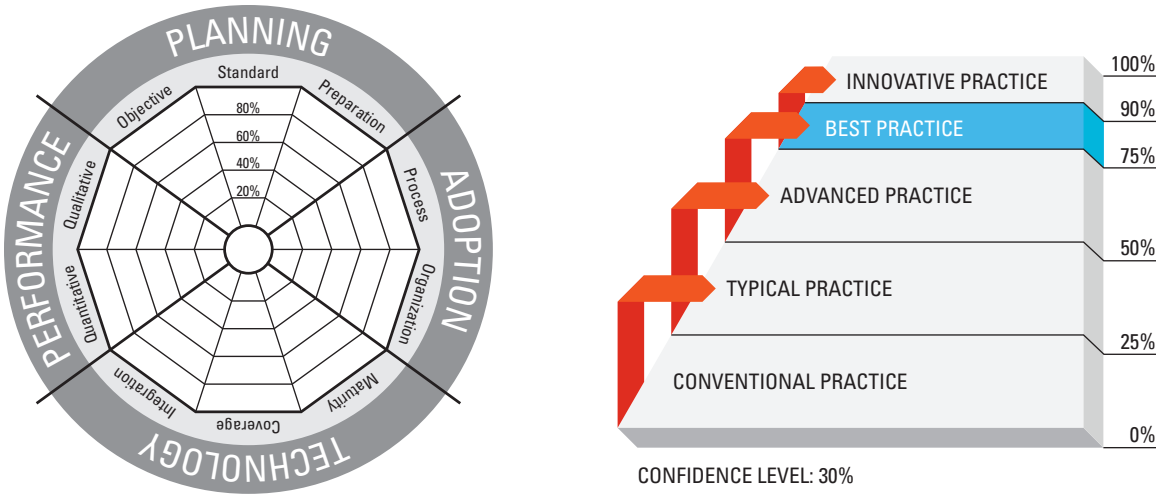

Figure 8-11 BIM scorecard and team performance tiers, adapted from Kam 2013

CASE STUDY: ALTA BATES SUMMIT MEDICAL CENTER

The design and construction industries have adopted helpful tools from the manufacturing and business industries to provide structured ways to streamline project schedules, support a logical decision-making process, and facilitate dialogue. The use of one or more of these lean tools alone does not ensure a successful project. However, when used consistently as strategies within an iterative, collaborative process, they have been shown to reduce inefficiencies and arrive at more sound decisions.

Project Details

Architect: Devenney Group Ltd., Architects

Owner: Sutter Health

Contractor: DPR Inc.

Key subcontractors:

- Steel fabricator/erectors—Herrick Steel
- HVAC—Superior Air Handling
- Electrical contractors—Redwood Electric Group
- Plumbing contractor—JW McClenahan Co.
- Medical gas—LJ Kruse
- Fire sprinkler—Transbay Fire Protection
- Structural engineers—Degenkolb Engineers
- Electrical/low voltage engineers—ECOM Engineering
- Mechanical and plumbing engineers—Ainsworth Assoc.

Location: Oakland, CA

Type: Health care—Remodel and new construction

Project duration: December 2007–June 2014

Size: 250,000 SF

Cost: $350M

Project delivery: 12-party integrated form of agreement (IFOA)

(*continued*)

(*continued*)

Figure 8-12 Alta Bates Summit Medical Center new patient care tower *Image courtesy of Devenney Group Ltd., Architects*

Introduction

Devenney Group Ltd., Architects is based out of Phoenix, with studios in Oakland, Pasadena, and Dallas. It has specialized in health care for over fifty years. Devenney was hired in 2008 by Sutter Health to retrofit their patient care pavilion at the Alta Bates Summit Medical Center and to design a new patient care tower that would add 238 private patient rooms to the existing building (Figure 8-12). The twelve-party IFOA contract included engineers, fabricators, and contractors, essentially forming one large company to share both the risks and the profits of the project (Figure 8-13).

Following the Northridge earthquake in 1994, the state of California passed a law requiring acute care facilities undergo seismic retrofits within a decade with no government financial support. Sutter Health made the strategic decision to build or replace hospitals rather than retrofit older facilities for its 23 acute care locations and has invested more than $7 billion in construction to meet and exceed the safety standards since 2000. This was significant motivation to search for a delivery method that would provide a more predictable schedule, reduce cost, and decrease litigation. They adopted IPD as an alternative to the traditional construction process, developing their own contract structure.

Structuring Integrated Delivery

The Alta Bates project was delivered under a twelve-party IFOA with Sutter Health serving

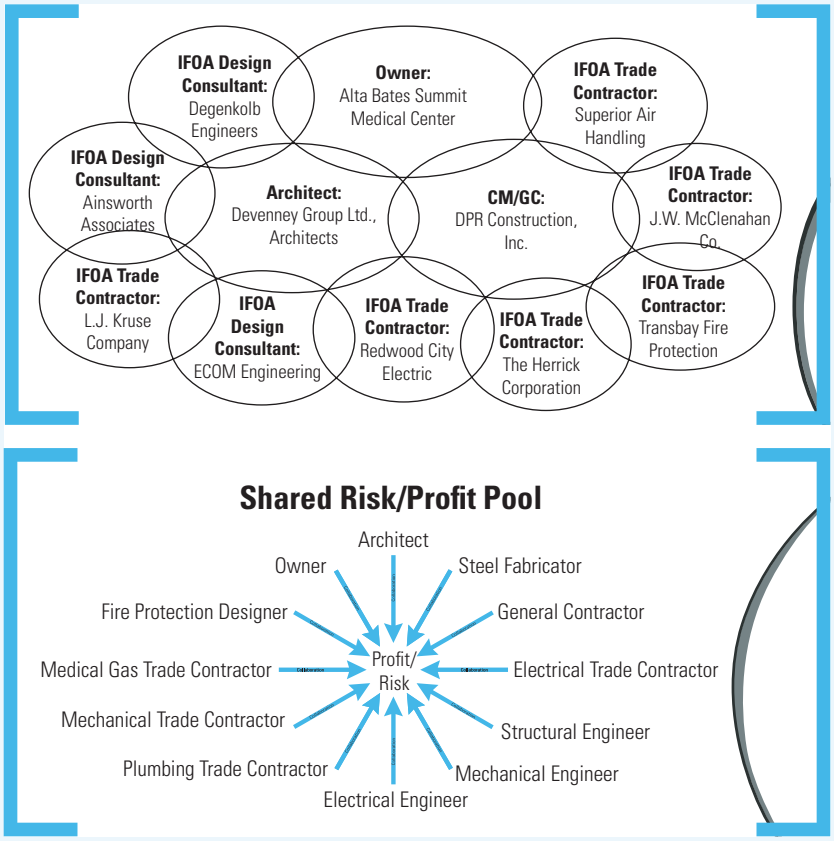

Figure 8-13 Project team structure *Image courtesy of Devenney Group Ltd., Architects*

as the leader of the collaborative process. The IFOA established a collective desire for success as all parties shared the profit and risk pool collectively. The contract covered the cost of worker salaries, fringe benefits, and a certain amount of overhead expense for office work and other miscellaneous costs. A profit percentage was then added to the project as a shared incentive pool. Money would be drawn from this pool if the project went over budget. Money saved, on the other hand, would be added to this pool as a bonus to be shared between the owner and team members upon project completion.

This contract model minimized finger-pointing and encouraged genuine collaboration between all parties. Solutions to problems were evaluated for their collective impact rather than their effect on a single team member, and ultimately the project team was able to claim 80 percent of the possible incentives.

Devenney Group assembled their team by identifying people who were willing and capable of collaborating on a complex project.

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Depending on the intensity of the project phase, up to fifteen people from the firm worked on the project full-time; two to three people were in the onsite field office, while the rest of the team worked out of the Phoenix office. Occasional substitutions were made if team members were unwilling or unable to collaborate.

The project team introduced a unique phased review strategy for the Patient Care Pavilion in order to address the laborious California Office of State-Wide Health and Planning Development (OSHPD) review process. They invited OSHPD representatives to review the project comprehensively, starting from the early stages of design, and provide feedback in order to identify possible obstructions to approval. Overall, the plan enabled the team to start construction thirty-two months faster than a comparable project (Figure 8-14).

Tools for Collaboration

The team used a variety of lean strategies throughout the project, starting with pull planning to define the overall goals (Figure 8-15). In the case of the Patient Care Pavilion, this process involved dividing the project into assignable tasks with durations and constraints. One key to making pull planning successful on the Patient Care Pavilion was to write comprehensive descriptions for each task, defining in detail what would be delivered, who would deliver it, and what was needed from other team members to make it happen. Although pull planning required a higher upfront investment in time, Devenney Group found that it paid off in terms of a providing smoother process and a better overall project.

All team members had password-protected, online access to the pull plan with the capacity to edit their part. This coordination helped each individual understand how his or her work affected the rest of the team. When a task was delayed or projected to miss a given milestone, the entire team met to analyze why and to plan a solution. Meeting together in this way also provided team members with the opportunity to form stronger interpersonal relationships.

The project team also used A3 Reports to solve conflicts. Using this tool, the team documented issues, outlined its impact on overall project workflow, and identified

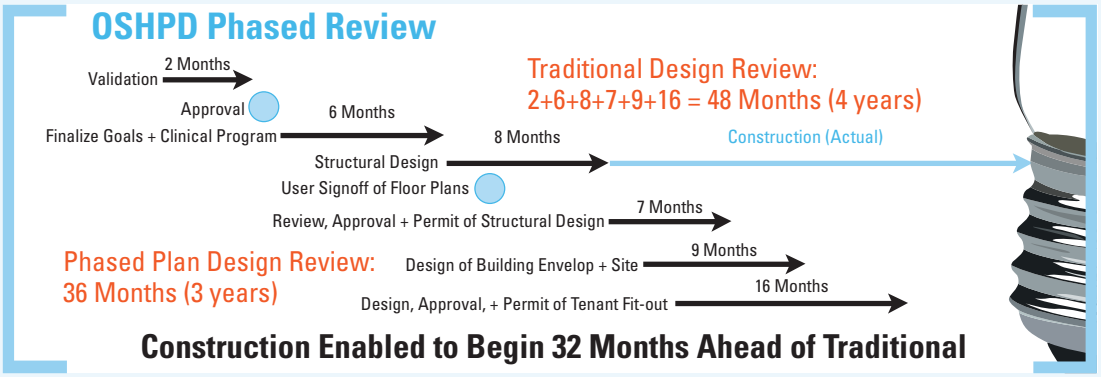

Figure 8-14 Phased review incorporating OSHPD milestones *Image courtesy of Devenney Group Ltd., Architects*

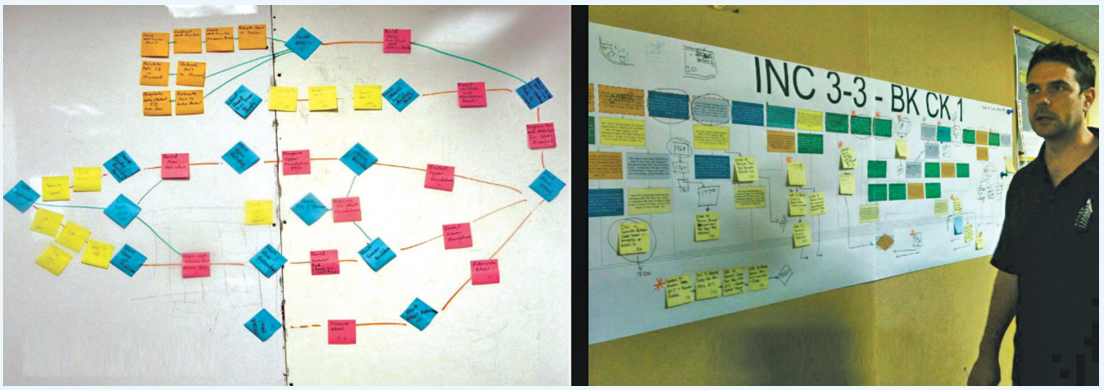

Figure 8-15 Pull plan development over time *Image courtesy of Devenney Group Ltd., Architects*

alternatives along with corresponding pros and cons. A report was then created and presented to a core group of six IFOA stakeholders, who voted on a final solution. The process helped team members address the root cause of issues rather than work around them.

BIM and Collaborative Construction

A collaborative environment was maintained not only during design phases, but throughout the construction process as well. Fabricators pulled information directly from the comprehensive BIM model in order to prefabricate components that were then brought to the site ready for erection. The model was verified through a laser-scanning process when problems arose. A real-time 4D scheduling process was used to compare the planned project progress with actual progress (Figures 8-16 and 8-17).

Building inspections were conducted digitally; inspectors had digital access to the areas they inspected through tablet computers taken on site. Additional laser scanning was applied after walls and ceilings were closed in order to document the location of all components. The result was a precise as-built model that could be used by facility management staff.

Not all collaboration efforts during the project were welcome. Some tradesmen initially resisted the transparent process, reluctant to have others challenge the way they had traditionally done their work. Once these parties understood that the intent was to produce a better result, however, they became more agreeable to collaboration.

A "big room" was set up at the project site that was used to house colocated team members and host collaborative work sessions throughout the design and construction of the project. The project required the IFOA teams to collocate staff to the big room to assist in the design and construction for the duration of the project. Devenney Group had a variety of staff colocated in the big room at various times during the project. Colocated roles varied between medical planners/designers, project managers, project architects and production staff. The big room environment allowed for the ability to review concepts with the proper stakeholders and quickly resolve issues that might arise, proving its value as a collaboration

(*continued*)

(*continued*)

Figure 8-16 Model to field, field to model *Image courtesy of Devenney Group Ltd., Architects*

tool throughout the project. The benefits of colocating staff in a Big Room environment allowed the design to progress at a faster pace with continued input and feedback from the IFOA members, thus maximizing opportunities for face-to-face communication.

Project and Process Leadership

The Devenney Group emphasized the importance of having a strong facilitator to lead collaboration. They believed that the person most fit for this role would be someone who was fully committed to the integrated design process, someone who could collect and interpret information from team members across disciplines. In the case of the Patient Care Pavilion, project leaders understood the value of drawing upon different vantage points. The Devenney Group invited trade contractors to collaborate with them during spreparation of the project specifications for various products used in the building, a process from which trade

Figure 8-17 Field verification of digital model *Image courtesy of Devenney Group Ltd., Architects*

contractors are usually excluded. These trade contractors highly appreciated being included, seeing the invitation as a welcome response to a longstanding appeal from the industry.

The Devenney Group stated that keys to the project's success included keeping team members consistent, which helped ensure that everyone knew the history of the project and was familiar with how decisions had been made. IFOA parties came to know and rely on one another over time, and trust and commitment between parties increased through frequent and collaborative pull planning exercises. Legal issues were avoided during the project, which is good evidence that the IFOA succeeded in its design in preventing major legal conflicts among parties. Colocation was found to enhance communication, productivity, and ownership of the project. Overall, building trust among all team members was determined to have been the most important factor in the success of the IPD process.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

PART 3

LEADERSHIP EFFECTIVENESS

Part 3, "Leadership Effectiveness," is concerned with the effectiveness of architects as leaders in project teams. It will introduce the three primary concepts of leadership—ability, awareness, and commitment—and the various styles of creative problem solving, behavior, and leadership. Readers will be able to reflect upon their own approach to leadership and understand what skills they need develop in order to increase their influence on project teams.

This part also reviews the functional, or career development, stages of design professionals and the associated interpersonal and leadership skills they should have in each stage, as well as strategies for leaders to provide appropriate direction and feedback to them at each state of their development.

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CHAPTER 9

Leadership Effectiveness

Foundations of Leadership

Though all architects understand that their work is not produced in isolation or without considerable outside contribution, they have been trained for decades in hierarchical and procedural modalities of practice that privilege architectural identity and authority as primary among a collaborative team (Doctors, 2011). For teams to collaborate successfully, they need effective leaders who can balance their own ego with the objectives of the greater project and model such practices to members of the team.

Leadership is a mindset, skillset, and set of behaviors that can be exercised by individuals in teams regardless of their position or authority. Leaders are critical to team building and team maintenance because they are able to positively influence others in a way that benefits stakeholders and supports the collective goals of the project (DeLisle, 2013). Influence may at first have a negative connotation, but in fact, influence is most often a positive force in the context of leadership.

People have influence either due to their position within a project or firm hierarchy or through their personality and behavior. For example, the president of a company has influence by virtue of his or her power over all employees, but a charismatic intern may also have the ability to influence team members' and superiors' behavior (Lussier and Achua, 2013:7). Leadership is thus not limited to those in management positions, though such individuals have a greater responsibility to be aware of the impact their actions have on others so as to not allow their situational influence to become coercive.

So too might authority have a negative connotation. The operating definition of authority in terms of leadership and collaboration is legitimized influence informed by official structures (legal definitions, professional appointments, etc.) and moral consciousness, or a person's ability to manage their behavior (DeLisle, 2011).

Leaders "create a sense of mission, they motivate others to join them on that mission, they create an adaptive social architecture for their followers, they generate trust and optimism, they develop other leaders, and they get results" (Bennis, 2007). Leaders influence to achieve organizational

objectives by communicating ideas, gaining support, and motivating others to implement these ideas through action.

Effective leaders of collaborative teams share several behaviors: They make their first priority the development of others; they are able to keep the primary project objectives in mind at all times; they engender and sustain trust; and they recognize that their ability to succeed is tied directly to the success of their teams. Collaborative leaders often "will not have the loudest voice, but the most attentive ear. Instead of pyramids, these post-bureaucratic organizations will be structures built of energy and ideas, led by people who find their joy in the task at hand, while embracing each other—and not worrying about leaving monuments behind" (Bennis, 1999).

Trait versus Behavior

Our understanding of what constitutes leadership and what traits and behaviors define leaders has evolved over the course of the nineteenth and twentieth centuries. Effective leaders were thought to possess specific traits that were both inherited and acquired that made them better able to lead than others (Cowley, 1931). Early theories focused on personality traits that were thought to define those who were or had the potential to be strong leaders (Carlyle, [1841] 1907). Personality *traits* are distinguishing characteristics that define behavior and distinguish a unique personality (Lussier and Achua 2013). The identification of traits is often achieved through self-reporting tools such as the Myers-Briggs Type Indicator personal inventory. Although commonly used to this day, it is important to note that such self-assessment tools are only as reliable as the answers given (Myers, 1995). Because there is no verifiable evidence or a reliable test that quantitatively links personality traits and leader effectiveness, this theory has been expanded to include knowledge, skills, values, and situational awareness, which create a more well-rounded definition of leadership (M. Kirton, 2003, 392; Stogdill, 1948).

Leadership theory has evolved in the twenty-first century to suggest that effective leaders exhibit specific *behaviors* or styles of leadership that may or may not be tied to personality traits. Researchers study ways in which process is linked to product in terms of leadership effectiveness, as assessed through the perceptions of others rather than through self-identified personality-based metrics alone. The challenge of this contemporary framework for leadership studies is that different behaviors or styles of leadership are more or less effective depending on the situation or type of team organization. Any one leader may exhibit the behavior of multiple styles depending on the situation (Bass, 1990). Rather than being defined by a simple set of criteria, leadership requires a nuanced understanding of how fundamental principles are applied in practice and shaped by context.

Ability

While leadership as a concept can be somewhat nebulous to define, a leader's effectiveness is the measure of how efficiently a leader can influence stakeholders. It is a direct function of three interdependent elements: ability, awareness, and commitment (DeLisle, 2013) (Figure 9-1).

Ability is based on trait theory. It is the capacity and expertise required to influence others' ideas and behaviors with or without authority. Effective leaders make decisions, solve problems, motivate others, and balance tasks and relationships in a project team. Ability to lead is a function of influence. Architects rely on their ability to influence others to get work

Figure 9-1 Elements of leadership effectiveness

done, because nearly every design project requires collaborative problem solving and decision-making practices. Architects are particularly well suited to lead collaborative teams and influence the work of others, because they are able to see the larger context of situations, understand the interrelatedness of issues, and possess fundamental problem-solving skills.

Although there are specific traits leaders have—regardless of situation—that make them more or less effective, their behavior must respond to contextual conditions in order to be efficient (DeLisle, 2013). Very few effective leadership traits are universally applicable across contexts and situations. Therefore, rather than focusing on a list of skills or characteristics, those interested in developing their own leadership skills should focus on the behavioral aspects of leadership (Fiedler, 1967).

Awareness

Awareness, the second tenant of leadership, is a state of consciousness; it is the behavior that is chosen rather than that which is instinctual. Awareness might be defined as the capacity to recognize events, situations, and characteristics in real-time (DeLisle, 2011). Awareness is also the ability to assess the impact of one's actions on situations or people and the ability to be critically self-reflective (DeLisle, 2011). Individuals become more aware over time—it is a direct function of experience, communication, self-discovery, and feedback. Trust, both from and for others, is required for an individual's awareness to continue to grow (DeLisle, 2013).

Architects, engineers, and contractors assume responsibility, both legally and ethically, for the quality of their work and recognize that it has a direct, tangible, and material impact on the lives of others. This impact is felt by those who are in contact with the buildings on a regular basis, including project team stakeholders, coworkers, and community members.

Leaders in project delivery teams influence complex and uncertain situations with an expectation for a positive outcome. Recognizing and embracing complexity is a necessary attribute for leaders in and related to the design and construction professions (Moe and Smith, 2012). Only a few other professions such as medicine, engineering, law enforcement, and the military share this ethical commitment to positively impact others above all else (DeLisle, 2011).

Commitment

Commitment is a leadership behavior that requires making decisions and facing the risk of doing the right thing for the team or the project despite possible personal repercussions. Effective leaders must commit to assuming the risk and responsibility for the outcome of their decisions, which requires that they have the ability to make hard decisions.

A hard decision is different from a tough decision, which is one made when there is ambiguity or uncertainty, when there are competing priorities,

or when factors such as time and money are significantly limited. Tough decisions require significant effort to parse situations while in possession of insufficient information or when there is seemingly no ideal option. A hard decision, on the other hand, is one where a leader must act to ensure that the proper ethical, legal, and moral decision is made even if the consequences are not ideal (DeLisle, 2011). The skill to make such difficult judgments is one of the key behaviors that separate leaders from managers (Tichy and Bennis, 2007).

Leadership effectiveness is the connected and symbiotic interrelationship between these three traits—ability, awareness, and commitment. A diagram of the model suggests that all corners of the triangle must be present for the form to be complete and thus for a leader to achieve a level of effectiveness. The corner assigned to each characteristic expands as new skills are developed and awareness achieved. The overall area of the triangle representing leadership effectiveness grows proportionally.

If leaders lack any of the three elements, they will not be able to have perceptible influence. The resulting deficiencies are varied, but the outcome is consistent: If leaders are aware and able but not committed, they will cause problems to go unresolved or plans to fail for lack of support; if they are able and committed but not aware, their behavior will yield good intentions, but result in very poor decision-making; and if they are aware and committed but not able, they will be ineffective on many levels (DeLisle, 2011). Ideally, all three traits should exist or be developed in a balance with one another.

Conscious/Competent

Another way to understand leadership effectiveness is through a model that plots a leader's characteristics as related to the concepts conscious and competent

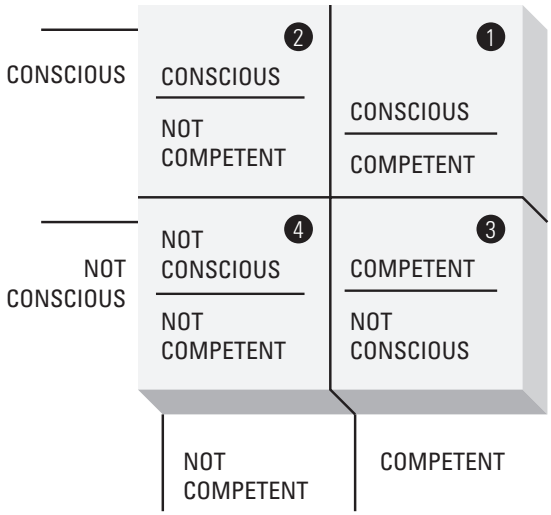

Figure 9-2 Conscious/competent matrix

(Burch, 1970). A four-square grid matrix can be used to visualize the possible combinations of the positive versions of these characteristics (Figure 9-2). On the *y*-axis are conscious and not conscious (which is not the same thing as unconscious). On the *x*-axis are competent and not competent (which is differentiated from incompetent). Both "not conscious" and "not competent" have inherently negative first readings. However, leaders may at times find themselves in situations where they are not conscious or not competent and must still lead (DeLisle, 2011).

Consciousness is a person's clear understanding of the impact of their behavior on other people in real time. Not conscious is the opposite, meaning a person is completely unaware of the effect their actions have on others. *Competence* is the ability to perform a task at a level of mastery. A person is defined as "not competent" when he or she does not have the skill set needed to achieve a given task. Both consciousness and competence can be developed over time, though traditional professional environments typically focus on developing employees' technical competency and ignore factors relative to consciousness.

Ideally, leaders should be both highly conscious and highly competent. However, most real-world situations are not ideal, and a leader's ability may not meet the desired level for each situation. This does not mean that they are not well suited for the job, but that they must make a critical examination of which skillset they are lacking and work to develop it to be successful in completing the project or task.

Acceptable (though obviously not ideal) combinations are ones where a leader is "competent but not conscious" or "conscious but not competent." The more desirable of these two states—conscious but not competent—is the one where the leader is fully aware of the fact that they do not have a clue. The less desirable—competent but not conscious—is where they are able to perform at a level of mastery but do not understand the implications of their actions. People who fall into the category of "not conscious and not competent" clearly should not be placed in positions of leadership or authority.

It may seem as though the "competent but not conscious" group should also be kept off of collaborative teams and out of leadership positions. However, if they are reliable, capable, and can execute tasks at a high level, they can be assets as long as the contextual conditions contributing to their expertise remain the same. If, for example, the building industry were to experience another radical shift similar to that from 2D drafting to 3D building information modeling that made such "competent/not conscious" team members' skillset obsolete, they would need to significantly shift their efforts to another area of focus or become irrelevant. A person who is considered "naturally talented" at a skill is more accurately not conscious of the factors that led to its development. They may now find themselves not conscious and not competent within this new context, feeling troubled and disconnected as a result.

Finally, the problem with a person being conscious but not competent is that they are fully aware of a situation but incapable of addressing the required need. This can be a troubling situation because it is hard for people, particularly leaders, to admit when they do not know something. Every new building is, to some extent, unique, meaning there is no one who is perfectly suited to address all of the project's needs. In such contexts, leaders spend a high percentage of their time being conscious but not competent, addressing situations for which there is no precedent. When a team must deal with a problem but are not sure how to do so, leaders step in to help make sense of the situation and develop a plan of action going forward. During this process, team members learn, grow, and gain competency (DeLisle, 2011, 2013).

Leaders, then, are often in a state of discomfort even when they are highly conscious and highly competent due to the unique nature of problems and tasks associated with building design and construction. Nevertheless, they must engage rather than deflect when faced with difficult situations and continuously learn and grow in order to be better suited for the next challenge (DeLisle, 2011, 2013).

LEADING TOGETHER—INTERVIEW WITH PATRICIA RHEE

Patricia (Patti) Rhee, AIA DBIA, is a partner at Ehrlich Yanai Rhee Chaney Architects (EYRC), the 2015 AIA Architecture Firm Award recipient. The firm recently transitioned from a sole proprietorship practice to a joint partnership. Along with the firm's marketing and business development manager, Sigita Moran, Rhee spoke to us not only about her efforts to

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continually develop the firm's design excellence, particularly in design-build projects that have become her specialty, but also about the role of gender and diversity in leadership and developing the next generation of leadership within the firm.

Erin Carraher: As the only woman partner in your practice, do you feel your leadership style is different from your male counterparts?

Patti Rhee: I do. Maybe that's because I'm a woman; maybe that's because of my personality. I don't necessarily think my way is more feminine.

Sigita Moran: I think you're a lot more perceptive about things that are unspoken. It's sort of a stereotype to say, "Women are more sensitive," but Patti is, of all the partners, the one who I feel has a sense of the morale or how people are feeling in the office, a lot better than the others. She has an intuition that is unique.

Carraher: I was thinking about the small percentage of women in leadership positions in firms and wondering if there is a way to advocate for the different qualities that women bring to leadership roles. Or is gender a moot point? Is it really most important to be a good leader and not qualify someone as a good woman leader or a good man leader?

Rhee: I think it's the latter, honestly. In an office like ours where it's pretty gender-blind, there is a pretty good proportion of women to men. It's not 50:50 overall, but there are almost an equal number of female associates and associate principals as there are men. It's not that we specifically tried to elevate an equal number of women versus men, more that people are rewarded based on their merit.

Something that I bring as a leader in the firm is a consciousness of making sure that we have diversity across the board, within our staff. That needs to be taken into account when we're hiring, when we're promoting people, and when we are looking at pay equity. It's not that we make decisions based on gender or diversity, but we are conscious about having a balanced, representative population.

Carraher: Can you talk a little about your personal experience "moving up through the ranks" at your firm? You started out in a junior position. What did your path to partnership look like? Did you outwardly express interest in taking on a leadership role or was it something that others saw in you and helped cultivate?

Rhee: Since we are a medium-size office, there is a lot of room for growth—more so, maybe, than I would have had at a larger firm. Also, the people who were leaders when I started at the office believed in me and my current partners. That obviously allowed us to thrive.

It's not that I walked in and thought, "I want to be a partner or a principal some day." You just don't think like that (or at least I wasn't) thinking like that so early in my career. EYRC is a place that nurtured me over time, and I grew into the role. The firm was always there to support me. It's as much about what comes from within as it is coming from the people at the firm around you.

Carraher: How was it for the firm to transition from a sole proprietorship to a partnership? Have you noticed any change in the leadership approach?

Rhee: We've been doing this for many years now, so it's not so stark of a change. We're increasingly becoming more organized and managing the firm more tightly than before.

Moran: The perception of design leadership has changed as well. Patti has always been a hand-in-hand lead designer with Steven [Ehrlich], and now the name more accurately reflects this four-person partner team.

It's much more of an open dialogue, too, with the onset of the partnership. Decisions aren't

just made quickly by one person alone. We have a discussion before any significant business decisions are made.

Rhee: [*interjects, laughing*] Which is good and bad. Things take longer. But at least we hash them out, whereas before they weren't always talked about it. At least now we feel like we're making wiser decisions—right?

Moran: The more minds, the better.

Rhee: And just two weeks ago, we elevated two associates to associate principals and named two more new associates. It's an exciting time because we hadn't done that in a while.

Carraher: Are the partners thinking about the different levels of leadership in the firm and ensuring you have good people in those positions or to fill gaps when they are identified?

Rhee: These are challenging times. Everyone is hiring from the same pool of talent. It's a limited pool—I've never seen anything like this in my career. It has been challenging to find the right people. Everyone is poaching from each other and salaries are highly competitive. But whether in leadership or anything else, we're always trying to find the best person for the role, whether that person is from within the office or outside the office.

Steven was smart [to bring on the three new partners] when he did, because it provides some assurance that there is going to be a future for the firm when he retires. He's going to be working until he's got one foot in the grave, so this is by no means his exit strategy. The idea is that we are elevating people and thinking about elevating new people that will take on the firm once we retire. It's this ongoing thing, it has life. You see too many times firms that shut down or even fold prematurely once the founding leaders leave or reach a certain age.

This is all part of growing. It's a question of being more aware and conscious of what you're doing. It helps that things are more codified and spelled out for junior staff now—people desire that clear path forward—whereas before things may have been more unspoken or unwritten. The desire now among staff is to know what they should be doing to stay on the track to leadership, so as much as we can, we are trying to accommodate that to support the continued growth and vitality of the firm.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 10

Leadership Development

Farm Gate Model

Team behaviors and individual behaviors are influenced by one another. Individual behaviors collectively define team behavior; team culture and attitudes influence the manner in which individual members behave (Waldroop and Butler, 2000). Technical skill, management ability, and interpersonal awareness are key individual skills and behaviors that lead to effective leadership in collaborative teams. Traditionally, technical ability has been valued over interpersonal awareness (Verzat et al., 2009). However, many argue that the latter is a greater predictor of an individual's potential to be a successful leader.

The *farm gate* model can be used as a visual metaphor to illustrate the importance of interpersonal awareness in leaders (Figure 10-1) (DeLisle, 2011; Hersey and Blanchard, 1977). The model contains three horizontal strata that represent introductory, mid-level, and top level positions within a project team or firm. Clearly, each project and team is structured differently, and the titles are meant only to represent three general levels of responsibility in a professional context.

The top stratum represents functional managers who are key stakeholders or core team representatives. In project delivery teams, this would represent the partner or project architect who is the firm's primary point of contact. This functional manager is responsible for a significant portion of high-level strategic leadership and management of project operations, setting forth goals and milestones and keeping team morale high.

In the middle stratum are individuals who have some level of management under the functional manager's umbrella, overseeing junior staff or functional subsets of the larger team. These are project managers or project architects that may be in similar positions on more than one project at any time.

Interns, designers, and design architects who do not have any managerial responsibility in the project or firm occupy the lowest stratum. These team members directly participate in the project and supervise the details and technical operations of their assigned tasks.

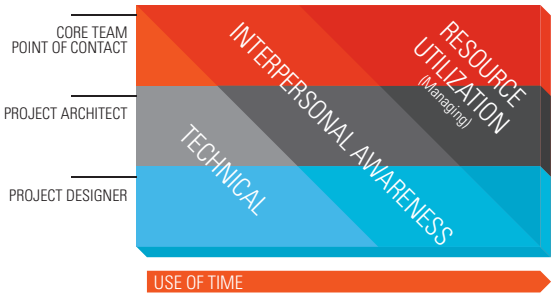

Figure 10-1 Farm gate model

The *x*-axis represents the allocation of time, which is the most valuable factor in a project because it is the only nonrenewable resource. How time is spent is a critical factor in measuring project and firm performance.

The addition of two parallel diagonal lines bisecting opposite corners, each crossing all three horizontal bands, completes the model. These diagonal lines create a triangular space in the lower left-hand part of the diagram, which represents technical skills, a parallelogram in the center of the two lines represents interpersonal skills, and the triangle in the top-right of the diagram represents management skills.

Technical skills include those used in problem solving and day-to-day production, such as managing the BIM model and coordinating specification information. Interpersonal skills are related to self-awareness and empathy and include coaching, communication, and conflict resolution. Management skills refer to planning, organizing, and coordinating the activities of a person, team, or practice (DeLisle, 2011; Wyld, 2009).

The diagram illustrates the typical distribution of such tasks as related to a person's role in a firm or project. Junior staff members spend the majority of their time directly addressing technical problems. This is a demanding job that requires a high level of technical capability. Interpersonal skills at this level are needed in order to learn the complex structures of project teams and how to engage with a wide variety of audiences. It also includes a small amount of management-related tasks so those in leadership positions can observe junior team members' aptitude in this area (DeLisle, 2011).

Project architects or project managers have equal responsibility in both technical and managerial areas. Having proven themselves skilled at solving detailed technical problems, they are also tasked with project management responsibilities, including planning, organizing, and coordinating other team members (DeLisle, 2011). The paradox is that the need for interpersonal skills in practice as a whole and at this level in particular is in stark contrast to the technical training architects traditionally focus on in school. Architecture students learn how to develop design ideas visually, spatially, and technically, but they are rarely, if ever, tutored in interpersonal skills and behaviors (Bloomfield and Price, 2010; Verzat et al., 2009).

The middle stage is one in which many people who have historically excelled with technical tasks may struggle. They often see a drop in efficiency as they ramp up in an entirely new skill set based on interpersonal relationships. It is also difficult for middle-tier managers to become comfortable with the multiple trajectories of influence they have in their position (DeLisle, 2011).

In the model, influence is defined by adjacency in any direction, while authority exists only directionally from top to bottom (Figure 10-2). Thus, downward influence is where individuals have authority legitimized by their organizational position, meaning they can assign tasks and expect results. Managers in the middle tier have influence and authority over those in the lowest tier. An example of this is a project architect redlining drawings produced by junior team members and assigning a deadline for the changes to be completed.

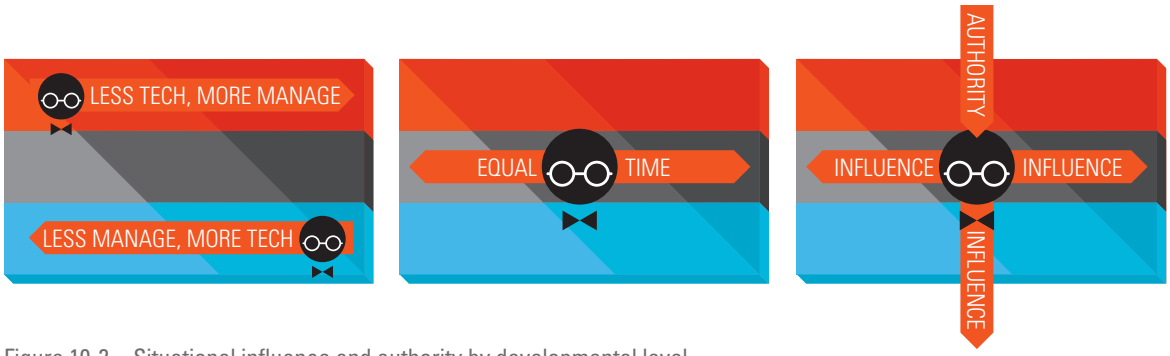

Figure 10-2 Situational influence and authority by developmental level

Middle-tier managers have lateral influence on those with similar rank in their own organization and with stakeholders on cross-functional teams. Because the relationships are horizontal, they do not have authority over their peers. Lastly, they have influence on the project architect and firm leaders as they report on the work they are responsible for and receive direction regarding next steps.

Obviously, middle-tier managers do not have authority over those who are above them in the hierarchy. In three out of the four domains, the middle-tier manager has responsibility to multiple groups, but is required to influence without authority. This is the differentiating factor that sets this stage apart and perhaps the one that defines this level as the most difficult, or at least most complex, in terms of relationships than those above and below who have more clearly defined roles regarding leading and being led.

The farm gate diagram also demonstrates that senior personnel spend the majority of their time planning, organizing, and coordinating; design architects and interns spend their time on technical tasks; while project architects and managers split their time between technical and management tasks. The only factor that is equally important across all levels is interpersonal awareness (DeLisle, 2011).

Interpersonal Awareness

Interpersonal awareness is the first step in being able to manage one's own behavior and relationships with others. Studies suggest that interpersonal awareness is one of the biggest predictors of performance in the workplace and is a strong driver of effective teams. This type of awareness can be referred to by many names, one of the more common being EQ, or emotional quotient, as differentiated from IQ, or intelligence quotient (Figure 10-3). While humans' ability to learn is inborn, their capacity for emotional awareness is not. It can be fostered, developed, and advanced through conscious effort over time (Bradberry and Greaves, 2009; Goleman, 2005).

It may seem that emotion should have no place in project delivery teams, but humans are fundamentally emotional beings. Our first reaction to any piece of knowledge or event is primal. Anatomically, thoughts pass through the part of human brains that processes emotions before arriving at the parts that involve reasoning. Though biology can't be changed, individual awareness, consciousness of emotional response, and understanding of the impact of actions on others can brought under greater and more intentional control (Van Kleef et al., 2009).

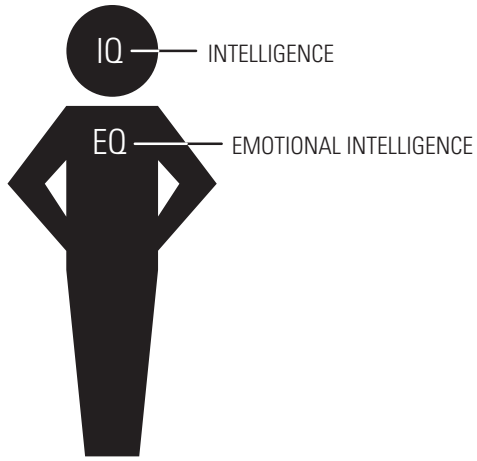

Figure 10-3 Interpersonal awareness

Individual Awareness Tools

To become more personally and socially aware, individuals need to understand the cause and relationship effect between themselves and those around them as well as how the actions of individuals affect group settings (Figure 10-4). Strategies for developing personal awareness include the following:

Build your self-awareness. There are many types of behavior inventories and personality profile tests available freely or for purchase. Though these are generalized and definitely do not paint the whole picture of a complex individual, they are often effective at raising the level of self-awareness. A person may think they are overly shy when in fact they are a quiet listener, or one may identify as a strong leader when they are in fact overpowering others in a domineering way.

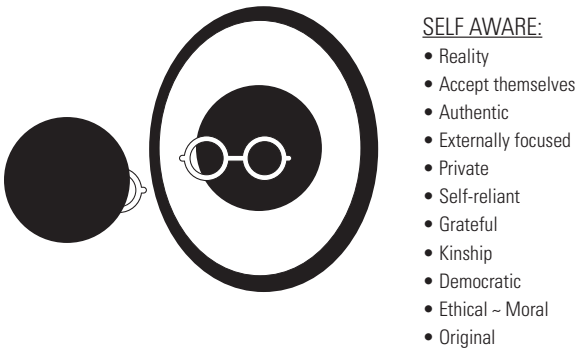

Figure 10-4 Self awareness

Build others' awareness of you. It is important not only for individuals to recognize their own natural inclinations (i.e., personality) but also for their teammates to be aware of them, too. In this way, a team can value each member for their diverse nature.

Build your awareness of others. Awareness of others allows you to be more sensitive to how your actions affect other people's actions and reactions. For example, when dealing with interpersonal conflict, it often helps to frame an issue in a way that is not accusatory—"I feel that my input is not being taken into consideration by the way you often cut me off. Is that your intention?" (i.e., this is how I interpret your actions), rather than, "You aren't listening to me!" (i.e., your actions are wrong). Understanding that people react differently to the same situations is a fundamental component of empathy, which affects all aspects of interpersonal relationships.

Build your communication skills. Communication is a factor of both what is being communicated as well as how this is done (i.e., body language, tone, volume, facial expressions, and the like). Miscommunication is common when done through e-mail or even over the phone because of the lack of verbal and visual

language cues. For example, a coworker may be in a hurry when writing an e-mail, which is misunderstood when read as terse when this was not the intent at all. Body language and tone are as important to communication as the actual information being communicated.

Reflect on your actions. Critical and objective reflection are needed to help individuals understand how their actions contributed to or detracted from a team's effectiveness. For example, did their enthusiasm about pursuing an idea rally others to work toward achieving it or did their preoccupation with a personal issue foster a perception that they were not invested in the team's success? The act of critical self-reflection also has immediate and significant benefits to team performance (Boytzis and Goleman, 2001; Duval and Wicklun, 1972; Goleman, 2005).

Team Awareness Tools

Similar to the types of tools used to raise individual awareness, team tools help groups develop awareness of their collective actions in an effort to become more collaborative, creative, and productive. Strategies for team awareness-building include the following:

Build knowledge about team members. Understanding people's skills, abilities, and personal histories helps develop a deeper collaborative relationship in teams.

Build understanding of team members' differences. Individuals rarely share the exact same value systems. These differences can lead to small annoyances or large conflicts if not understood.

Build trust among team members. Trust is not something that can be prescribed: it develops over time and through personal engagement. Trust requires a degree of vulnerability, and should not be given lightly or, conversely, withheld unconditionally. When trust is established, teams are able to engage in open and honest debate, but when trust is broken, it is difficult to rebuild (Covey, 2006).

Vulnerability occurs when team members are open with each other and willing to share personal information, which helps provide greater understanding of their past experience and current perspectives on issues (Bradberry and Greaves, 2009). Though vulnerability is necessary for trust to grow, it does not require individuals to reveal more intimate information than they feel comfortable having people know. Vulnerability is also related to professional contexts—a senior project manager being willing to ask a junior designer to explain a digital tool is not only an opportunity for professional development for both parties but it is also an example of how interpersonal relationships may be strengthened.

CASE STUDY EXCERPT: BULLITT CENTER

Individual behavior and team culture shape team behavior. By setting aspirational goals, assembling a team of highly skilled individuals, and creating a supportive environment, teams can achieve success even when faced with novel challenges for which there are no precedents. Technical skill alone will not lead to success, however, if not coupled with equally strong interpersonal skills.

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Figure 10-5 Bullitt Center *Image courtesy of The Miller Hull Partnership © Nix Lehoux*

Project Details

Architect: The Miller Hull Partnership

Owner: The Bullitt Foundation

Developer: Point32

Contractor: Schuchart

Key subcontractors:

Mechanical/electrical/plumbing—PAE

Structural—DCI

Landscape—The Berger Partnership

Solar—Solar Design Associates

Waste—2020 Engineering

Location: Seattle, WA

Type: Commercial—New construction

Project duration: June 1, 2009–April 22, 2013

Size: 52,000 SF over six floors

Project delivery: Design-bid-build with integrated design process

Introduction

The Miller Hull Partnership is a 90-person firm based in downtown Seattle, WA. Founded in 1977 based on the principles of socially responsible and humane public architecture, the firm works on a broad range of project types and scales, with an emphasis on simple, innovative, and authentic designs.

In 2013, construction was completed on the Bullitt Center, the greenest commercial building in the world, a project that exemplifies the firm's commitment to environmentally sensitive, site-responsive design (Figure 10-5). It demonstrates how owner-driven collaboration is one of the

most effective ways of fostering integrated project design and delivery for extremely high-performing buildings.

Leading by Example

The Bullitt Foundation is a visionary organization whose mission is to safeguard the natural environment by promoting responsible human activities and sustainable communities in the Pacific Northwest. In planning their new headquarters, the organization's leadership sought to lead by example in assembling a high-performing group of experts to set a new precedent in sustainable building practices by meeting the requirements of the Living Building Challenge, one of the most ambitious benchmarks of sustainable design in the built environment (Figure 10-6). To become certified as the largest and first commercial building to achieve such certification, the building was required to satisfy all of its own energy, water, and waste needs on site.

The team determined not to make a "one-off" building, but one that could demonstrate sustainable practices that could be applied to all buildings using existing technologies. The project represents not only the level of sustainability possible in an urban environment, but also the level of innovation and collaboration possible when integrated design teams target aggressive efficiency goals. "Integrated design was imperative" in achieving these goals, according to project manager Brian Court of Miller Hull. "The Living Building Challenge demanded great effort on all fronts. A synchronized team was the first step toward achieving this goal."

Assembling High-Performance Teams

Miller Hull led an integrated design team handpicked by the Bullitt Foundation, which sidestepped the traditional RFP process to vet firms recommended by peers as the best

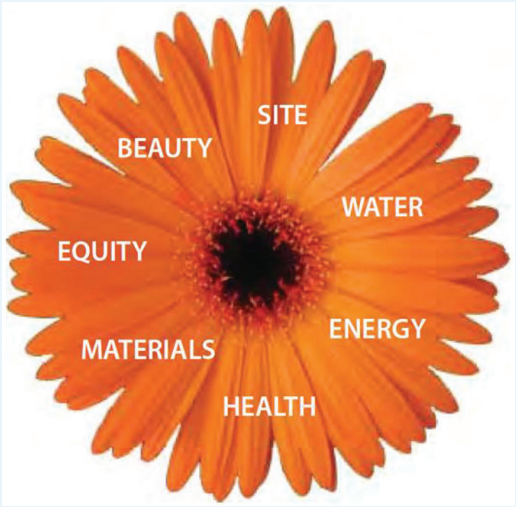

Figure 10-6 Living Building Challenge "Petals"
Image courtesy of The International Living Building Institute © ILBI 2009

suited to create a Living Building. Design and development team members included Point32, Schuchart Corporation, and Portland-based PAE Consulting Engineers. Court led the performance-driven design process as set out by Bullitt Foundation president and CEO Denis Hayes. "The building was intended as a new prototype," Court explained, fitting into a typical developer's pro forma of mid-rise structures at six floors and 52,000 gross square feet. Its deeper purpose, however, resonated with the mission of the Foundation, which is "to change the debate on sustainability and urban issues in the world today."

The Bullitt Center is intended as a "billboard of sustainability," with a sustainable and performance-based scope spanning the building life cycle, net-zero water, net-zero energy, and occupancy considerations. To retain flexibility and resiliency to adapt as technology improves, the building was designed to be easily taken apart as systems require replacement or updates without disrupting other building elements.

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A 250-year heavy timber, concrete, and steel structure is clad in a 50-year envelope, adorned with a 25-year photovoltaic array. Net zero water is accomplished with a 50,000-gallon cistern filled by rainwater captured on the roof as well as complete grey water and waste treatment on site. Net-zero energy is achieved with a balance among mechanical means, natural daylighting and ventilation, and renewable energy from the project's photovoltaic array. Ground-source heat exchange, radiant floor heating and cooling, and a heat recovery ventilation system operated with night-flushing operable windows contribute to the energy-saving environmental control systems.

In order to achieve such high-performance goals for the building, the design team used an integrated, performance-driven process (Figure 10-7). The team selection process was led by the owner, represented by Hayes, with input from Miller Hull and the developer, Point32. "We had to have the best of the best," Court recounted.

Together they organized "a carefully vetted team of people with a demonstrated portfolio of innovative, aggressive, sustainable buildings." The Bullitt Foundation held a traditional design-bid-build contract for the project but made the effort to bring many team members on early in

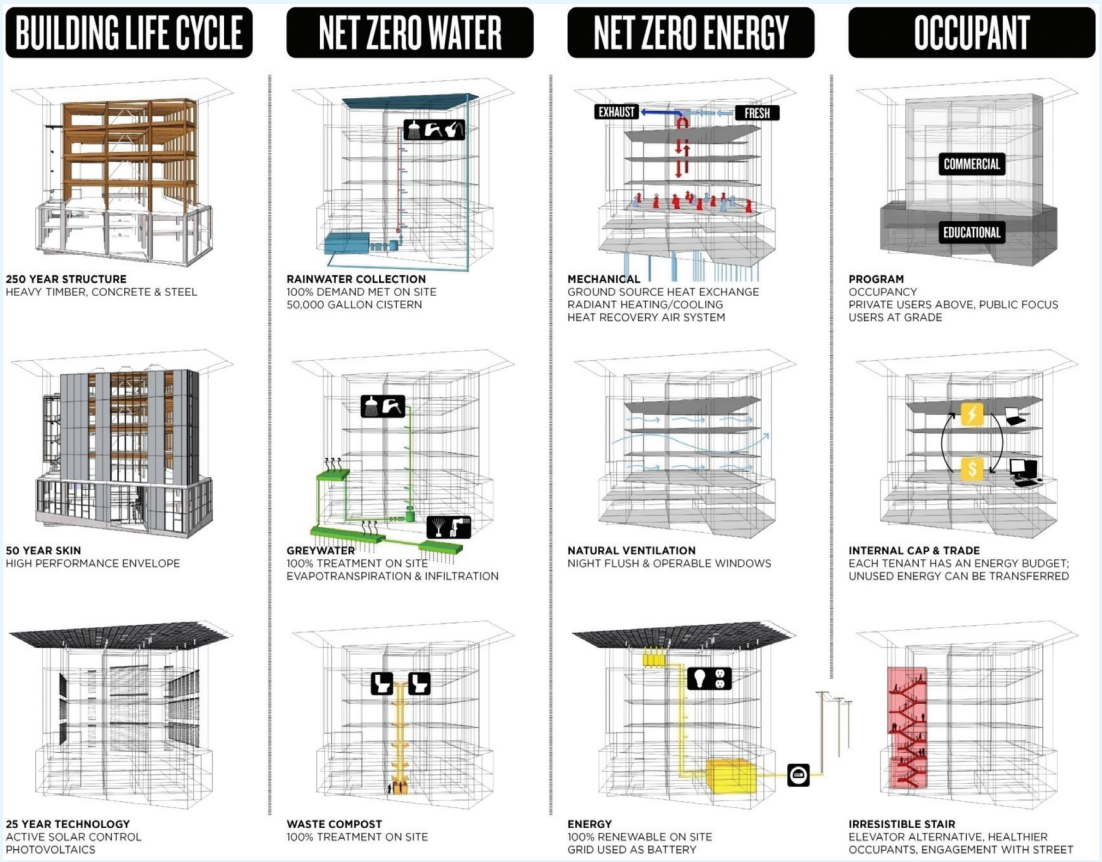

Figure 10-7 Primary sustainable systems *Image courtesy of The Miller Hull Partnership*

the design process. Court reflects that a true IPD contractual agreement may have better suited the project's goals.

Collaboration and Culture

Though not formally an integrated project, the Bullitt Center team proceeded as if it were, beginning with a two-day kick-off meeting attended by forty team members. This proved an effective team-building exercise. "This design process was going to be different," Court explained: "Everyone was at the table." Horizontal meetings, including the architect, contractor, owner, and mechanical and structural engineers, were conducted weekly to inform every decision with expertise from all design professionals. Consultants from Solar Design Associates and net-zero water consultants from 2020 Engineering along with a host of other team members participated as needed.

"The attention-getting elements of the Bullitt Center—100 percent on-site renewable energy, water and waste management, as well as a safe, naturally day-lit and ventilated work environment built to last 250 years—follow from an equally exciting integrated design process that enabled us to move beyond the traditionally linear design, engineering, and construction process to orchestrate a diverse team targeting the seemingly impossible together, right from the start," said Court. "In considering first and foremost how to design a building with essentially no environmental footprint, it was energizing to identify imaginative and elegant ways to beautifully express the building's core performance functions through design strategies using a mix of existing and new technologies, systems, and materials. While in one sense we had to do more with less, we happily found that designing to high-performance targets actually opened up numerous formal design opportunities."

Leadership and Buy-In

Hayes helped lead the collaborative process and attended all weekly meetings along with the developer and the architect. With data and feedback coming from so many fronts, the architect took the lead in synthesizing the information to help the team make the most informed decisions.

Collective buy-in to the common mission helped sustain the team's direction during crucial decisions and amidst fluctuating data. For example, the ultimate decision to use a midrise type IV heavy timber frame as the primary structural system was based on a variety of factors, including ethical material sourcing, aesthetic qualities, and sustainable carbon sequestering properties of the timber (Figure 10-8). This choice required code officials, structural engineers, and the contractor's cost estimators to evaluate a structural system that had not been used in Seattle in over eighty years. "None of the building officials really knew what to do with it," Court explained.

Though heavy timber is itself fireproof, the design team developed a series of modular steel connectors to facilitate on-site construction connections, which required special consideration in terms of fireproofing. The structural engineer originally detailed conventional recessed timber frame steel connectors, which would have been fireproofed by concealment within the assembly. However, cost constraints set forth by the contractor demanded a less-expensive alternative.

"We had to work closely with the structural engineer, the contractor, and also with the fire marshal to devise a connection system that acted as a 'bucket' to catch the upper-floor timber columns and beams, transferring their load directly through the first-floor columns," said Court. The upper-floor columns and beams would also have to penetrate and be fixed

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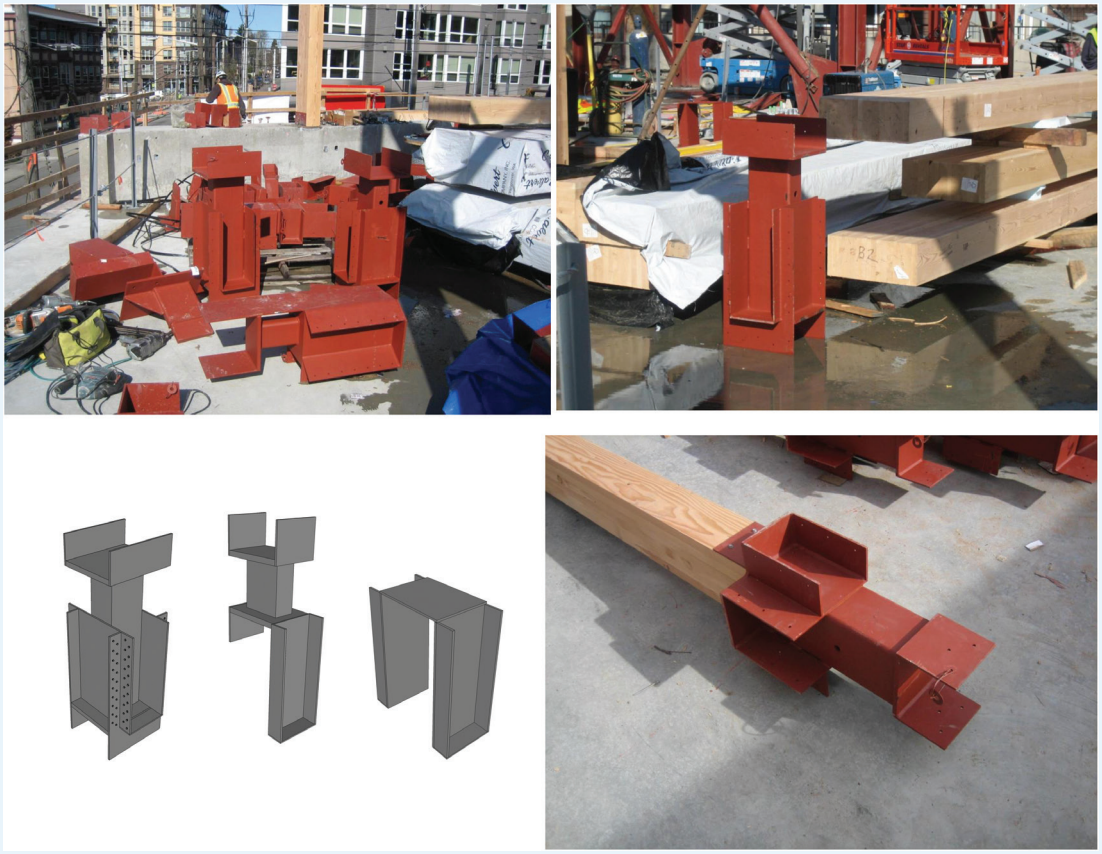

Figure 10-8 Timber connections *Image courtesy of The Miller Hull Partnership*

within the steel connectors, so that in the event of a fire, if the steel melts away, the beams would still be supported by columns below. In the end, the team was able to overcome the technical issues, and on-site assembly proceeded smoothly. "It was an example of a really collaborative, integrated design exercise," explained Court.

"In deciding to proceed with the Bullitt Center, we were trying to accelerate the pace of change by showing what's possible today, using only off-the-shelf products that any building project could choose. We combined these

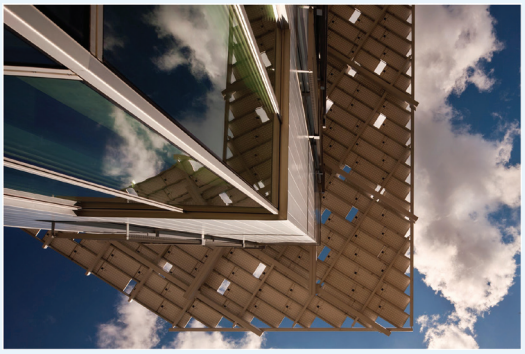

Figure 10-9 PV array overhang *Image courtesy of The Miller Hull Partnership © Nix Lehoux*

Figure 10-10 Bullitt Center interiors *Image courtesy of The Miller Hull Partnership © Nix Lehoux*

time-tested approaches in one building in a way that allowed for new synergies," states Hayes on the Bullitt Foundation website (Figure 10-9).

With the goal of altering the mindset of the design and construction industry by creating "the greenest building in the world," the Bullitt Center team brought together conservation groups, architects, developers, contractors, engineers, manufacturers, fire marshals, building officials, and utility companies in order to accomplish their mission (Figure 10-10). Under the strong leadership of Hayes, the team achieved Living Building certification in 2014, far surpassing projected energy performance goals, using existing technology and within the economic means that most developers could achieve. "Operationally," Denis Hayes wrote in his vision statement, "the Bullitt Foundation has moved to a more proactive, streamlined, and collaborative approach to its work…We will work closely with our colleagues in the field to devise strategies, identify opportunities, and help find needed resources to move the environmental agenda forward."

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 11

Leadership Stages of Development

Guildhall Model

The growth and success of leaders is interrelated with the growth and success of the teams they lead. Each person progresses through a similar series of development stages in the pursuit of effectiveness. Consciousness, the awareness of the impact of behavior in real time, and competence, the ability to perform tasks at a level of mastery, are two key factors in achieving effectiveness. True effectiveness can only be achieved through deliberate engagement with others (peers, mentors, teachers, etc.) and the development of interpersonal skills.

The historical precedent of artisan guilds can serve as a useful model for explaining leadership development as both a progressive and a cyclical process. Both guilds and project delivery teams utilize an internship or experience-based learning model to teach new members how to effectively use disciplinary tools in complex, creative, collaborative problem solving situations. Both feature senior practitioners with extensive experience and expertise in collaborative or integrated project delivery as mentors to the younger individuals.

Guildhalls are a building typology that emerged during the Middle Ages in Europe. The Black Death decimated between one-third and one half of Europe's population during the fourteenth century. Many of the casualties were artisans, and soon there were few living people with a particular skill or capability. To develop a more formalized system for passing along knowledge from one generation to the next, guilds, or collections of artisans and merchants, were formed. Over time, as the guilds grew in stability and profitability, they built grand buildings referred to as *guildhalls*. Here, new members progressed through a series of formalized stages of professional development that parallel the stages of contemporary leadership development (DeLisle, 2013; Hersey and Blanchard, 1977).

Novice

Beginning their studies with no prior knowledge or experience, novice guild members receive explicit, repeated direction as they are introduced to their chosen craft. They begin to develop basic skills and learn about their craft under the strict and

immediate supervision of more senior and capable people. Those who demonstrate promise move on to the next stage, the apprentice.

Apprentice

An apprentice's level of engagement increases along with his growing responsibility and the complexity of the tasks he is given. Apprentices continue to work under constant supervision and with consistent feedback from more senior members, though they can now be trusted to perform simple tasks more independently.

Journeyman

A journeyman is a person who has been fully educated in a trade and can work independently and unsupervised. The term comes from the French word *journée*, meaning "a day's work" or "a day's travel." Journeymen are expected to work unsupervised for short periods of time, but they still seek guidance and feedback periodically. Though skilled, journeymen are not yet at the level where they can objectively assess their abilities within the broader discipline.

Master

The highest rank in a guild is that of master. Masters are self-organizing and self-managing, having reached a level of capability that allows for autonomy from supervision.

Development Stages

To diagram the development of a design professional working in collaborative project teams, the letter "D" is used to indicate a series of developmental levels corresponding to the Guildhall model

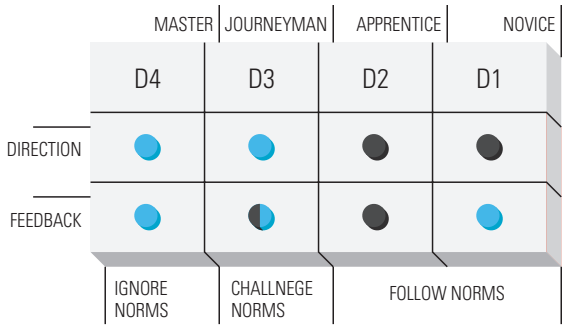

Figure 11-1 Guildhall structure

(Figure 11-1). As such, D1 corresponds to the novice or intern, and D4, the master or firm principle.

As a novice progresses in their professional development, the D2 stage is equivalent to that of a designer. At this level, young architects-in-training need significant feedback and direction from leaders as they start taking on more responsibility in project teams.

Once a person has achieved a level of confidence in their own abilities and can recognize when to seek assistance, they move beyond the apprentice level to that of journeyman, or D3. This stage is equivalent to a project manager or associate in a firm. At this stage, individuals become productive and work independently, but still seek and respond to feedback from more experienced mentors (Figure 11-2). There is a fine balance at this stage between not providing enough direction to ensure journeyman's efforts are properly focused and too much direction, which might make them unmotivated or confused (Blanchard et. al, 1985).

Eventually, a person reaches the last level, D4 or master, where they are recognized as an expert in their field. The contemporary equivalent would be partnership at a firm or elevation to fellowship in a professional organization.

An individual's progression through the stages of professional development with regard to collaborative project delivery requires significant investment from

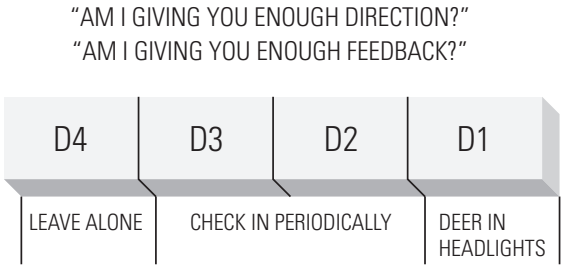

Figure 11-2 Feedback by developmental level

teachers and mentors, who demonstrate skills and provide guidance, direction, feedback, and encouragement regarding both technical and social issues.

There are benefits to providing the service of mentoring, such as developing a level of in-house mastery, expanding the capacity and intellectual capital of the entire organization, and increasing the effectiveness of project teams. A systemic lack of commitment or responsiveness by leaders to developing professionals' needs, however, can lead to frustration, stagnation, and—in extreme cases—abandonment of the firm.

Combined Development Model

By mapping the guildhall stages onto the farm gate framework, a combined development model emerges that more accurately describes the nuance of advancement from one stage to the next. The farm gate has three horizontal strata divided diagonally into three spaces, a triangle at the lower left representing technical skills, a triangle at the upper right representing management skills, and a center stripe representing interpersonal skills. If we draw the continuum from D1 through D4 for each of the sets of skills, it becomes apparent that a professional can develop through the levels technically, socially or organizationally.

When professionals in firms are promoted, it is often because they are very skilled technically or because they have excellent management abilities. These individuals are rewarded with promotions that bring more responsibility in addition to additional compensation. What the individual models alone do not clearly show is that when the professional moves from a position in which they operate at a high level—even mastery—with regard to technical skills to a new position that requires different skills, the development process begins again at the novice level for the new set of conditions.

Many leaders assume that an individual who is excellent at one thing will be excellent at all others. This leads to many emerging leaders being placed in leadership positions in project delivery teams without the proper training or resources. The expectation internally and externally is often that they will immediately excel and accomplish their given project successfully, with very little direction or feedback. Most people struggle but eventually survive. However, the process is incredibly inefficient and leads to unnecessary stress and feelings of self-doubt.

CASE STUDY EXCERPT: ASU MEMORIAL UNION

The relationship between leaders and team members changes over time. Depending on their level of development and experience in a certain area, a person may need more or less direction and wish for more or less autonomy. Collaborative leaders are skilled at recognizing the right method of engagement to match the situation and encouraging individuals to achieve their best possible performance by continually challenging them to grow.

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Figure 11-3 ASU Memorial Union lobby *Photo by Bill Timmerman*

Project Details

Architect: Studio Ma, Inc.

Owner: Arizona State University (ASU)

Contractor: CORE Construction Services of Arizona, Inc.

Key subcontractors:

Acoustical wall panels—Armstrong

Ceiling panels—Eventscape

Location: Tempe, AZ

Type: Institutional—Renovation

Project duration: April 2008–August 2008

Size: 95,000 SF

Cost: $22,907,825

Project delivery: CM at-risk

Introduction

Studio Ma is an award-winning Phoenix-based architecture and environmental design firm delivering responsive, sustainable designs centered in the desert southwest. The philosophy of the studio is embodied by the concept of *Ma*, a Japanese term that acknowledges the dynamic relationship between objects and their surrounding environment.

In 2007, the firm was chosen for the logistically complex remediation and renovation of the fire-damaged Arizona State University Memorial Union (MU) in Tempe, Arizona (Figure 11-3). The building had been closed in November of that year after sustaining fire damage to the interior, displacing approximately 27,000 daily users. Studio Ma and CM at-risk CORE Construction Services of Arizona were brought on to the team under the leadership of Larry Sorenson, ASU's project director.

The goal was clear but daunting: renovate the outdated and damaged MU building that had undergone multiple previous additions and renovations up to contemporary code requirements and establish a new design standard for public space on campus, all within a period of

Figure 11-4 Public space interior *Photo by Michael Weschler*

four months. The collaborative process undertaken by the team was reflected in the successful delivery of the project on time and under budget and has brought about a paradigm shift in how the university approaches collaborative teams in project delivery (Figures 11-4 to 11-10).

Expedited Project Delivery

Complexity came not only from the logistics required to remediate the fire damage but also in reconciling multiple additions that had been made to the original 1954 building. The building was originally constructed in honor of the soldiers lost in World War II and has since been listed on the State Historic Register. Significant additions were made in 1971 and again in 1989. While each new addition complied with their respective current codes, original portions of the building were seriously outdated.

Project phasing addressed the critical importance of the building to the life of the campus by implementing an intensive remediation effort to open the basement and first floor levels over the winter break immediately following the fire. An RFP was then issued for the renovations and remediation of the heavily damaged second level and overall building renovation over the summer break to allow for the building to be reopened prior to the start of the fall semester, while the first floor and basement

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Figure 11-5 Renovated classroom *Photo by Michael Weschler*

levels were required to remain open continuously during construction.

The project team recognized that a traditional design-bid-build approach would not allow the project to meet the tight deadline. Studio Ma proposed an unconventional three-pronged approach that combined building and code assessment, conceptual design, and conceptual estimating in a single phase. With the contractor in support of the approach, ASU agreed to support the design team in doing what was necessary to establish a new standard for collaborative project delivery at the university.

Collaboration and Culture

In their three-part design approach, Studio Ma collapsed the traditional project delivery stages into one concurrent phase. The RFP provided 60 calendar days for the architect to establish a plan that would bring the building up to code, devise an architectural concept, and determine base pricing. CORE Construction would then have 102 calendar days to complete construction.

The design team generated multiple design options for the owner, each with an outlined scope and cost. Early feedback from the owner on these options established a clear set of project goals and priorities, allowing the team to make critical decisions early in the process and stay on schedule (Figure 11-11). The contractor colocated a team of estimators on site who provided weekly updates with detailed estimates for all divisions of the work. Clearly defined scoping documents ensured that the subcontractors' pricing was consistent and accurate.

The project was formally CM at-risk, but took on an alternative, highly collaborative approach to ensure that both parties worked together to meet the overall goals. Both the architect and contractor's teams relocated to

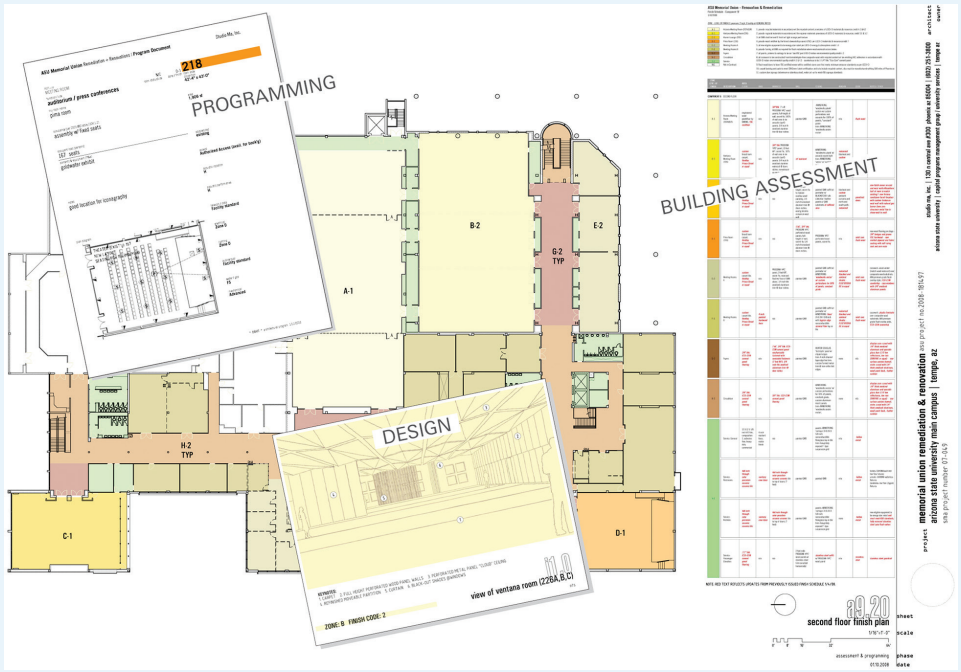

Figure 11-6 Design process scoping documents *Image courtesy of Studio Ma*

Figure 11-7 Alumni lounge *Photo by Bill Timmerman*

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the site for the duration of the project and held daily coordination meetings beginning at the outset of design to foster a collaborative team environment.

In the two months before construction began, the programming, building assessment, and design phases had to be completed, and the State Historic Preservation Office requirements met for proposed changes to portions of the original historic building. The contract documents were completed within the project GMP. "We were all basically located in the same room exchanging information in real time," Studio Ma partner Chris Alt explained, which provided a constant feedback loop that helped the design team make informed decisions regarding cost and constructability.

During construction, the contractor led daily coordination meetings with the trade contractors, design professionals, and client, which allowed issues to be identified in a timely manner and addressed by the group. CORE and Studio Ma could provide immediate feedback on issues from their on-site field offices.

Leadership in Teams

Sorenson served as the owner's representative as well as the university's project manager. His leadership approach facilitated dialogue between the team members with the intent of maintaining a steady workflow. The project team followed Sorenson's guiding mandate: "Do not come to me with a problem; always come to me with a solution." This approach ensured that the team took a proactive approach to problem solving for both technical and financial issues and brought Sorenson proposals that were collaboratively developed and financially sound. "There were no change orders in this job," said Alt. "Zero. We had no choice but to solve the problem within the budget."

Figure 11-8 Student lounge areas along corridors *Photo by Suzanne Star*

The overall collaborative process was led by Sorenson, who made the work of both architect and contractor wholly dependent on one another. It took a highly qualified and fully committed design and construction team to make such a collaborative approach successful. All four of Studio Ma's partners maintained direct and full involvement on the project, attending all coordination meetings. Studio Ma partner Tim Keil attributes this hands-on approach as a large factor in the project's success. "We knew what it would take to deliver what ASU wanted, and we organized ourselves accordingly to deliver it," said Keil. "We were flexible enough to invent a process within our firm to get the work done."

CORE was laterally organized and had strong, established relationships with a range of sophisticated subcontractors who they brought into the process as early as possible. This approach allowed the design development and detailing process to be informed by those who would be doing the actual construction.

Communication and Motivation

Studio Ma partner Christiana Moss estimates that CD packages were sent out at what would typically be seen as 50 percent complete for pricing. "We needn't think of it as a percentage, we saw it more as a continuum," she said. "Because things were moving so quickly, the innovation was in how we structured the documents to allow for a reasonable continuum to be established and allow for us to backfill additional information. The best way to do that is to have someone on site where the contractor had teams of project managers and estimators working simultaneously. We were constantly producing drawings and having them priced and re-priced." The initial set of documents established the scope for setting the GMP and addressing code issues to attain a building permit. The contractor worked with the architect to establish appropriate contingencies for each area of work, and the architect issued a steady stream of details throughout construction.

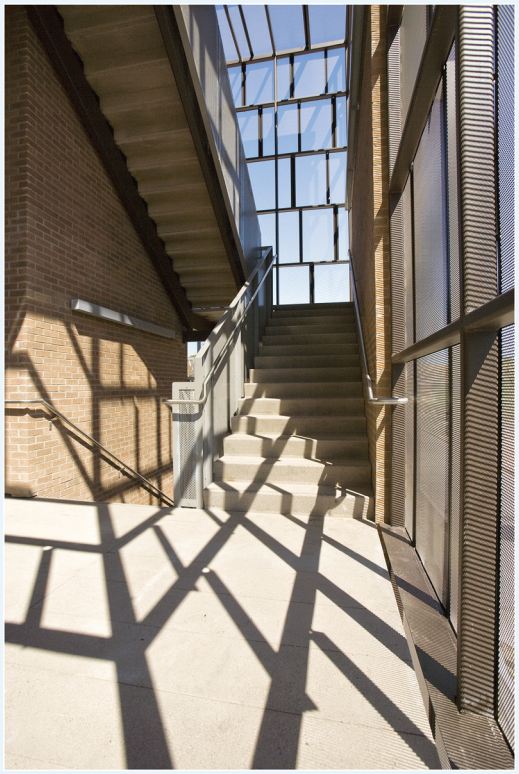

Figure 11-9 New egress stair *Photo by Bill Timmerman*

The high-performance team worked collaboratively from start to finish in order to meet the aggressive schedule. As a result of the project's success, ASU capitalized on the opportunity to reinvent their campus policy on project delivery. The University's subsequent RFPs include teaming and

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Figure 11-10 Renovated auditorium *Photo by Bill Timmerman*

collaboration experience as requirements for project stakeholders. The MU renovation clearly demonstrates that a highly functioning team is necessary for a well-built project. Regarding the benefits of a collaborative over more adversarial past processes, Studio Ma partner Daniel Hoffman concluded: "It's the type of experience that everyone wants."

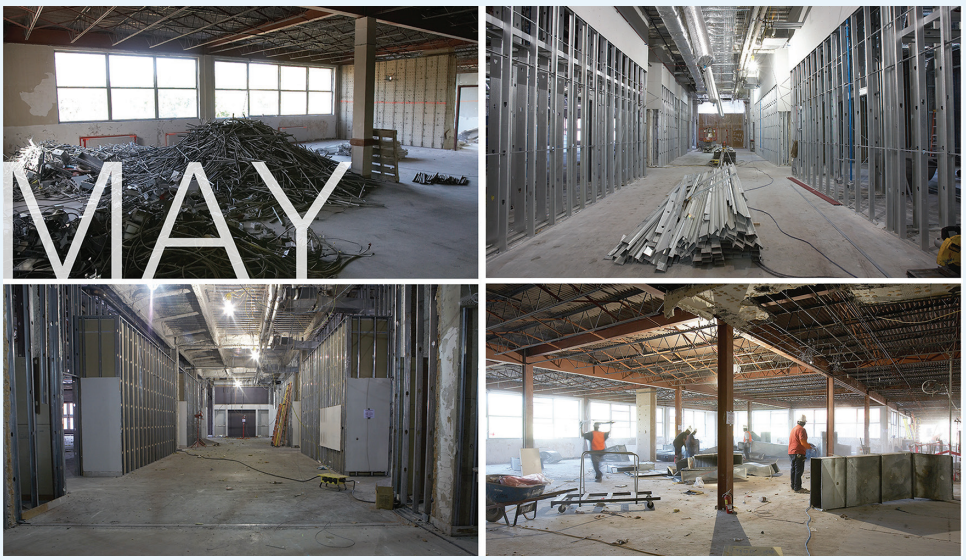

Figure 11-11 Project progress *Photos by Core Construction*

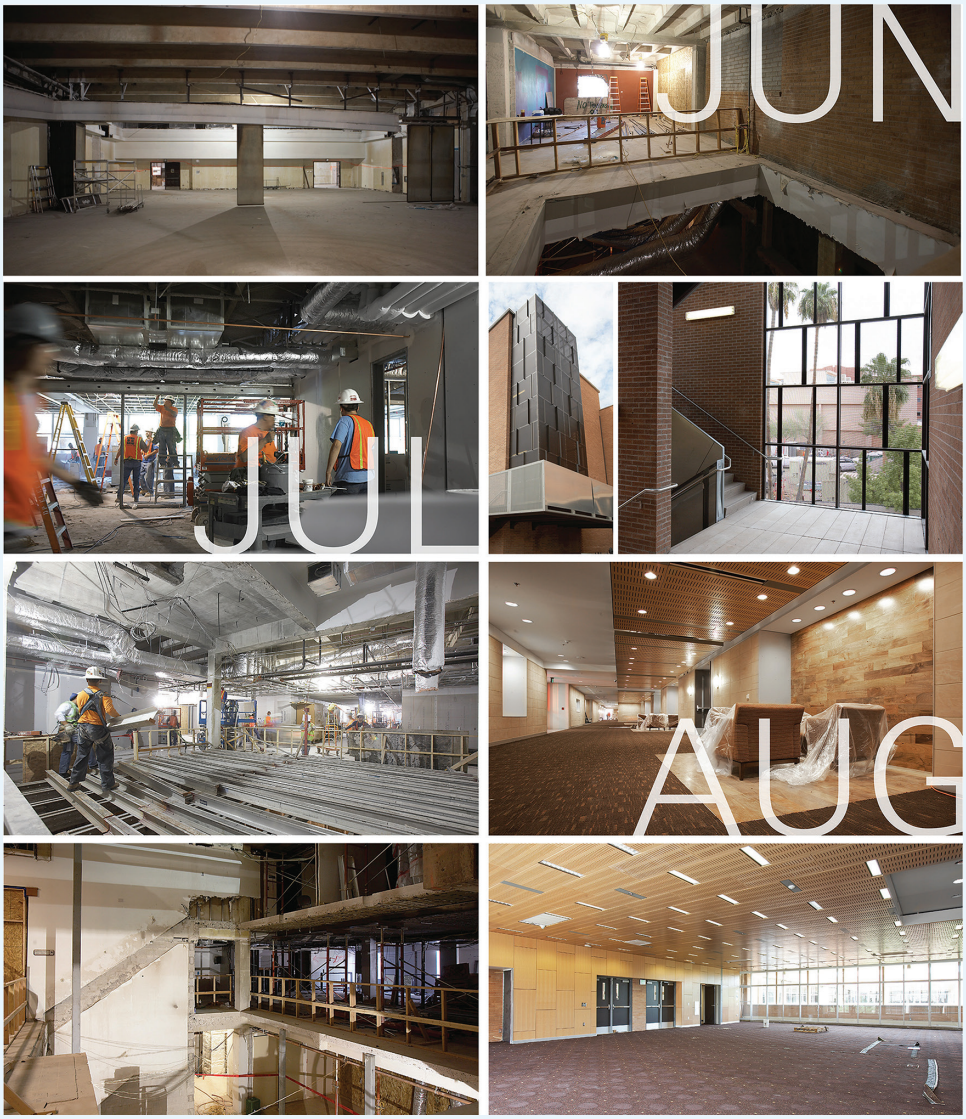

Figure 11-11 (*continued*)

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 12

Task-Relationship Behavior

Leader in Development

Leadership development is a continuum where more experienced team members support the development of others even as they continue with their own growth. Each person's path through the development process is a cyclical one, as advancement to a new position marks both progress toward a higher level of professional responsibility as well as beginning a new cycle as a novice in their new role. Leaders in supervisory or mentoring positions must understand each developmental stage and individual's needs in order to provide the appropriate amount of direction and constructive feedback. This process requires a leader have the ability to be critically self-reflective and empathetic.

The time required for each stage of development is a function of how quickly each individual can move to a level of mastery in a particular context. This has no correlation with age or experience; it is purely a function of how quickly one learns. For example, a recently licensed architect who is given their first project manager job would be categorized as a D1 or D2 in terms of their development in that role, even though they had achieved mastery at the D4 level in their previous role managing the digital workflow for a project.

The process of development is continuous, even for those who have long been seen as masters in their area, for example, a senior partner who has no direct experience with collaborative project delivery and BIM but who understands the theory and potential of these tools and is interested in engaging in a collaborative process for a new project. He has, in some ways, intentionally defined himself as a novice in a new area in order to challenge himself to grow. To further demonstrate that the development process is specific to each person, the senior partner may engage a young, technology-savvy intern as his mentor, reversing traditional roles (Blanchard et al., 1985).

Direction and Feedback

Architects often make the mistake of assuming that social skills, such as leadership, communication, and feedback, do not need to be taught, either because they will be learned on the job or because

they are taught during childhood. This is simply not the case. Most breakdowns and failures in the project delivery process stem from interpersonal issues, reinforcing the need to constantly evaluate individual and team behavior and performance (Deutsch, 2011; Cohen, 2010). Based on the assumption that it is desirable for developing professionals to move to a level of mastery as quickly as possible so as to become successful and self-confident team members, it is then the leader's responsibility to respond with the appropriate direction needed to support such goals.

For example, the tendency is to assume that recent graduates with BIM modeling skills understand what they are modeling in addition to knowing how to model it. The consequence of doing so, and therefore leaving a new intern alone with an assignment, is that they can actually regress in their capability because their uncertainty with the task is so high that they become afraid to do anything (Hersey and Blanchard, 1977). Too much information too soon can either stifle growth or confuse individuals. Alternatively, too little information keeps team members from understanding the context of their work and learning to act independently.

One final layer of information can be added to the combined farm gate–guildhall model—the level of leader supervision needed at each stage, as mapped on a task-relationship matrix (Blake and Mouton, 1985) (Figure 12-1). Here, S1, S2, S3, and S4 represent different levels of supervision corresponding to their position in the matrix, which has the task behavior represented along the *x*-axis and relationship behavior on the *y*-axis, both mapped from high to low (Hersey and Blanchard, 1977).

When evaluating the need for individual supervision, S1 mirrors that of D1 in that it is the very earliest stage of development. A leader or mentor providing oversight would understand that a level-1

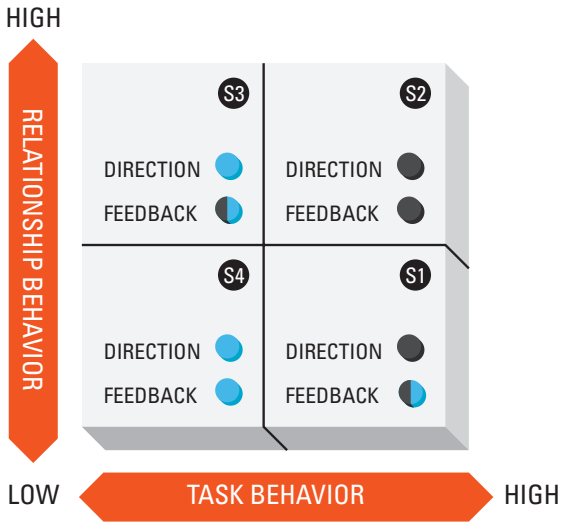

Figure 12-1 Supervision by developmental level

or S1 individual needs much task-based direction and little relationship-based feedback at this earliest of stages. S1 can then be defined as high task and low relationship.

After moving to the S2 or apprentice level, individuals begin navigating the steepest part of the developmental learning curve and are in need for much supervision. Leaders should make a commitment to respond during this stage with high task and high relationship behavior (lots of direction and feedback) immediately and consistently.

As individuals continue to the S3 stage, they may have gained competence in the subject matter, but continue to need guidance on how to achieve a level of performance where they can become self-organizing and self-managing. S3 is the quadrant where individuals need low task and high relationship supervision.

The last stage of supervision, S4, is one where leaders engage minimally, providing low task and low relationship behavior. In the S4 stage, the leader recognizes that some professionals are at a point in their

development where they are becoming self-sufficient and may have even surpassed their mentor's understanding of the area of development. Conscious and competent professionals with a level of mastery in collaborative project delivery, for example, no longer only respond to existing conditions but also may begin to be forward-looking in their practice. They may begin inventing tools, techniques, communication methods, custom BIM scripts, and other innovative tools that have the potential to advance collaborative practices beyond the scope of a project.

The resulting task-relationship matrix shows a direct correlation between development stage and direction type. While in the skill-building stage, individuals need direction. They are not yet making decisions that inform the process, so there is nothing on which to provide feedback. In the second rapid development stage, individuals require significant feedback and significant direction, because they are still learning—and doing so even more rapidly than before—and are just beginning to make decisions that affect the process. Close supervision at this critical stage helps individuals develop good rather than bad habits and working methods. When they move to the third development level, feedback is still critical because the individual is making more decisions on more impactful topics, but their skill level has reached a level where they no longer require direction. Once individuals achieve the fourth level, they don't need much, if any, direction or feedback and begin working with leaders as peers.

Stage Assessment

Individuals in a state of development, unlike apprentices in guilds, do not require formal permission to proceed to the next stage. Instead, it is more often a fluid process of transition over time. In order for mentors to determine what development stage someone is in and therefore the appropriate form of feedback, the best option is to ask directly, "Are you receiving enough direction? Are you receiving enough feedback?" If the respondents feel comfortable with their ongoing tasks but suggest checking in weekly over coffee, their response indicates they are at the second development level, D2. They are still learning how to trust their own judgment and decision-making abilities but are likely approaching the next developmental level by expressing that they understand the technical aspects of the topic. Requesting weekly meetings rather than claiming independence in this area is more an indication that they are almost ready to move to the third stage by creating a checkpoint in their mind, which is one of the characteristics of the third stage where continuing feedback is needed to gauge the quality of the work. By understanding their response at this level of detail, the leader is better able to respond with the appropriate feedback.

Conversely, if the initial response was a distracted, "Oh, you're here again?" the individual is at a very different level. Assuming the person is a strong contributor and not a surly slacker, such a response likely indicates that they have achieved a level of mastery, D4.

Though they no longer need supervision or feedback, D4 level professionals still need to remain engaged. One way to constructively engage a master is to ask what they are working on. Their response will help the supervisor understand the specifics of their approach and allow them to be a better-informed leader.

Lastly, asking the question of a brand new employee will likely elicit a somewhat bewildered look. This is a sign that the person needs a high level of input as to how to accomplish their tasks and feedback as to their performance.

Task-Relationship

The task-relationship model illustrates the importance of the leader in assisting those less experienced in their firm develop skills to the highest level of capability in the most expeditious amount of time. Leaders interact with team members and subordinates in their own firms by exhibiting both task and relationship behavior. These behaviors—relationship behavior (concern for people) and task behavior (concern for results)—are interdependent. Effective leaders respond with specificity to each context in order to maximize both relationship and task outcomes. The task-relationship matrix places a concern for people and relationships on the *y*-axis and tasks or results on the *x*-axis, each with a range of 0–9. Most people fall somewhere near the middle of both axes and are competent in both their concern for people and their concern for results (Blake and Mouton, 1985; Blanchard et al., 1985; Hersey and Blanchard, 1977). Those who lie more at the far reaches can be classified as one of four more extreme types of leaders (Figure 12-2):

1. Authoritarian: strong focus on tasks and weak interpersonal skills
2. Country club: weak focus on tasks but strong people skills
3. Impoverished: weak in both task and relationship areas
4. Team leader: strong focus on tasks as well as a strong ability with people.

Leaders who display high task, low relationship behavior are called authoritarian or autocratic in their style. Leaders with this rating are very much task-oriented and can be hard on their workers. There is little or no allowance for cooperation or collaboration. Authoritarian leaders display the following characteristics:

- They closely adhere to schedules.

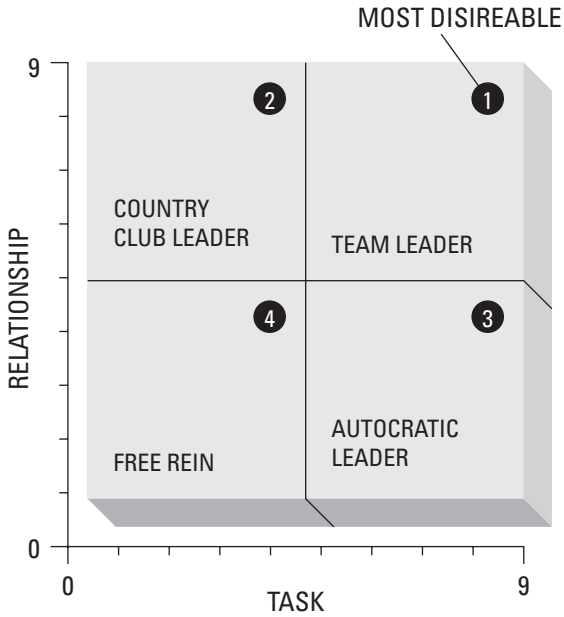

Figure 12-2 Extreme leadership behaviors

- They expect people to do what they are told without question or debate.
- When something goes wrong, they tend to focus on who is to blame rather than what the problem is and how to resolve it.
- They are intolerant of what they see as dissent.

It is difficult for subordinates to contribute to the project dialogue or develop their own abilities as a result of these behaviors (Blake and Adams, 1991; Blake and Mouton, 1985).

High-task, high-relationship people are team leaders. They lead by positive example and foster a collaborative environment where all team members can reach their highest potential, both as team members and as individuals. Such leaders encourage team members to reach collective goals as effectively as possible, while also working continuously to strengthen the bonds among members. These leaders form and lead very productive teams (Blake and Adams, 1991; Blake and Mouton, 1985).

Low-task, high-relationship or country club-style leaders predominantly use "reward power" to maintain discipline and to encourage the team to accomplish its goals. This type of reward structure encourages team members to comply with a leader's wishes and may be done through giving bonuses, raises, promotions, or extra time off from work. Conversely, these leaders are almost incapable of employing legitimate punitive or coercive powers. This inability results from the fear that using such powers could jeopardize relationships with the other team members (Abudi, 2011).

Low-task, low-relationship leaders use a "delegate and disappear" or an impoverished management style. They essentially allow their team to self-direct; they are committed neither to accomplishing tasks nor to team maintenance. Impoverished leaders detach themselves from the team process, causing power struggles within the team as it searches for someone to provide direction (Blake and Adams, 1991; Blake and Mouton, 1985).

The most desirable combination of behaviors in a leader is the one that yields the highest possible task and relationship scores, 9, on both scales, which is the team leader-type. This does not mean that the other styles are without merit; in fact, they are each most appropriate in certain situations. For example, by playing the impoverished leader, one allows their team to gain self-reliance. Authoritarian leadership can instill a sense of discipline in an unmotivated worker. Careful study of the situation and the forces affecting it will let you know at what points along the axes you need to be in order to achieve the desired result (Blake and Mouton, 1985; Clark, 1997).

The aim of good leaders should be to balance the desire for extraordinary results with creating and maintaining effective relationships in a finite amount of time (Figure 12-3). When time is of the essence and a task is in danger of not being accomplished according to the project schedule and

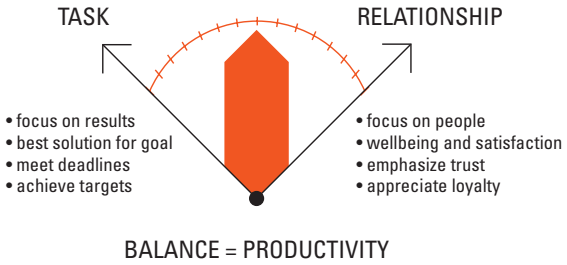

Figure 12-3 Task-relationship balance

goals, the leader may have to prioritize one over the other—moving in a direction of high task/low relationship, which means doing whatever it takes to get the task done, regardless of impact on team dynamics. The alternative—low task/high relationship—accepts that the team may not succeed in meeting its deadline and engages the project team in studying potential options and alternatives.

Neither approach is an ideal solution, but there are advantages to each. When time is the determining factor, prioritizing relationship over task is the better, if seemingly counterintuitive, option. Ultimately, it is people who accomplish tasks, and they can never be fully removed from the equation. The problem with prioritizing tasks completely over relationships is that the project may get completed but relationships will likely be damaged. When working with the team members on future projects, leaders will need to spend time rebuilding trust, which is essential for team effectiveness. If this rebuilding process is avoided, the best possible environment the team can hope to create will likely be polite and compromising, because team members will always be wary of ending up as collateral damage when the leader is under pressure to perform and again resorts to a "take no prisoners" approach.

Though preferable, the relationship-first option may not be possible in situations where the consequences of failing to achieve a task would be too severe. Even if the decision is to focus the team's

efforts on the task, taking the time to understand why the project is off course or why a person is not performing effectively may be worth the tradeoff of potentially identifying the root problem rather than just addressing the resulting symptoms. For example, an employee may be experiencing a personal issue that a leader is unaware of, so that prioritizing task over relationship may create an even more counterproductive environment for their fragile state. By understanding the issue, especially with a person with whom a leader has built a positive relationship, the leader will likely be able to accommodate their needs and get the person and the project back on task (Bolman and Deal, 1991; Northouse, 2007).

PRACTICE-BASED SCENARIO: THE STORY OF FRANK AND DENISE

The following scenario examines the role of interpersonal awareness as related to effective communication and motivation skills in collaborative teams.

Background

Three classmates from an East Coast architecture school started a medium-sized design firm in the 1990s. Each partner had complimentary specializations and found that their capacity to work together cooperatively greatly enhanced their overall success. Each of the partners assumed somewhat informal management over various parts of the business practice. One led in managing design, one in managing production, and one in managing the business affairs, finances, and human resources. One of the partners was also assigned to manage each ongoing project in the office and provide guidance when required to project architects, designers, and interns in the firm.

Since its inception, the firm consistently emphasized a model of practice that resulted in creative, innovative, and sometimes bold departures from traditional building types. Their firm was an early adopter of digital technology for the automation of construction documents and later BIM.

In order to stay competitive among other vanguard firms during economically challenging times, the partners decided to make strategic hires to develop the firm's expertise in technologically integrated and collaborative practices as both a business and a brand investment. They recruited a handful of top graduates to establish an integrated practice unit within the firm. This in-house consultancy was slated to lead projects that explore innovative collaborative processes and advise other project teams on tools and tactics.

The partners realized that they also needed someone with the skills to lead this team and help the new graduates apply their digital expertise, as they were collectively novices in the skill sets used in traditional practice. The partners unanimously selected Frank to lead the initiative.

Frank

Frank was a mid-career project manager with fifteen years of experience. He had been licensed for almost a decade and had run multiple traditional design-bid-build projects in the firm with great success. He was an excellent spatial designer and had been instrumental in building the firm's reputation for computer-aided design early in its history. Because of his obvious intelligence, capacity to take on new initiatives, and experience with digital technology, Frank had the full confidence of the partners in his ability to lead this new unit and was given full autonomy to do so as he chose.

The tech group's first task was to represent the firm in a design-build venture with a local contractor that the firm had worked with several

times previously. The owner of the construction firm was also a seasoned developer of outpatient clinics as an alternative health care delivery system in remote regions of the country. The owner used the design-build delivery method for the benefit of having a single point of contact on the project delivery team. The architecture firm's partner in charge of managing the project accompanied Frank and his group to the first meeting with the build team and then let Frank continue to run the project in a self-directed fashion.

About a month later, the partners received an e-mail from the contractor indicating that design work had not progressed according to schedule. The partners called Frank in to a meeting and explained the importance of their long-term relationship with the contractor. The partners reviewed their vision of Frank's unit within the firm and their desire for the unit to serve as a model for all project teams in the firm to eventually follow when working on collaborative projects that required BIM integration and early engagement with stakeholders. The partners suggested that Frank needed to organize and motivate his group and take a more proactive role in leading the project team. The partners then called the contractor and assured him that Frank would deliver according to schedule.

Another three weeks went by before the contractor called the managing partner again, indicating that Frank was becoming quickly frustrated and was terse when communicating to members of the project team at the weekly project meetings. The contractor stated that the owner was concerned and had been discussing the potential of bringing in other architecture firms on the project. That same week, two of the three newly hired designers in Frank's unit quit unexpectedly.

Upon investigation, the partners discovered that Frank was exhausted, working eighty hours or more a week, but even so he was failing to meet interim deadlines for the project. Long-time friends in the firm had begun to avoid Frank at lunchtime, and others in the office who knew him well were concerned about the autocratic style that he seemed to be using to control his team. The team members who resigned reportedly confided to others in the firm that they were not getting the feedback they needed and had no idea what was expected of them to meet the project deadlines. They had been approached by other firms seeking designers with expertise in computational design, and they quickly jumped at the opportunity to move on.

Frank Debrief

Based on this information, it is possible to examine what likely went wrong. First, Frank was taken out of his original position as a successful design leader in projects that used traditional project delivery models and placed in a new context. The partners thought they were rewarding him for his excellent performance by giving him more responsibility and autonomy with this new opportunity. This is not uncommon—professional success is often rewarded with more responsibility and freedom. However, Frank was promoted to a position of authority, but was given no training or mentoring in skills such as building interpersonal relationships and communication with various stakeholders.

The partners of the firm were all highly skilled in their own areas of specialization, but none had any experience in collaborative project delivery. Because they had established a model of practice in which talented project managers led high-performing project teams as autonomous studios within the office, the firm culture was one that provided little feedback from partner-level

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management. Outside of the initial meeting with the project team, the partners used their standard delegative leadership approach, which did not give Frank adequate direction or feedback during this critical stage in his development.

Clearly, another contributing factor to the issues was that Frank did not *ask* for support or feedback. Because of his previous success, he likely saw asking for support as a sign of weakness and assumed that perseverance and long hours would eventually result in success. What he did not realize was that the skills required for collaborative project delivery were considerably different from those he had used in more traditional contexts, and that no amount of overtime hours would help him intuit the technical, social, and management skills that he did not yet have.

Turning Point

The partners still believed in the necessity of making the integrated practice unit successful within the firm, but clearly could not allow the current dysfunctional approach to continue. They met to discuss how the situation could be salvaged. Firing Frank was not the answer, because it would create a culture of fear for the rest of the employees in the firm when approached with new initiatives. Allowing Frank to continue in his current position would be a problem for the remaining unit members as well as the contractor and owner, not to mention Frank himself. Reevaluating the organization of the unit and its relationship to the project was determined to be the likely best course of action. At lunch with a former classmate who had long worked at a large multinational firm, one of the partners happened to bring up the situation. The classmate expressed disbelief at how the firm had approached this new venture and shared some of his own positive experience working on collaborative projects.

With this newfound perspective, the partners meet with Frank to collectively assess the situation and identify each of the factors that had contributed to the mess. They asked Frank what he would like to do, giving him the opportunity to stay in the unit or to return to his previous role in the firm with their full support.

Should Frank choose to remain in the new unit, what actions should the partners take to support him? Ideally, they would bring on a new employee or a consultant with a high level of experience in collaborative project delivery to act as a mentor and provide feedback and direction as Frank develops the needed skills to effectively lead the unit. The partners, in their role as firm leaders, must also take personal responsibility for Frank's development. They should adjust their leadership approach to a more hands-on model, checking in with Frank frequently to ensure that he has the needed resources to succeed in the assigned tasks and is receiving sufficient feedback to understand how his behavior is perceived. Over time, the partners can gradually transition back to a more delegative leadership style as Frank's unit becomes more established (Hersey and Blanchard, 1977).

Denise

A second example of the importance of developing interpersonal skills and using appropriate leadership styles and feedback types involves Denise, a project architect who has been asked by the leader of the core project team on a large IPD hospital project to lead a cross-functional team responsible for addressing a coordination issue that has the potential to significantly impact the project's success if not resolved quickly and efficiently.

The cross-functional team is composed of several members from the architect's office, including Denise as the architect of record, the

structural engineer, the curtain wall consultant, and the contractor's core project team, including the GC, the concrete subcontractor, and the curtain wall subcontractor. The team is assembled to resolve issues surrounding the slab edge condition where the team has identified a significant problem with the enclosure detail that has widespread implications for the project's timeline, budget, and long-term building performance. The team has been charged with identifying all contributing factors, developing revised details, mocking up the proposed assembly, and coordinating with the manufacturer regarding ongoing prefabrication of enclosure panels and onsite installation strategies, as well as overseeing commissioning to confirm the installed system performs as designed.

The enclosure system as originally developed during the fast-tracked design phase resulted in many custom details. The owner feels strongly about the aesthetics of the design, which have been widely disseminated as the visual identity of the new medical center, so it is imperative that the cross-functional team deliver a final product that honors the design intent in addition to performing as specified with regard to air tightness, moisture resistance, and thermal performance. Denise was asked to lead the coordination efforts of the various experts and consultants with the belief that a collaborative effort will most effectively integrate all relevant factors into a successful result rather than addressing individual issues in isolation. Time is of the essence, and the problem is complex.

Coordination among the cross-functional team members is not the only level of coordination needed. Denise is responsible for reporting on the cross-functional team's progress to the core team as well as the other cross-functional teams that continue to address other geographic areas and systems on the project. At once, Denise must lead the slab edge cross-functional team with authority, laterally influence, with little authority, the other cross-functional teams, and influence the core team regarding decisions about her team's work without any authority. Denise cannot simply use a task-based approach with her subordinates and a relationship-based one with the core team leadership; she must use a combination in all situations (Hersey and Blanchard, 1977; Blanchard et al, 1985).

Adaptive Leadership in Action

Denise assigned the detailing task to the structural engineer and the enclosure subcontractor to discuss at the next meeting. After two subsequent meetings with no positive development, what should Denise do to get the group's efforts back on track?

In this situation, it is recommended that Denise first determine the underlying causes of the problem and then develop a specific action for resolving them. Denise draws from a simple problem-solving model she had learned in a management seminar:

- Discovery: Find out about the event. Denise engages in informal one-on-one conversations with each team member to better understand how they were approaching their tasks.
- Recognition: Learn where the problem stems from. Through these discussions, Denise was able to determine that there had been several mistakes made when translating structural slab dimensions in the shared model.
- Discipline: Develop specific actions for resolving the problem. Once the mistakes were discovered, Denise can lead the entire cross-functional team in a charrette to develop an alternative approach that maintains the overall geometry but simplifies the number of unique parts.

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Thanks to a suggestion by the curtain wall subcontractor during the charrette, the team is able to develop an adjustment that will offset the potential change order cost and allow the project to remain on schedule. When reporting back to the core team on the cross-functional team's performance, Denise attributes the success to the team's willingness to work together, calling out specific team members such as the curtain wall subcontractor for particular mention. She also ensures parallel feedback occurs with cross-functional team members so that everyone is aware of her evaluation, both of their individual and collective performance, and that she is attributing credit where it is due. This strategy works on most other types of team-based issues, including those involving interpersonal conflicts.

Conclusion

The ultimate goal of any leader is to create a situation of interdependence among team members, which is a marker of team efficiency. Interdependence can only be accomplished through open and honest dialogue, cultivation of trust, a high degree of communication, and shared team goals and values. Transparency is critical for team members to know that their well-being and professional development are valued by leaders.

Teams are built on relationships. Interdependence between individuals allows for teams to utilize their collective skills and abilities to accomplish goals. It is in interdependent, high-performing teams that outcomes are consistently successful and motivation and morale are high (Gregory et al., 2009).

Particularly for those new to leadership positions or those working in a new form of project delivery, feedback and direction are needed from their superiors, as was shown in the case of Frank. Additionally, leaders in collaborative, cross-functional teams must be aware of the needs of stakeholders and provide feedback and direction, as was shown in the case of Denise. Leaders, in either situation, must also cultivate a culture of respect for the expertise of all members. The key determining factor in both of these cases was the absence or presence of interpersonal awareness.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 13

Cognitive Styles

Understanding Cognition

Not everyone is enthusiastic about the changing culture toward more collaborative environments. Some people express that they do not like working in teams, opting instead for individual tasks if given the choice (Benkler, 2011; Robbins and Judge, 2011). Others who were trained in command-and-control or autocratic environments can have difficulty transitioning to team-based methods of operation. They may not like the level of feedback and direction given or have patience for the time spent on deliberating larger issues in collaborative teams (Ashcraft, 2011a). All of these outward behaviors are expressive of an individual's personality traits and past experiences.

Interpersonal skills have already been identified as fundamental to a collaborative team's culture and communication. The same skills can also be used to understand how individuals and teams behave and develop from a problem-solving perspective. With such understanding, leaders are better equipped to communicate effectively with individuals from different perspectives in the context of problem solving.

A *cognitive style*, or thinking style, is a term used to describe the way people think, work, process information, and remember it. It is different from a person's ability, aptitude, or intelligence. Gaining awareness of each person's approach to problem solving is beneficial to project teams for a number of reasons. It creates self-awareness in individuals who may not have consciously considered their intuitive approach previously. It also allows for accommodation rather than frustration between team members who have different cognitive styles.

Research shows that team members with similar cognitive styles feel more positive about their participation in a team. However, a team with a uniform cognitive style is not guaranteed success. Such uniformity can even negatively affect the team's performance due to a lack of diversity. Leaders benefit from the awareness of individual working styles by being better able to individually direct and provide feedback to members (Hackman, 2011; Katzenbach, 2005).

Cognitive styles can be assessed in a variety of ways (Figure 13-1). A popular assessment tool is the *Myers-Briggs Type Indicator* or MBTI (Myers, 1995). This tool was developed based on Carl Jung's psychological types theories, which identified patterns of how people observe and internally process information from the outside world (Jung, [1959] 1981). Through the cross-listing of four principal functions

of sensing, intuiting, feeling, and thinking and two dichotomous pairs of cognitive functions—judging (thinking and feeling) and perceiving (sensing and intuition)—sixteen possible patterns of behavior result. An individual's behavior pattern is assessed though a series of questions intended to determine which functions and attitudes are dominant in them at any given time.

The *cognitive styles analysis* tool was developed in 1991 by Richard J. Riding. This assessment uses two orthogonal dimensions representing the range between wholist–analytic and verbal–imagery to map where an individual fits within the overall field. The W–A dimension reflects how individuals organize and structure information. A wholist is a comprehensive thinker, versus an analytic who will break problems down into component parts. Similarly, the V–I dimension distinguishes between verbalizers, who represent information in words, and imagers, who see mental pictures (Riding and Chema, 1991).

Other less common methods include Herman Witkin's *field dependence–independence* model that identifies an individual's perceptive behavior, and others that measure technical versus interpersonal skills (Witkin et al., 1977). Robert Ornstein's left

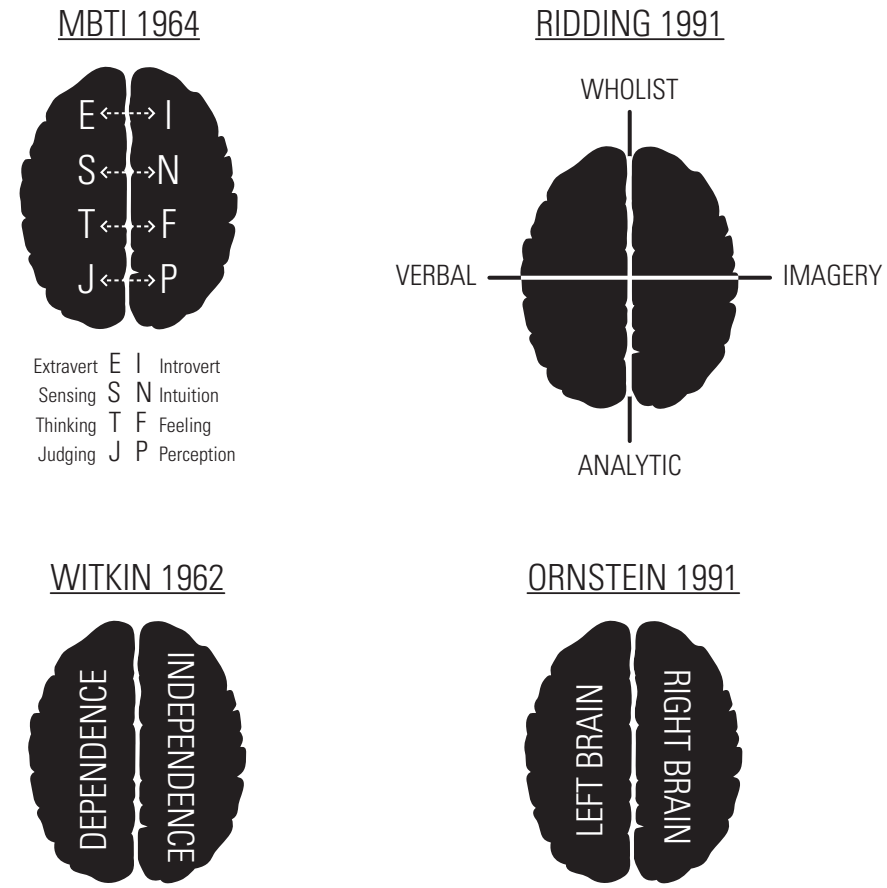

Figure 13-1 Cognitive style assessment tools

brain/right brain theory that categorizes which of the analytical/holistic and intuitive/pictorial cognitive styles are more dominant in an individual (Ornstein, 1998) is widely cited in popular culture but critiqued by neuroscientists as oversimplifying the complex and unique organization of each individual's brain.

Though any reflective activity can increase a person's self-awareness, none are perfect. The common critiques of the above-mentioned theories and assessment tools include that their effectiveness relies completely on the quality and accuracy of responses from the subject being assessed. Results are too often vague to determine a clear conclusion, and there is no commonly accepted approach among those who provide consulting on these matters. Most important, they do not take into account individuals' conscious and unconscious response to being assessed, both of which can affect the results (M. Kirton, 2003).

Michael Kirton developed an alternative assessment model that evaluates cognitive style based on a person's approach to problem solving along a spectrum rather than attempting to categorize it based on personality traits (Figure 13-2). The resulting assessment can help leaders and individuals recognize the affect their working style has on creativity, problem solving, and decision making (M. Kirton, 2003).

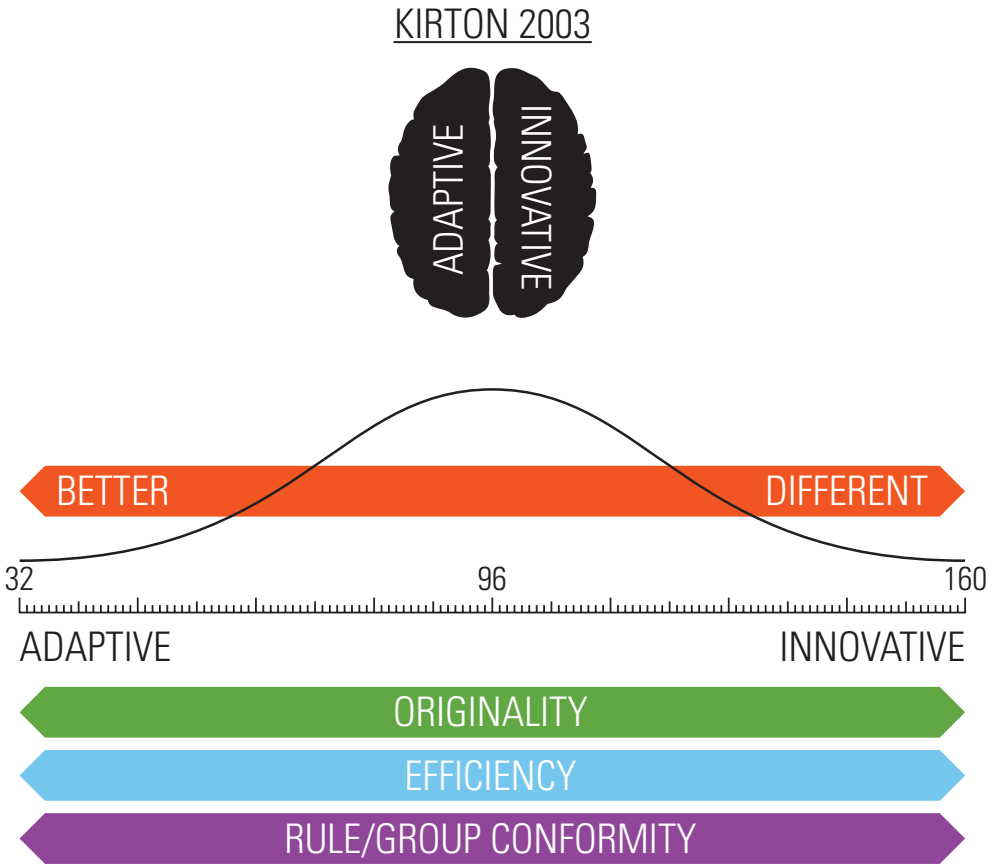

Figure 13-2 Kirton's Adaption-Innovation Inventory model

The Adaption-Innovation Inventory is an assessment tool developed to evaluate an individual and team's working style. Leaders can better facilitate different working cultures once armed with this knowledge. The Adaption-Innovation Inventory can be used to select, build, and maintain project delivery teams. More commonly it is used in team building as an assessment tool to help members understand how to most effectively communicate and work with each other (M. Kirton, 1976; M. J. Kirton, 1978).

Adaptive Problem Solving

Those identified as having *adaptive* cognitive styles are problem solvers who look for a few well-reasoned, well-thought-out solutions to a problem that have high probability for success. Adaptive problem solvers are comfortable working within constraints and boundaries and seek harmony and positive relationships among team stakeholders. Adapters are very efficient and bring discipline, order, precision, and elegance to the work they do. They accomplish tasks in a timely and effective manner. To avoid misinterpretation, we will illustrate these working styles using examples of historical problem solvers outside of contemporary architectural and construction practice.

Thomas Edison famously said: "Invention is 1 percent inspiration and 99 percent perspiration." He was renowned for his persistence and willingness to test alternatives to problems exhaustively until a reasonable solution was found. If it took 1000 times to identify the right answer, he considered the first 999 attempts to be simply failed experiments. Having a strongly adaptive cognitive style (as opposed to being further to the center of the range), Edison did not often see higher-level relationships between his inventions, yet he was amazingly creative and prolific within specific domains.

Another example of an adaptive thinker is Michelangelo, who was one of the most of talented artists and sculptors in history. His greatest works were the Sistine Chapel and the statue *David*. In terms of logistics, the site and medium established clear parameters that required Michelangelo work quickly and expertly, for example with wet plaster when painting a fresco.

The painting on the ceiling of the Sistine Chapel is considered one of the finest works of art in the history of Western civilization. It is also a tremendous accomplishment in terms of logistics. Michelangelo, while lying in a semiprone position directly under the ceiling, was able to translate the calculations he had made about the perspective based on the viewpoint of a person standing on the chapel floor. He used similar combinations of artistic vision and technical expertise to carve the *David* from a flawed piece of marble. He is quoted as having said about his creative process, "I simply took away the parts of the statue that didn't belong."

Both Edison and Michelangelo serve as prime examples of adaptive problem solvers by demonstrating behaviors that are both creative and efficient, each striving for elegance in both design and execution (Figure 13-3).

Innovative Problem Solving

Kirton's model defines the alternative working style as *innovative*. It is important to note that the term innovation's normal association with creativity does not imply that adaptors lack imagination. While it is true that innovators are creative, the examples of Edison and Michelangelo show that adaptive problem solvers are also creative, just in different ways.

Innovative problem-solvers look for as many solutions to a problem as possible. The process they go through might best be compared to

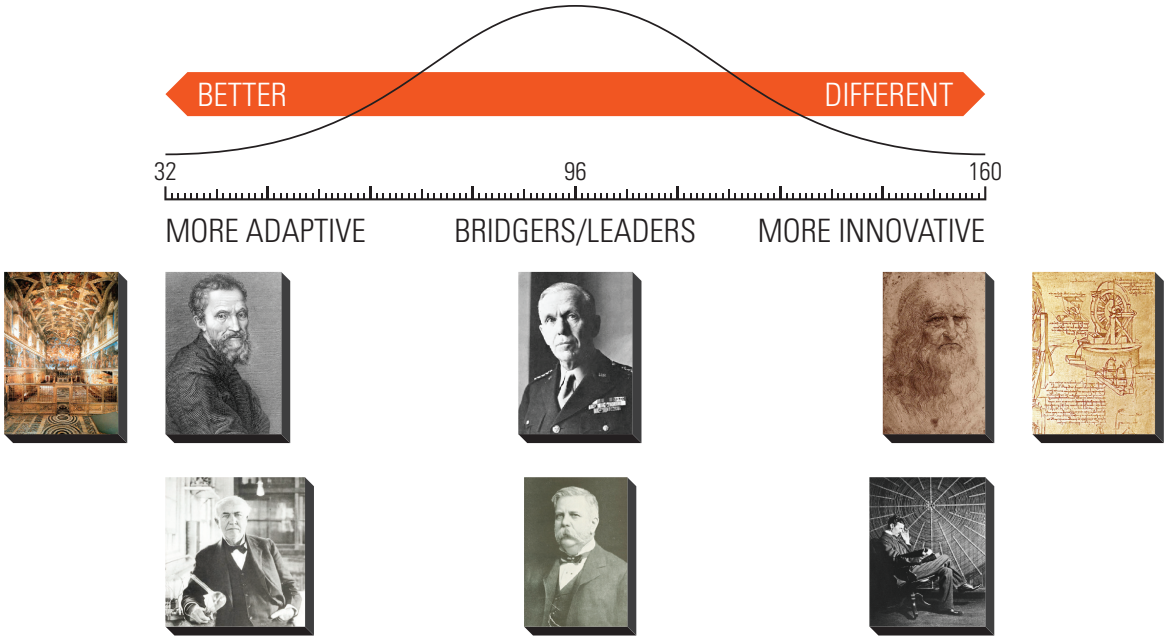

Figure 13-3 Adaptive and innovative figures from history

stream-of-consciousness writing, where solutions are prolific, though some might not reflect the project parameters. Innovative problem solvers are often seen as renegades, breaking with conventional wisdom, and disregarding or breaking rules. They operate extremely effectively in situations that are highly uncertain or ambiguous. However, innovators also often fail to finish tasks or are easily distracted. Unlike adaptive problem solvers, innovators often operate as disruptors on project teams and may show little concern for the feelings and opinions of others.

A historical figure that embodies the innovator style is Nicola Tesla, an entrepreneur and prolific inventor who was a contemporary of Edison. Tesla invented alternating current, wireless radio transmission (eventually enabling the invention of cell phones), tinkered with batteries large enough to store the power of a lightning strike, and described television and microprocessor technologies in the 1880s. Though his contributions to science and engineering are responsible for many of our contemporary daily conveniences, he does not have the same name recognition today as does Edison. The reason may have much to do with the difference in their cognitive styles. Tesla never wrote anything down, guarding his intellectual inventions in his head. He was eccentric, aloof, and very difficult to work with in a collaborative fashion. He and Edison reportedly hated each other; there is even some evidence suggesting that Edison blew up Tesla's lab at least once.

Another historical example of an innovator was Leonardo da Vinci, who was a contemporary of Michelangelo. He is best known as the artist who painted the *Last Supper* and the *Mona Lisa* and serves a model of the ultimate Renaissance man. Though he was most recognized for his paintings, Leonardo was prolific in a wide range of disciplines.

He was a military and aeronautical engineer, a mechanic, an architect, an anatomist, and a scientist, in addition to his work as a painter and sculptor.

It is reported that Leonardo started over 400 works of art in his lifetime but only finished around 40. It is interesting to speculate on what his legacy would have been had he been able to stay on task. Leonardo was extraordinarily creative, as was Tesla, and has a body of work that crosses boundaries of conventional wisdom and disciplinary tradition. The feuds between these two pairs of figures (Tesla and Edison, Davinci and Michelangelo) also serve as extreme examples of how different working styles can lead to conflict in teams.

Bridgers as Leaders

If innovators are located on one end of a continuum and adapters on the other, *bridgers* are those who show characteristics of both working styles and occupy the center (Figure 13-4). Bridgers are people who see the importance of new and different ways of approaching problems and recognize the need for order and discipline. Because they can empathize with both cognitive styles, they are able to create positive relationships between those at the opposite extremes of the spectrum. Bridgers can help innovators understand the need to pare down their list of ideas and show adapters that it is important to be flexible and willing to embrace change.

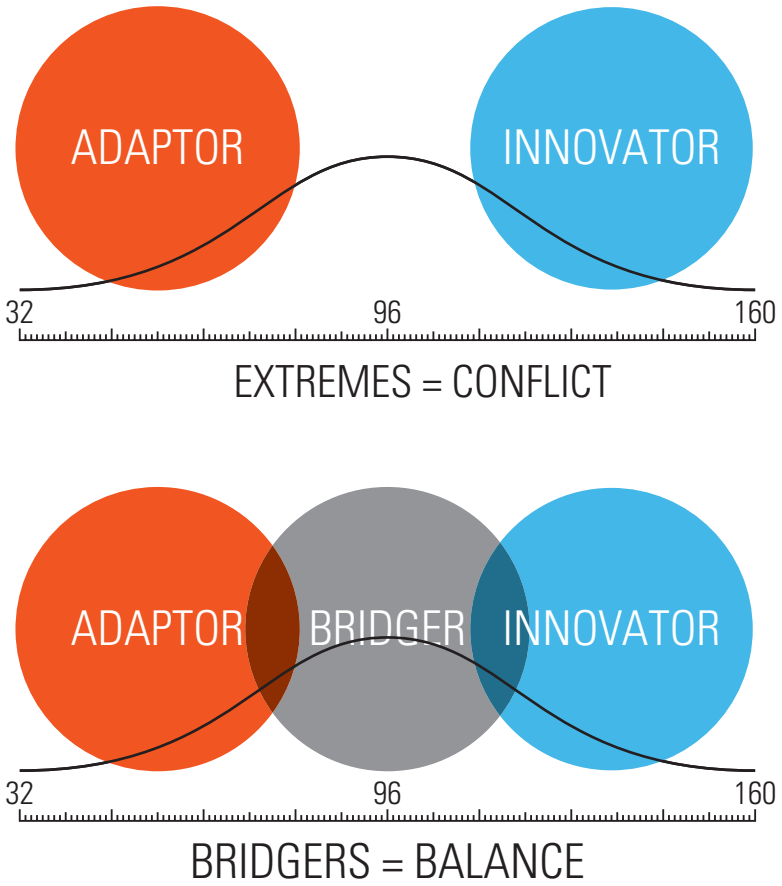

Figure 13-4 Bridgers provide balance

A historical bridger who lived at the same time as Tesla and Edison is George Westinghouse. He saw the potential in both men's inventions as well as the need for them to collaborate in order for either to be a success. Westinghouse attempted to convince them to work together, with some success. His recognition of the potential of both men's inventions was demonstrated at the World's Columbian Exposition of 1893 in Chicago, which had the distinction of being the first large-scale, electrically lit public event in the United States and also included demonstrations by Tesla.

A second example of a bridger is General George Marshall. He had the uncanny ability to balance diverse interests and was committed to the successful employment of people from wide-ranging working styles toward the successful completion of a common mission. He was successful both in the military and as a statesman and is credited for being largely responsible for the economic recovery of post-World War II Europe.

Had Marshall not looked for compromise and insisted on collaboration, the world would have not enjoyed the relative stability that built modern Europe. Marshall was exceptionally creative in his understanding and management of interpersonal relationships, allowing him to broker conversations among leaders like Eisenhower, Patton, and Bradley, who represent a wide variety of problem-solving styles.

Adaptive and Innovative Team Cultures

Each primary cognitive or working style has elements of creativity as well as typical strengths and weaknesses associated with it. Leaders who develop their understanding of the different ways in which people approach problem solving can use that information to positively influence the collaborative project delivery process. For example, innovators can be given the freedom to explore wide-ranging solutions, bridgers can be asked to help articulate the applicability of various alternatives to the situation, and adapters can design an execution plan to develop and refine initial concepts.

The same terms that have been used to describe an individual's working style can also be applied to the type of working environment created among teams. Purely innovative teams that are free to think divergently and try new and different approaches may seem like the ideal creative environment. However, such groups fail to fully articulate or bring any of these ideas to fruition.

Conversely, an entirely adaptive group may focus on a few viable options without examining the changing context over time. They will likely end up with solutions that are well crafted but no longer fulfill the evolving nature of the problem.

When the environment is defined as bridging or balanced, the project team is open to many new ideas and has the ability to articulate and efficiently execute a plan to turn them into successful outcomes. Excellent solutions do not emerge unless all three problem-solving types—innovators, adaptors, and bridgers—are present on a team. The absence of one or more of these working styles can create serious imbalance in team dynamics. In a balanced team, each style has a critical but distinct role.

Reflective Environments

In addition to individual working styles, cognitive styles can define climates or environments that affect team behavior and ability to successfully innovate. Such environments are dominated by either adaptor or innovator behaviors (see previous section). Either can foster team productivity, but only

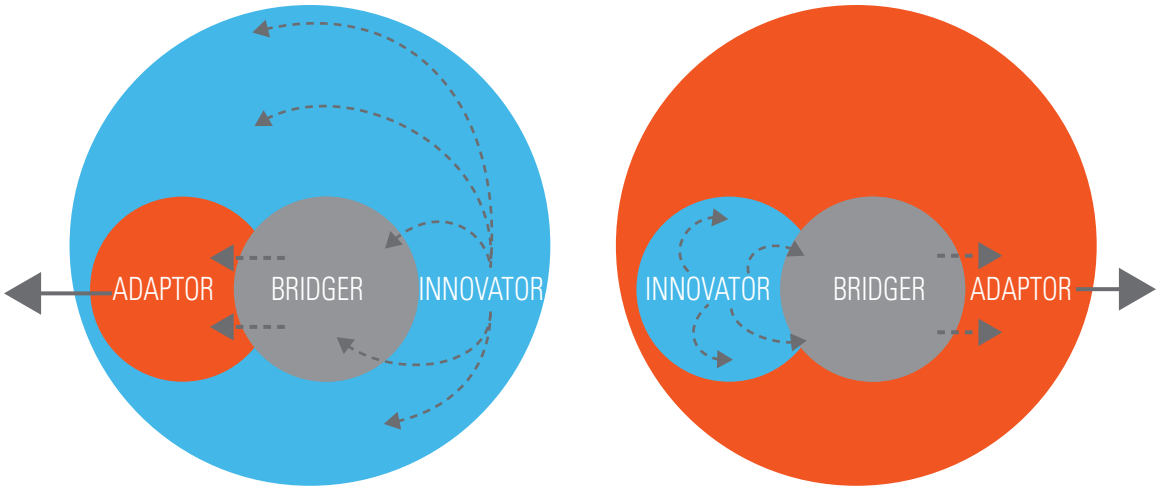

Figure 13-5 Innovative and adaptive reflective environments

when it is also critically reflective (Figure 13-5), meaning that team members are able to respond to environmental conditions in real time.

In nonreflective environments, the worst tendencies of each working style proliferate: innovators become oblivious to the effects of their actions and lose focus, bridgers are consumed with preserving harmony, and adapters often settle on any viable solution without exploring sufficient alternatives. Leaders play an important role in ensuring a working environment is reflective and thus productive.

Climates that are dominantly innovative as well as reflective are active with creative innovator energy and can be productive when populated by a balanced team, including adapters and bridgers. This type of environment is characterized by the free and open expression of many ideas and alternative processes and complexity and ambiguity are welcome. Because the climate is reflective, all parties are happy because everyone is aware of the rich potential. Innovators generate ideas, bridgers articulate and edit them, and adapters evolve and execute them elegantly.

Innovative environments that are not reflective are also fun, creative places to be but tend to be less productive because there are seemingly no negative consequences to a lack of productivity. Such teams can be productive if balanced with bridgers who step in to edit and define ideas before passing them off to adapters who see them through to execution. Unreflective innovative cultures tend to be extremely enjoyable for innovators and stressful and exhausting for adapters and bridgers.

Adaptive reflective climates can also engender creative, productive results. Adapters obviously thrive in this context, which is clearly structured and ordered. Bridgers remain in their traditional role of translators. Innovators are best organized in isolated "think tank"-type settings when working in adaptive climates.

An example of a successful reflective environment is the Skunk Works, a special division of Lockheed Martin founded in 1943 to address the seemingly impossible task of developing the country's first jet fighter plane and delivering a prototype in 150 days. The group successfully accomplished

the task in 143 days and has continued to achieve similar success in ensuing decades due to its unique structure. Developed by founder Kelly Johnson, the Skunk Works team structure is defined by small groups of innovative people unencumbered by management and logistic responsibilities. Each group is led by a strong, autonomous leader who reports directly to senior management. The team's requests for resources are promptly granted, and they are rewarded for their successes.[1]

The only climate that is inherently negative for all involved is an adaptive, nonreflective one. These environments are characterized by a strict adherence to rules and conformity. Innovation and individual expression are punished, which generally leads to these creatives leaving the team or attempting to fit in until the discomfort becomes too much. In the worst extremes, they might be persecuted or threatened for failure to comply.

Developing and maintaining well-balanced teams with diverse problem-solving approaches is a leader's challenge. The leader as a bridger has to assess situations and help team members see how cultural differences can actually be the team's greatest strengths. The leader's role is to very openly approach people, articulate what they assess that person's preferred problem-solving style to be, help them understand the nature of the problem and environment, and task them to address the problem using appropriate means.

Sometimes, circumstances arise where the nature of the problem might require an approach different from a person or team's preferred working style. People can adapt their working style in such instances, though they will often not be as focused, disciplined, and capable as they are in conditions where their preferred approach is applicable.

Architects acting as bridgers may tend toward adaptive or innovative styles of working; however, they can choose to alter their behavior to influence the team as needed. In this way, they are able to create bridges between individual members of the team and the companies and firms they represent, each with their unique cultures and working styles, in order to create a collaborative project delivery culture.

CASE STUDY EXCERPT: THE CENTER FOR BUILDING ENERGY SCIENCE & ENGINEERING (BUILDING 661)

Each person thinks, works, processes information, and comprehends differently, all of which have an impact on creativity, problem solving, and decision making. Those who can recognize and respond to others' cognitive styles are better able to communicate, work with, and provide feedback to one another. In addition to individual working styles, cognitive climates affect team behavior and can either foster team productivity or decrease it.

Project Details

Architect: KieranTimberlake

CM-as-agent: Balfour Beatty

Owner: The Pennsylvania State University

Key stakeholders:

Geotechnical engineer—Pennoni Associates

MEP/FP engineer—Bruce E. Brooks Associates

(*continued*)

[1] Lockheed Martin Corporation, Inc., "Kelly's 14 Rules and Practices," www.lockheedmartin.com/us/aeronautics/skunkworks/14rules.html.

(*continued*)

Figure 13-6 Building 661 *© KieranTimberlake*

Structural engineer—CVM

Civil engineer—Hunt Engineering

Landscape architect—Studio Bryan Hanes

Commissioning agent—ARAMARK

Environmental/lighting design—Atelier Ten

General trades contractor—Ernest Bock & Sons

Mechanical contractor—Devine Bros.

Electrical contractor—EJ Electric

Plumbing contractor—Dolan Mechanical

Location: Philadelphia, PA

Type: Educational—Advanced energy retrofit

Project duration: 2013–2014

Size: 35,000 SF

Total construction budget: $33M

Project delivery: Design bid build (multiple prime) with CM as agent (preconstruction)

Introduction

KieranTimberlake is an award-winning 100-person architecture firm that specializes in a sustainable, collaborative, research-based approach to the design of new buildings as well as the transformation of existing structures to improve economy, efficiency, and quality. The firm draws from a broad range of in-house expertise, relying on collective intelligence and nonhierarchical production structures.

Because of their extensive experience in environmental stewardship and adaptive reuse projects, the firm was selected in 2013 for the advanced energy retrofit (AER) and design of Building 661 (Figure 13-6), officially known as The Center for Building Energy Science and Engineering, at the Navy Yard in Philadelphia, PA, for the new headquarters of the Consortium for Building Energy Innovation (CBEI). CBEI is a dynamic, performance-driven venture comprising 25 organizations, including major research

universities, global industrial firms, and national laboratories from across the United States aiming to transform the energy efficiency market for existing small-and medium-sized commercial buildings.

Balfour Beatty was brought on board as CM-as-agent and to provide constructability and estimating services during the design phase. A global leader in infrastructure projects for over 100 years, Balfour Beatty provides design, engineering, construction, and consulting services on projects in over eighty countries. The firm takes pride in local partnerships and fosters a culture based on innovation and integration to maximize long-term relationships, making them an ideal partner in collaborative project delivery.

The project would serve as both the headquarters for CBEI as well as a test bed from which to deploy proven energy-saving, whole-building-system solutions and integrated retrofit design and delivery methods. The 37,000 SF structure was originally a nineteenth-century recreation center for the Philadelphia Navy Yard, featuring a double-height swimming pool and a basketball court and had been standing vacant for fifteen years. The new program called for classroom and exhibition spaces dedicated to energy efficiency education. Documentation of the AER of the building was meant to advocate for a feasible and replicable process, reflecting CBEI's educational goals. As such, energy usage was the primary focus and drove decisions made by the core team.

Collaborating with Constraints

KieranTimberlake was chosen based on its proposal from among a shortlist of firms. Balfour Beatty was selected as construction manager based on its reputation as a leader in sustainable infrastructure projects, and advocated for the use of integrated design principles throughout the project. In initiating the project, the team chose a collaborative, integrated process to address the challenges of public funding and local contracting laws, which required the team to hit a specific target budget, neither spending too much nor too little, and mandated a traditional open bid, multiple prime procurement process.

Ideally in an integrated process the contractor is involved during the design of the project in order to provide constructability and cost estimating insight and allow for early procurement of major scopes of work. However, procurements laws in Pennsylvania carefully govern the delivery methods for public projects, prohibiting contractors from intervening in projects prior to bid in order to avoid collusion. This constraint undermined the collaborative potential of the team.

Team Culture and Organization

"Even though we had spoken a lot with the client about an integrated process, I don't think either one of us were as familiar with the day-to-day modalities of an integrated process versus what Balfour Beatty knew," said KieranTimberlake partner David Riz. "When we started the project, we jumped right in to designing the building, like we do on every other project." It was Balfour Beatty who directed the team's energy first into a series of project-defining workshops. These sessions focused on aligning the values of the project that would guide decision making and information sharing.

The team supplemented the conventional contract with a collaboration agreement that was developed during the initial workshops. An additional series of workshops focused on BIM standards not only to streamline the project workflow but also so that the model could serve as a resource for facilities management after construction. Finally, because energy was the

(*continued*)

primary focus of the project, the team engaged in workshops to discuss integrated systems and how they would be modeled and evaluated during design.

Balfour Beatty's previous experience with integrated project management offered a starting point for the team. Bevan Mace, vice president at Balfour Beatty, advises teams "go slow to go fast" at the beginning of a project, meaning that they should take the time to establish the project goals and processes before beginning design. The team also established a nonhierarchical culture that committed to establishing trust and shared values within the team.

Team Leadership

"In integrated projects, the best answer lies somewhere in the team," says Mace. "You just have to pull it to the surface." He sees leadership on integrated projects as the art form of asking the right questions and ensuring open conversations occur across the team. The earlier these conversations take place, the greater their impact. Mace's leadership enabled the team's collaborative decision-making ability throughout the design process.

Establishing a Collaborative Process

The core design team of owner, architect, and CM prepared a structured governance and organization chart that described various committees, groups, and teams and identified which parties would attend each type of meeting (Figure 13-7). "Instead of diving right in to a programming exercise, we spent a month and a half with all the front-end protocols for an integrated process," Riz explained. Though it was time consuming, the alignment process was key to circumventing wasteful redesign practices downstream that are common on typical projects, and the team saw this as time well spent (Figure 13-8).

Many project stakeholders attended workshops that established effective knowledge-sharing practices on the project. The relationship-building stage concluded with a group dinner for the project team. It was difficult for some team members to have patience with the process when they were used to immediately beginning the design, but in the end everyone involved found the team alignment invigorating. "It's not just goal-setting, it's value-setting," said Riz. "That's a very different thing. Values are what we really think are most important to retain throughout the project, not what the end result is going to be."

Communication and Motivation

The project benefited from Balfour Beatty's target value design costing approach, both during design and construction (Figure 13-9). The CM applied real-time, iterative cost modeling to the design on a monthly basis rather than at the end of each phase, which allowed the team to test strategies fluidly. Using an iterative estimating process during the design phase, the owner, architect, and contractor understand that there are a number of elements in play. Over the course of the process, these items were narrowed down and given actual value.

"Everybody was in the decision-making pool and understood what the most important things were about this project," said Riz. Careful budgetary decisions were made in tandem with design decisions, both of which were simultaneously revised until the final scheme was developed. This approach resulted in a high-performing retrofit boasting an energy use index of 40 compared with the recorded baseline of 71.

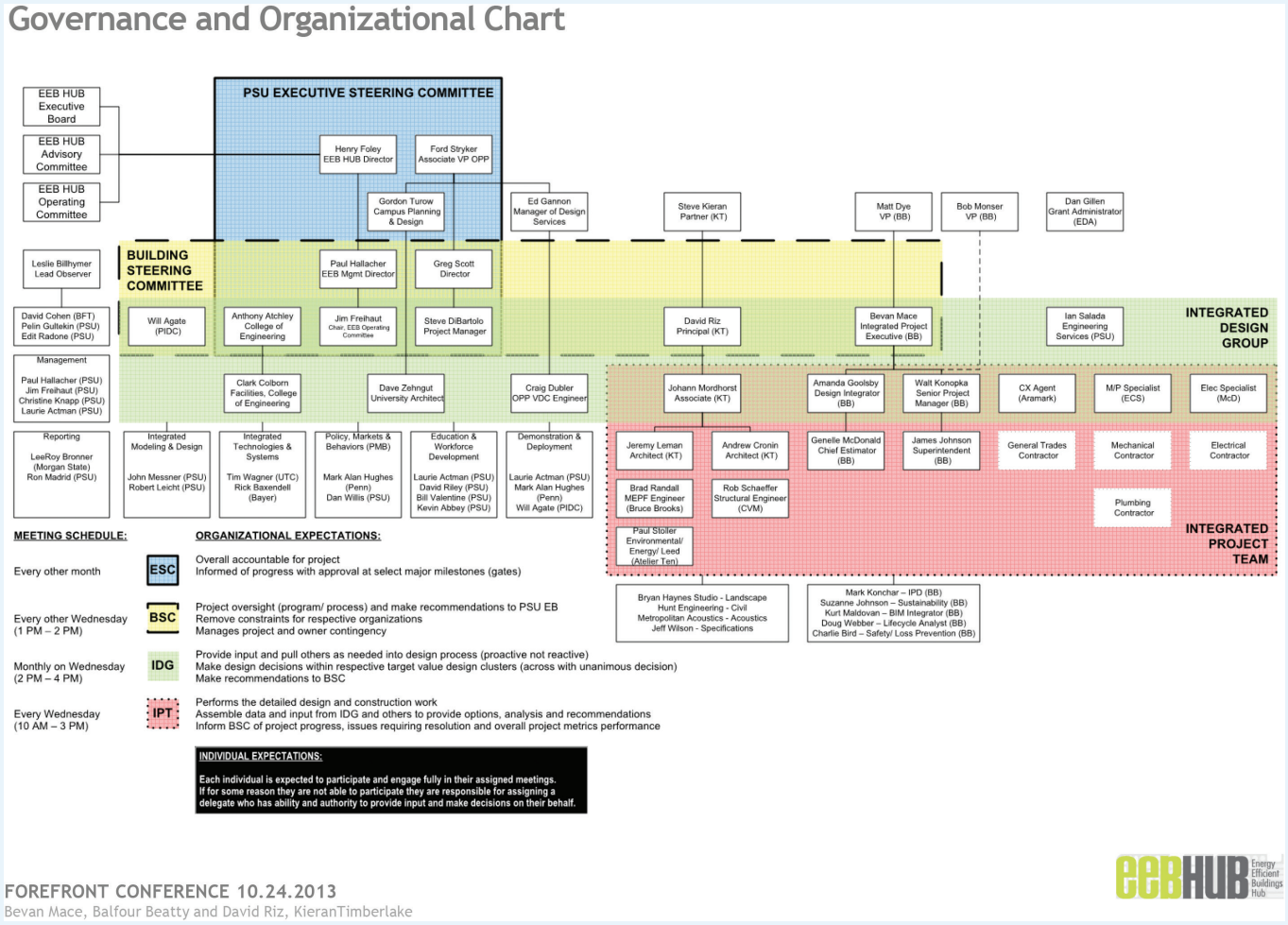

Figure 13-7 Governance and organization chart *Image courtesy Balfour Beatty Construction*

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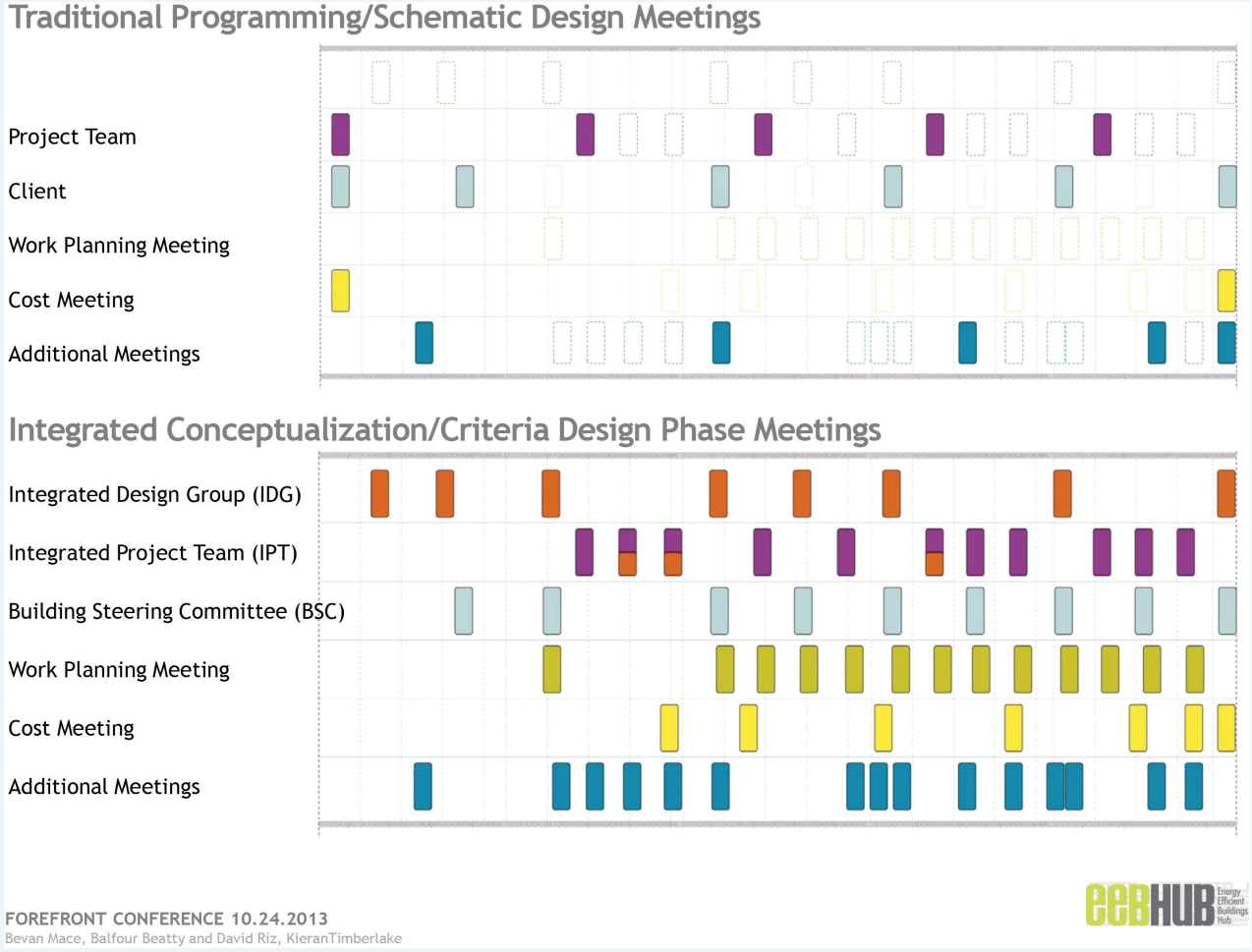

Figure 13-8 Integrated process meeting schedule comparison *© KieranTimberlake*

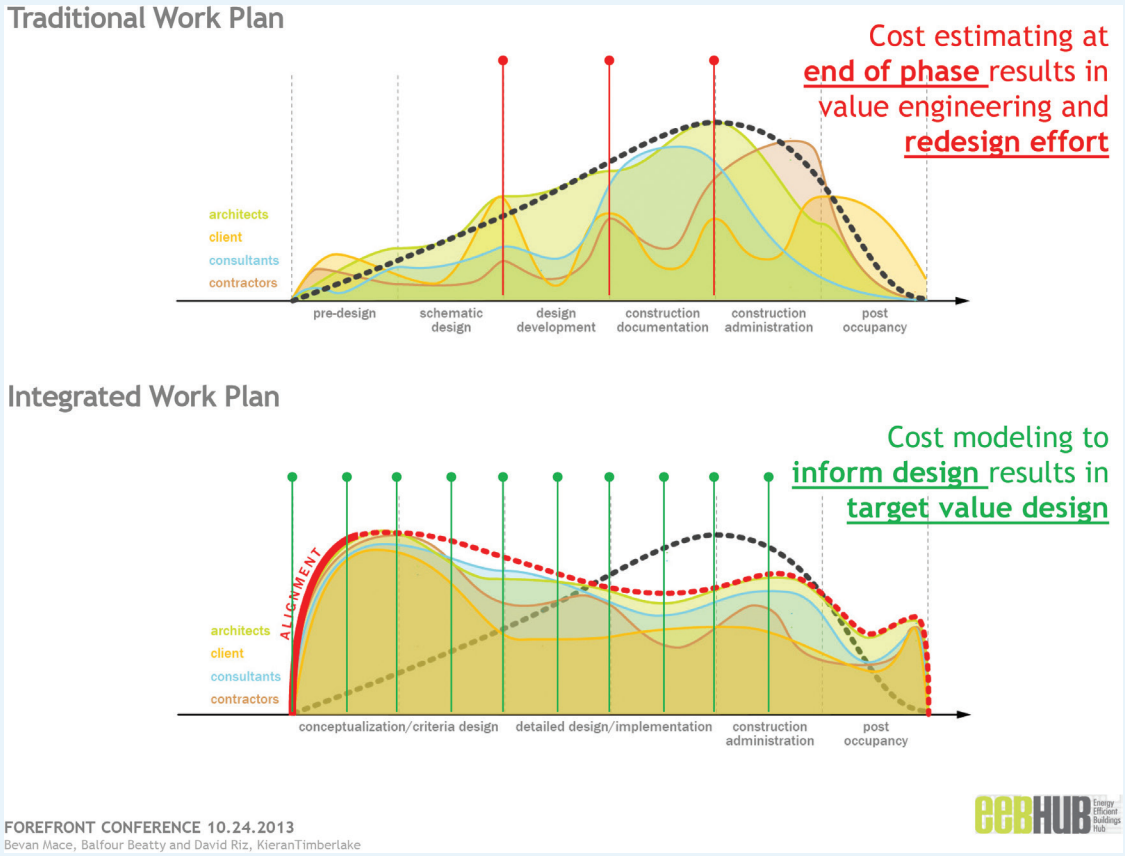

Figure 13-9 Work plan comparison *© KieranTimberlake*

The Building 661 renovation is a model project for AERs that challenged delivery methods decreed by public regulation that have historically not supported collaboration (Figures 13-10 to 13-11). The team identified the following elements as essential for an integrated approach: early identification of the GC or CM to provide constructability and cost modeling (not just a lump sum estimate) and an alignment process where project goals and working methods are identified.

Despite constraints of traditional delivery models, collaboration proved not only effective, but transformative to the team's effectiveness. "We are asking teams to do things in a different way now," Mace reflected. Change is hard and takes forward-looking leaders. "To really make change happen, you've got to demonstrate it. That is what integrated design is all about—changing the industry."

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Figure 13-10 Longitudinal section revealing mechanical details *© KieranTimberlake*

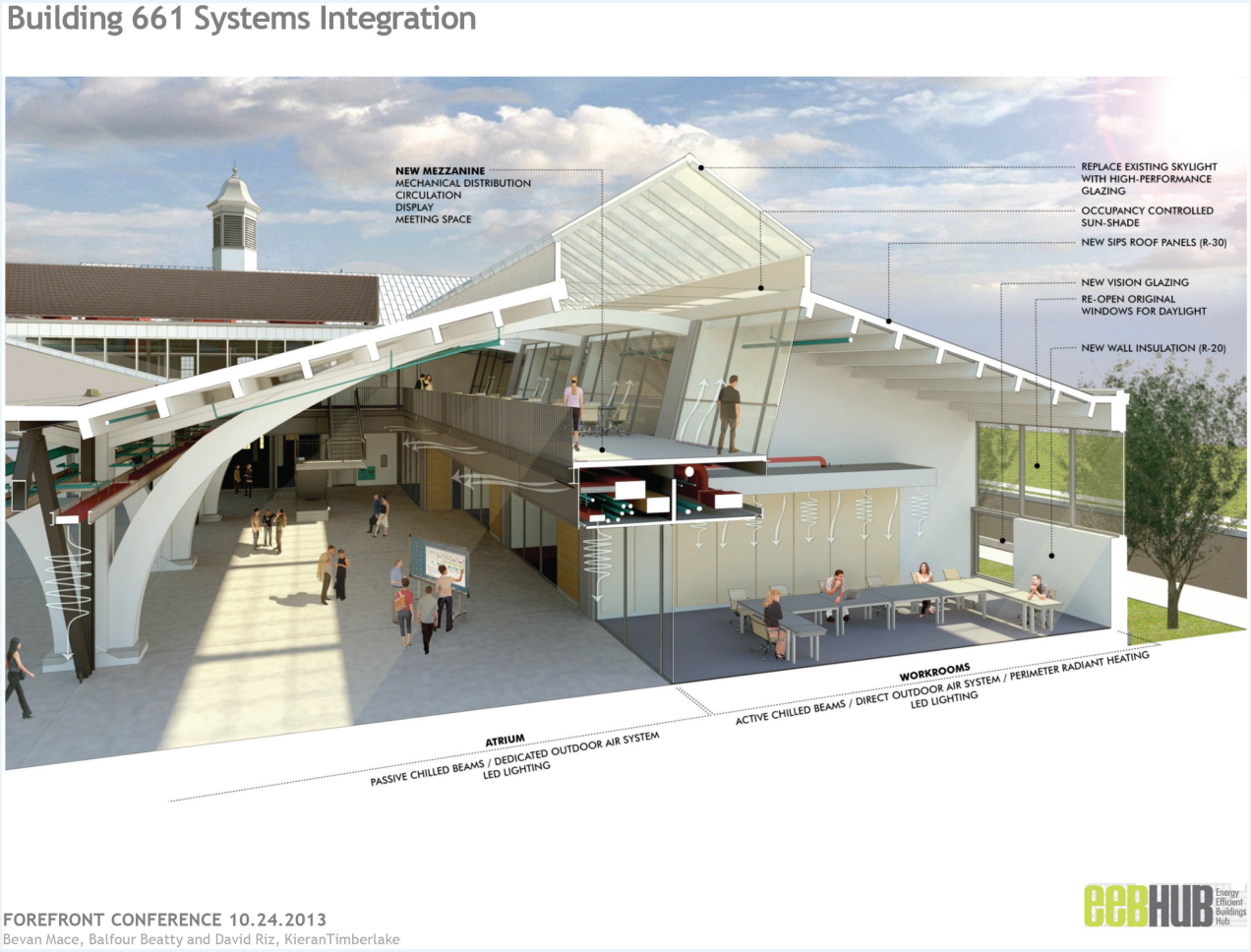

Figure 13-11 Cross-section revealing daylighting strategies and insulation improvements *© KieranTimberlake*

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 14

Leadership Styles

Authoritarian/Autocratic

A leadership style is the approach leaders take when providing direction, implementing plans, and motivating people (Clark, 1997). A leader's approach directly affects team productivity, positively or negatively. There are many models describing leadership styles, two of which will be discussed in this chapter. Based off of the first major study of leadership styles in 1939, the first model locates leadership along a spectrum of authority ranging from authoritarian or autocratic where the management has all the power, to participative or democratic where the leader and team share decision-making responsibility, and finally delegative or free rein where the leader is essentially absent and the team is responsible for leading itself (Figure 14-1) (Lewin et al., 1939:271; Hofstede, 1997). While it might first seem that a democratic approach would be ideal at all times, leaders must determine which approach is appropriate based on their own cognitive style, the team's dynamic, and the situation in which they are working.

Under authoritarian or autocratic leadership, all decision-making responsibility is centralized in one individual or a small group of individuals. In this top-down approach, leaders assign tasks and define how they are to be accomplished without input from the team. Although this is the leadership style historically associated with dictatorships and may have a somewhat negative connotation, it can be useful at times in certain circumstances (DeLisle, 2011; Lewin et al., 1939:273).

When using the authoritarian style, leaders can make quick decisions without spending time engaging others in discussion. At times, this approach also involves delaying the release of decisions from the team until the leader feels the time is appropriate. Authoritarian leadership should be reserved for limited conditions when leaders have all the relevant information needed to solve the problem, when time is a critical factor, and with teams that are highly motivated. In these situations, decisive, clear, and specific direction can lead to successful results (Lewin et al., 1939).

Shouting, demeaning language, and threats are not appropriate leader behaviors at any time and should not be mistakenly associated with this approach. Such actions are abusive and unprofessional, regardless of the situation. Even though the

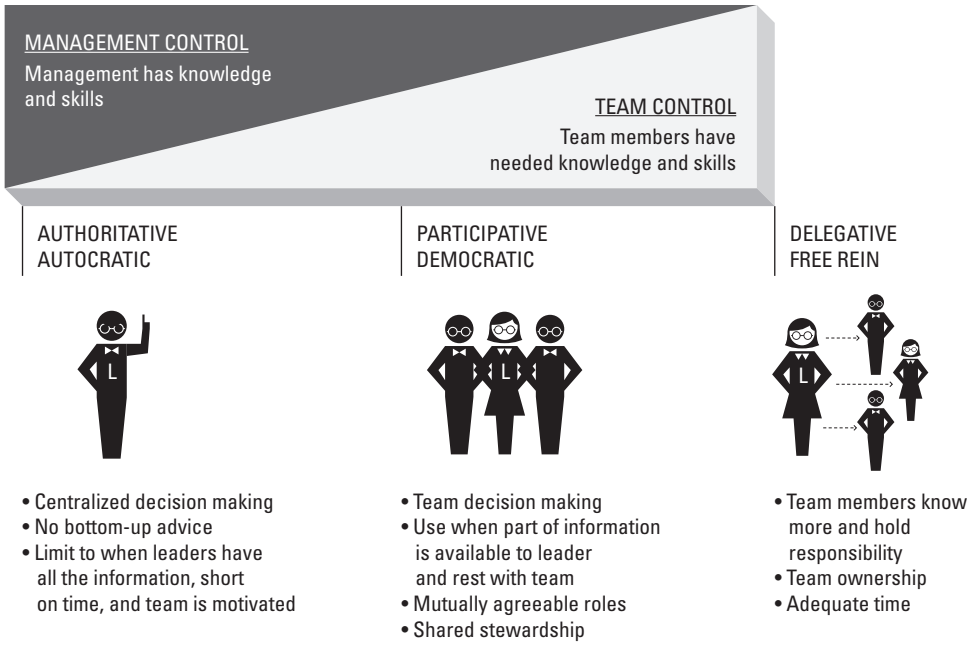

Figure 14-1 Leadership styles

authoritarian style may produce successful results in the rare occasions listed above, if there is time and a leader would like to develop a more engaged and motivated team, he or she should use a more participative style (Clark, 1997).

Participative/Democratic

The participative or democratic leadership style is one in which a leader involves one or more team members in the decision-making process. The addition of outside perspectives helps a leader understand all relevant considerations and potential implications regarding decisions to the project and/or team. However, the leader retains final decision-making authority and may ultimately make an unpopular choice if they believe it best serves the larger project objectives. Seeking the input of others is not a sign of weakness; rather it is a sign of a leader's self-awareness and respect for the expertise of their team (Newstrom and Davis, 1993).

The democratic leadership style is often used in situations where a leader only has some of the information relevant to an issue and where the expertise of other team members is required to fill in the gaps. It is mutually beneficial to both parties, allowing team members to feel included in the decision-making process and for those in leadership positions to make better, more informed decisions. A participatory process—sometimes referred to as shared leadership—also promotes social equality among team members and team leaders (Clark, 1997).

Delegative/Free Rein

In the delegative or free-rein style, the leader delegates the decision-making responsibility to team members but retains ultimate accountability for the

decisions that are made. This is used when teams are able to analyze the situation and determine what needs to be done as well as how to do it. The role of the leader in this approach is to set priorities and delegate tasks while decisions are made by the team members who are responsible for the day-to-day work on the project (Schriesheim, 1982).

Delegating does not imply that a leader is abdicating responsibility in order to have others to blame should something go wrong. Instead, it implies that a leader trusts and has full confidence in team members' abilities and judgment. A delegative or free-rein leadership style can encourage team members to be innovative, and quickly builds confidence in those who are motivated (Clark, 1997).

Style-to-Situation

Effective leaders use all three styles to some degree, depending on team dynamics, his or her own working style, and the project context (Figure 14-2) (Hersey and Blanchard, 1977). For example, a leader might use an authoritarian style with a new team member who needs quick and succinct instruction on how the team operates. If the leader is a competent coach, the team member who is new to the project can quickly understand and become invested in the team's working style.

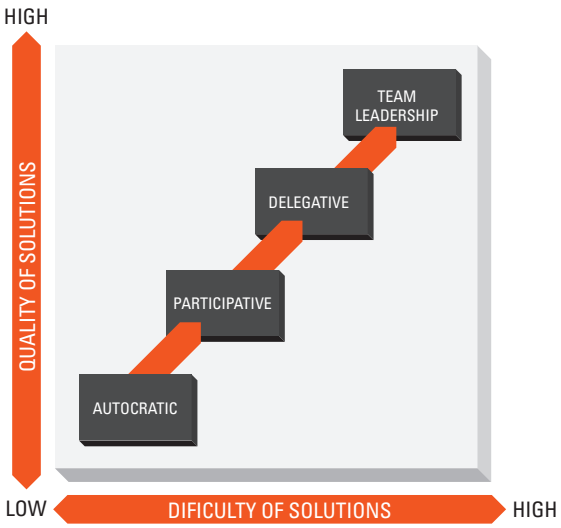

Figure 14-2 Leadership style to situation, adapted from Clark, 1997

In another instance, a leader may use a participative style with a team of experienced stakeholders. The leader knows the problem but does not have all the information. The stakeholders know their jobs and want to ensure the project runs efficiently. Through their shared efforts, decisions can be jointly made that accomplish all goals.

A leader may use a delegative style with the project team when the team is more knowledgeable about an issue than the leader, while still maintaining stewardship over the project as a whole. This allows tasks to be completed in the most efficient manner. In the extreme case of a free-rein approach, the leader has confidence in the skill, ability, and self-direction of a team and may provide little or no direct feedback. Team members are given authority to decide their own policies and methods and are motivated to be creative and innovative as a result.

Sometimes all three methods may be in use at the same time. During a single meeting, for example, a leader may need to tell members in the core team that a procedure is definitively not working correctly and a new one should be established (authoritarian), ask for team member input to solve a technical detail (participative), and assign tasks to other team members who are better equipped to solve them (delegative) (Clark, 1997).

The forces that influence a leader's choice in leadership style include (Figure 14-3):

- How much time is available
- If the relationships in the team are based on respect and trust

Figure 14-3 Forces influencing leadership

- The personality, philosophy, and experience of the leader
- Who has the information—the leader, the team members, or both
- The stress levels among the team members
- The type of task being performed—structured, unstructured, complicated, or simple
- The regulations that determine legal responsibility, such as whether a registered architect is required to sign construction drawings (Clark, 1997).

Positive and Negative Reinforcement

Positive styles of reinforcement, such as using rewards (education, independence, advancement, and compensation), are better at motivating teams. While a negative approach may have a place in a leader's repertoire, it must be used carefully due to the potentially high cost to team dynamics and morale (Lussier and Achua, 2013:71, 96–98; Newstrom and Davis, 1993).

Positive approaches to reinforcement build on the collective intelligence of the group. These styles build up the team, encourage it to perform at a high level, and leave individuals more developed professionally, personally, and emotionally. Positive reinforcement leads to engagement, which is a key leadership practice needed to address contemporary complex tasks such as project delivery.

Organizations that focus on constructive practices, "engage both leaders and employees in understanding the existing conditions and how they can collectively assist in addressing them. Reaching out to employees during difficult times to better understand their concerns and interests by openly and honestly conveying the impact of the downturn on them and their organizations can provide a solid foundation for not only engaging them but retaining them when things do turn around."[1]

Domineering and superior behaviors are examples of a negative reinforcement. Leaders who employ these behaviors frequently believe negative consequences, such as penalties, job loss, days off without pay, or public reprimands, will scare employees into higher levels of productivity while simultaneously increasing the leader's own power and authority. Yet what often happens when this approach is used is that morale falls, which leads to exactly the opposite results (Lussier and Achua, 2013:96–97; Clark, 1997).

In the same way that leaders use more than one style of behavior, so too do they use both positive

[1] Stephen Cohen, "Four Key Leadership Practices for Leading in Tough Times." Originally hosted on the Leadership Insights blog at www.linkageinc.com/thinking/linkageleader/Documents/Stephen_Cohen_Four_Key_Leadership_Practices.pdf, last accessed January 7, 2014. The site no longer hosts blog entries dated earlier than May 2010.

and negative reinforcement approaches, with most falling somewhere on a continuum rather than at either extreme (Figure 14-4). The tendency to use a dominantly positive style is often the differentiator between "leaders" and "bosses" (Clark, 1997).

Negative leaders tend to lead with one of two styles—narcissistic or toxic. Narcissistic leadership is a style in which the leader is self-interested at the expense of other team members' needs (Maccoby and Conrad, 2003). Such leaders are driven by the desire for power and admiration to fuel their egos (Perryman et al., 2010:29). Narcissism is a personality disorder in which an individual is self-involved, and displays behaviors of arrogance, dominance, and hostility. Unfortunately, narcissistic leaders are common both in history and in contemporary practice. Although this approach may seem charismatic and heroic and even be productive in the

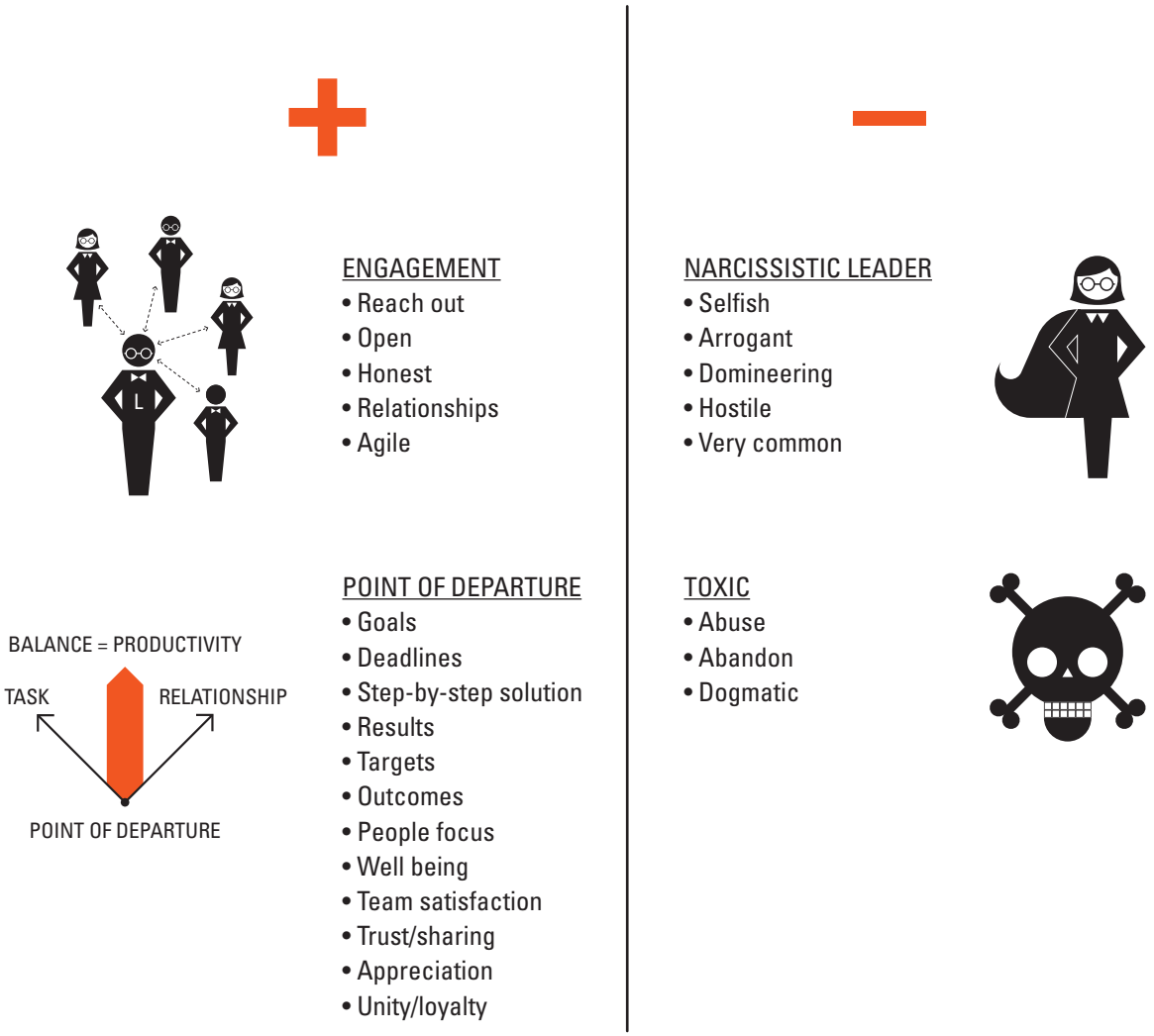

Figure 14-4 Positive and negative leadership qualities

short term (think of fictional characters like Howard Roark), narcissism rarely results in positive long-term outcomes.

Another negative leadership style is toxic leadership. There are many traits that may lead to a toxic state, including narcissism. Toxic leaders are those who abuse their position of authority or responsibility over a group of people or an organization, leaving the team worse off than when they started (Whicker, 1996).

Task and Relationship

The second model of leadership style is defined by differentiating task-oriented from relationship-oriented approaches (Fiedler, 1967). This topic is addressed several times throughout this book due to its importance. Task-oriented leadership is a style in which the leader is primarily focused on results, such as meeting project goals and deadlines. Task-oriented leaders are generally more concerned with producing a step-by-step solution for a given problem or goal, strictly enforcing milestones, and realizing outcomes (Mind Tools, 2012; Hersey, 2012).

Fred E. Fiedler was the first to develop a theory of situational or "contingency" leadership. The associated contingency leadership model was the first to factor in multiple variables in determining the leadership style that would provide the most productive outputs for a given task (Figure 14-5) (Fiedler, 1967; Lussier and Achua, 2013:115–119). Fiedler believed that leaders are relatively constant in their actions,

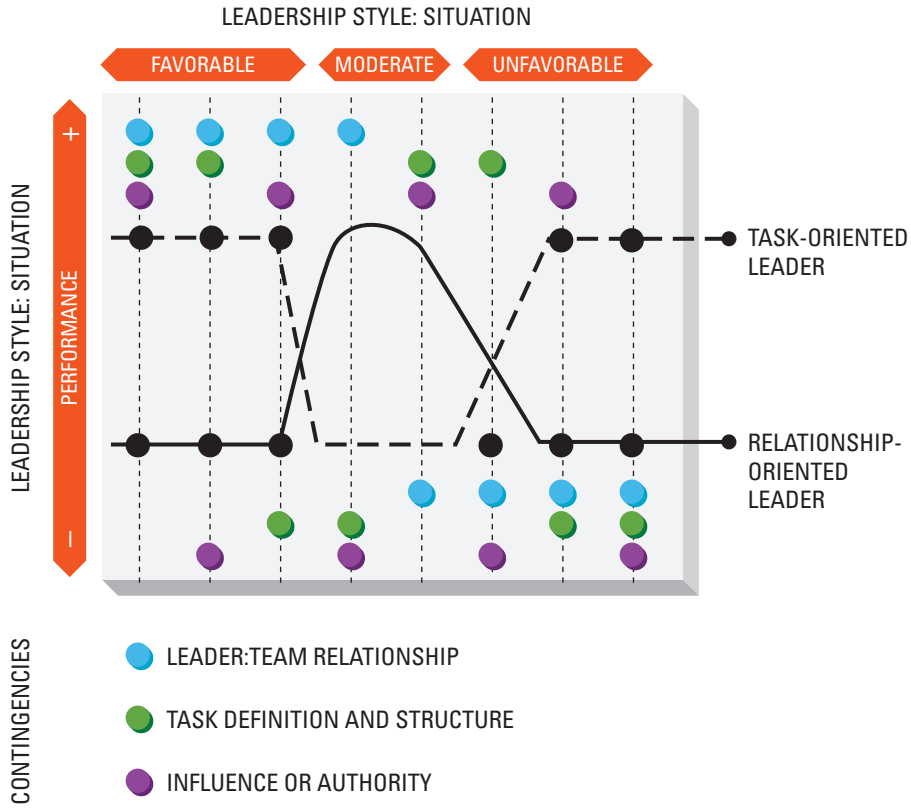

Figure 14-5 Contingency Theory of Leader Effectiveness *Fiedler, 1967*

counter to other theorists, and suggested they learn to influence the other conditions for success—such as the interpersonal relationships and trust between a leader and team; the extent to which a task is structured or unstructured; and the influence team leaders have in the situation relative to power and authority (Lussier and Achua, 2013:115).

Alternatively, relationship-oriented leadership places concerns about people over those related to tasks. Relationship-oriented leaders are generally more concerned with the overall well-being and satisfaction of group members, emphasizing trust and sharing, and appreciating unity and loyalty among team members both to each other and to the overall project. By fostering such an atmosphere, relationship-focused leaders believe teams will be self-motivated to strive for excellent results (Griffin and Ebert, 2010). Although extremes exist, most leaders fall near the middle of the spectrum, focusing on a balance between task and relationship priorities.

LEADERSHIP IN DEVELOPMENT—RICK DEL MONTE AND FRED PERPALL

CEO Fred Perpall, AIA LEED AP, and Chief Design Officer Rick del Monte, FAIA LEED AP, of The Beck Group, a 101-year-old construction company focusing on integrated design, construction, and development services, discuss their respective paths to becoming leaders in the firm and their organization's innovative leadership development program that addresses the holistic needs of future leaders at multiple stages in their careers.

Erin Carraher: The Beck Group appears to have a very thoughtful way of developing future leaders. Could you explain how you go about this—is it a formalized program or a more informal and individualized approach?

Rick Del Monte: We had done mentoring programs in the past that were more informal, but we decided we needed to accelerate the development of leaders in the firm, so we started the Beck Leadership Series (BLS), a year-long leadership program offered to a selected group of approximately 20 high-potential employees intended to build core leadership capabilities. The initial plan was to take a group through this training meeting face-to-face once a month. At these meetings, firm leadership and outside speakers would make presentations on a variety of topics related to leadership and communication skills, critical thinking, and focusing on best practices. The in-person meetings also provided opportunities for mentoring and coaching.

We ran a few groups through that program. Quickly, we realized the need to expand this structure to address growth and transition points in the leadership development process. What has developed are three levels of leadership training, BLS-1, BLS-2, and BLS-3.

The original program—BLS-2—is for mid- to senior-level employees, future leaders, who you put in leadership positions and give opportunities to test their skills. BLS-1 is for the most promising recent graduates, to start them on the track toward leadership. Lastly, we realized we didn't have that many people who were absolutely ready to step in and run an office, which is a major responsibility. So we set up BLS-3, for people we think are within three or four years of major responsibility within the firm. It's a more intense, advanced program. Three of us who are senior partners each have three or four people that we are working with in more of a one-on-one mentorship role as part of this process.

What's interesting is that the program is as much physically as mentally based. We are dealing with better eating habits, exercise,

(*continued*)

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stress, as well as the other leadership aspects. What we are finding as we engage with the BLS-3 group is that at least half of the group is under severe stress in their current position, which affects their personal life as well as their work. You've got to address those issues if you are going to become an effective leader who moves up through the organization.

Carraher: Could you talk a little about your own leadership development? Did you have good mentors who helped you along the way? Did you have a clear progression to a leadership role?

Del Monte: I worked for nine years at KPF in New York where I was an associate principal in design before moving to Dallas and joining a small firm, Urban Architecture, that we grew to 45 people before merging with the Beck Group.

I was a kind and gentle guy compared with most New Yorkers, but when I got to Dallas, the same behavior came across as very "in your face." I struggled initially to figure out how to get things done in the organization. How do I get these partners who are my equals to go in the direction that I think the firm needs to go? The old saying, "What got you here won't get you there," is definitely true. A certain hard-driving personality had gotten me to that point in my career, but now in a larger organization I wasn't being effective.

So, a dozen or so years ago, I took an executive development course at Stanford on "Leading Change and Organizational Renewal." It was a three-day, one-on-one retreat with one of the professors there, Peter Finkelstein, that lasted from 7AM to midnight every day. It was pretty much psychoanalyzing your life—it tore you down and let you open all those closet doors we tend to keep closed. That was a major step for me; it was the first step in trying to become a more effective leader on a much larger stage. Since then, I've kept working.

Carraher: Can you describe the process leading up to Fred Perpall being chosen to take over the leadership of Beck Group?

Del Monte: I hired Fred out of school. He always had a larger than life personality, a magnetism that attracted people to him. The other important quality he had was that he was a very talented architect. That combination is pretty potent.

We began taking him to meetings early on. It became apparent that even though he was only a year or two out of school, he had a real gift for connecting with very senior people on the client side. He was also very ambitious, so we realized we needed to give him opportunities to advance if we wanted to keep him around.

Within five years of Fred coming to work for us, we sent him to Atlanta to run our new architecture group there. Within another three to four years, he ran the entire office—architecture and construction. Within two to three years beyond that, he was made CEO of the company.

What leads to the selection of a thirty-eight-year-old CEO? Several things had to align for the partners to be ready to take a chance on a young leader. The eight of us who are senior partners thought it was an ideal time to develop the next generation of leadership in the firm. We're all in the prime of our careers and were set in our positions leading the various offices. It was a point in the company at which a new CEO could grow. From a pragmatic point of view, we also felt comfortable taking a risk because we were young enough that if for some reason something didn't work out, we could step back in and take the reigns.

It's important to note that success stories like Fred's don't just happen. There was a tremendous investment in mentorship, training, and leadership opportunities all along the way that prepared him to move into the CEO position. That is one of the shortcomings I see in architecture

firms today: firms aren't planning for the future. As a part of a 101-year-old firm, we understand that there has to be a vision among the partners that "this has to go on beyond us."

Fred Perpall: In my first year as CEO, we had already started our next succession plan. There's a notion that you are constantly in succession planning mode. It's important that you don't view your position as a throne you sit on indefinitely. You need to view it as a role you play, and perhaps ten years from now you will have a different role to play.

Del Monte [*directed to Perpall*]: As we think about developing young people, what are the most important things that firms, companies, and mentors did that got you to the leadership position you are in today that we could think about reproducing the next generation?

Perpall: The story for me has been really about people and process. I've been blessed to have three wonderful mentors at Beck; Rick was the first. When I was twenty-six, he said to me, "You know, you are going to be something special in this company." At that age, three or four years into your career, you're just trying to keep your job. You're not thinking about running the company some day.

Rick said that to me ten or more years ago. It's easy to say that, but it's even tougher to do the things required to let that person continue to develop. People who care about you, they tell you want you need to hear, not what you want to hear. They allow you and empower you to do things, even before you feel ready to do them. They give you confidence, not just because they are there with you, but because they let you know they will still be there if you stumble. That's been the thing I try to understand about my career and try to provide for young people.

Del Monte: I spent nine years at KPF, and was one of the first generation associate partners. I knew that at some point I was going to get promoted. I remember going in to the managing partner's office one day and asking, "What's my future at the firm?" He said, "Here's the deal. Four or five years from now, we'll make partners. If we like you we'll make you a partner. If not, we won't." That really didn't give me a career path to aspire to in the company.

What I learned is that when I saw Fred and when I see other young people with leadership potential in the firm, they aren't going to sit around and wait until you're ready to tell them, "It's time. We're moving you up." At some point at a very early stage, I take the time to let them know they are special and let them know I think they have leadership potential. Young practitioners today are impatient. If you don't let them know that you see a future for them, you're going to lose them.

Perpall: It's not only "waiting and seeing" in those years, either. It's a chance to go back to school and get additional education in certain areas. You may need to tighten up on your design skills or develop an understanding of finance and accounting. Not only creating a vision for what they can be, but also creating a pathway and providing support along the way, is what allows us to retain our most talented young people.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

PART 4

COMMUNICATION AND CONFLICT

Part 4, "Communication and Conflict," discusses verbal and nonverbal communication strategies and tactics that increase leaders' ability to influence project delivery teams. Strategies for providing constructive feedback will be presented and related to various forms of motivation and self-awareness. This part also covers effective strategies to move teams toward greater productivity through better communication and constructive conflict resolution.

Leading Collaborative Architectural Practice
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CHAPTER 15

Communication Fundamentals

Modern humanism is communication, not geometry. Communication tools allow architects and our collaborators to conceive, discuss, explore, and understand every detail before we produce it. The process is accessible to all, including the user and client. Architects are no longer limited to the fragmentary representation of physical ideas; we can now fully pre-form them. The composite understanding of architecture before it actually becomes substance offers a deep understanding of the elements of architecture that affect our daily lives. Refabricating architecture leads toward a new humanism.

(Kieran and Timberlake, 2004)

Components of Communication

Communication is the exchange and flow of information and ideas from one person to another (Department of the Army, 1983). Many of the problems that occur in a project team are the direct result of stakeholders failing to communicate or of unclear communication leading to confusion—both of these conditions can cause teams and projects to fail (Mistry et al., 2008). To effectively convey a message and understand those being sent by others, a leader needs to understand the communication process, particularly instances where communication tends to break down (Tubbs and Moss, 2006).

At its most fundamental, communication involves two parties—the sender and the receiver—and a medium, which is the method of communication (Figure 15-1). When communicating with others, the sender has a thought, idea, concept, information, or feeling that they want to express. This message is sent to the receiver in words, symbols, or by other means. The receiver then translates the message into information they can understand (Lussier and Achua, 2013; Shannon and Weaver, 1949). Everyone uses and interprets the meanings of words and symbols differently, so during the communication process, even simple messages can result in an entirely different meaning than was intended. This misunderstanding can be further

This chapter includes excerpts from "Art and Science of Leadership," (Clark, 1997). Available at www.nwlink.com/~donclark/leader/leader.html. Thank you to Don Clark for permission to repurpose this content.

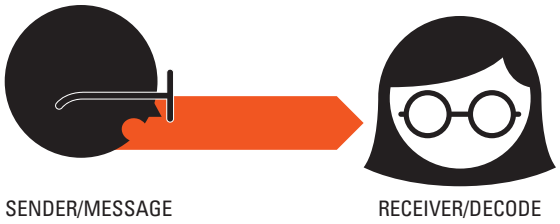

Figure 15-1 Communication components

complicated by indirect factors such as the sender's body language and the receiver's preconceptions (Shannon and Weaver, 1949).

During the transmission of a message, two elements will be received: the message content and its context (Figure 15-2). Content is the words or symbols of the message that are conveyed through language. Spoken and written words combine into phrases that make grammatical and semantic sense. In addition to words, number sequences such as equations, tables, graphs, images, or architectural symbols that represent spatial or physical elements can also be conveyed through forms of verbal and visual language (Betts, 2009, Tubbs and Moss, 2006).

Context is the way the message is delivered or the nonverbal elements in speech such as the tone of voice; spacing, caps, or bold characters in an e-mail; the look in the sender's eyes, body language, and hand gestures; or emotional state (anger, fear, uncertainty, confidence, etc.) that can be detected by the receiver. Although context clues can cause messages to be understood differently from their literal interpretation, they are powerful communicators that help human beings to understand each other (Tubbs and Moss, 2006). Indeed, humans often trust the accuracy of nonverbal behaviors more than verbal and text messages (Mehrabian, 1972).

Some leaders and team members think they have communicated successfully as soon as they finish a sentence or send an e-mail, assuming the message was received. However, the message has *not* been communicated unless the receiver understands it (Tubbs and Moss, 2006). A sender can know if a message was properly received through two-way communication or feedback (Figure 15-3). This is not to be confused with the type of feedback defined as guidance that leaders offer to developing professionals and team members. In the context of communication, feedback is related directly to the function of transmitting ideas and tells the sender that the receiver has understood the message, its level of importance, and what must be done with

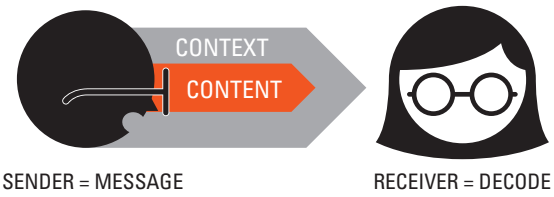

Figure 15-2 Content and context

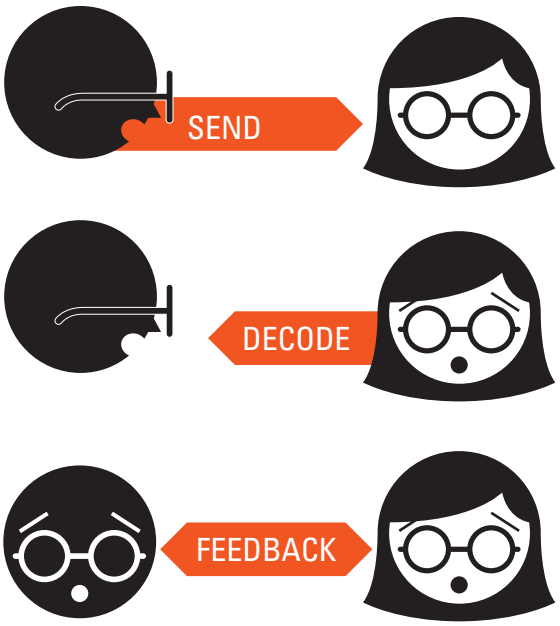

Figure 15-3 Communication feedback

it (Lussier and Achua, 2013:198). Communication is an exchange, not a one-way process, and requires that all parties participate.

Barriers to Communication

Anything that prevents a message from being understood is a barrier to communication (Figure 15-4). Such obstacles include physical and psychological barriers such as bias, distractions, ego, perception, and interpretation (Robbins and Judge, 2011).

People have different past experiences that define the way they perceive the world. Culture, background, and biases are important, as they allow people to use our past experiences to understand something new, but these individual experiences can also change the way in which a message is translated, leading to unintended results. It is when the meaning of a message is changed that personal experience interferes with the communication process. For example, a team member who has worked for several years under a project manager with a loose adherence to internal deadlines may misinterpret an upcoming deadline set by a new project manager as more flexible than intended.

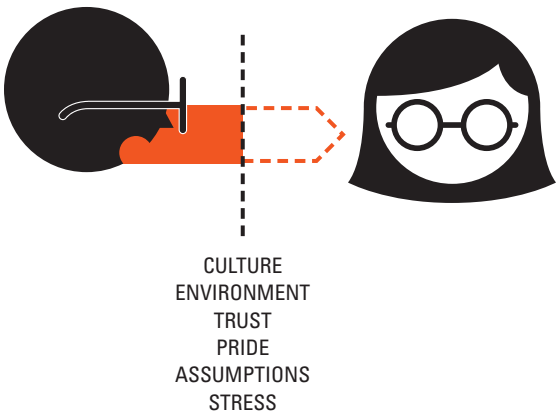

Figure 15-4 Barriers to communication

Equipment or environmental noise, moving images, and people can impede clear communication by providing distractions. The sender and the receiver must both be able to concentrate on the message being sent and received. When conditions are good, there is a sense of confidence and trust in the subject being shared as well as in the proper reception of the intended message.

Self-involvement is likely one of the greatest barriers to communication. People often focus on themselves in conversations rather than on the other person, which can lead to confusion and conflict. Some of the factors that result from self-involvement are defensiveness (the feeling of being attacked), superiority (the feeling of knowing more than the other person), and ego (the feeling of being at the center of the situation).

If the sender is talking too fast, not speaking fluently, or not articulating clearly, their message may be dismissed altogether. Preconceived attitudes also affect the ability to listen—people may listen uncritically to those in leadership positions, believing the leader knows best, while at the same time dismissing more junior staff.

Too often, people leave out information from communication that they believe is common knowledge or has no value to others. With communication, it is best not to assume that the receiver has such information. Similarly, it is best not to assume that they have understood the message by actively confirming that there are no questions, especially if nonverbal clues make it appear that the receiver is unsure or unclear.

People do not perceive things the same way when under stress, when there is a considerable time constraint, or under budget restrictions. Outside of project-based factors, communication can also be affected by personal tragedy or emotions. People have psychological frames of references—beliefs, values, knowledge, experiences, and goals—that

influence what they see and believe at any given moment. These factors color the way people send and receive messages and can become barriers that may color or muffle intended meaning. The way to overcome such filters is through active listening and feedback and by consciously challenging assumptions and biases.

Listening and Feedback

Hearing and listening are not the same thing. Hearing is the act of perceiving sound. It is involuntary and simply refers to the reception of aural stimuli. Listening is a selective activity, which involves the reception and the interpretation of aural stimuli. It involves decoding sound into meaning. Listening is divided into two main categories: passive and active. Passive listening is little more that hearing. It occurs when the receiver of the message has little motivation to listen carefully, such as when listening to music or television and when being polite.

People speak at 100 to 175 words per minute (WPM), but they can listen intelligently at 600 to 800 WPM. Since only a part of a person's mind is paying attention when listening, it is easy to fall into "mind drift," which is thinking about other things while listening to someone. The cure for this is *active listening* (Figure 15-5), which involves listening with a purpose.

The purpose one may have when actively listening may be to gain information, obtain directions, understand others, solve problems, share interest, see how another person feels, or show support. It requires that the listener attend to the words and the feelings of the sender. It takes the same amount or more energy than speaking. It requires the receiver hear the various messages, understand their meaning, and verify the meaning by offering feedback to the sender (Clark, 1997).

RED LIGHT
- Talking
- Dominating
- Bias
- Planning
- Daydream
- Interrupting

GREEN LIGHT
- Let go
- Nod
- Respond
- Summarize
- Answer
- Notes
- Feedback

Figure 15-5 Active listening

The following are a few traits of active listeners. Active listeners:

- Spend more time listening than talking.
- Do not finish the sentences of others.
- Do not answer questions with questions.
- Are aware of biases.
- Never daydream or become preoccupied with their own thoughts when others talk.
- Let the other speakers talk and do not dominate the conversations.
- Plan responses after the others have finished speaking, not while they are speaking.

- Provide feedback, but do not continually interrupt.
- Analyze by looking at all the relevant factors and asking open-ended questions.
- Walk others through their though process by summarizing.
- Keep conversations focused on what others say, not on what interests them.
- Take brief rather than extensive notes, forcing them to concentrate on what is being said (Clark, D., 1997).

Verbal and Nonverbal Communication

The purpose of communication feedback is to reiterate messages so that the listener understands the intention of the speaker. It includes verbal and nonverbal responses to a message. Providing communication feedback is accomplished by rephrasing the words of the sender to restate the sender's feelings or ideas in other words: "This is what I understand you to have said, am I correct?"

Feedback not only includes verbal responses, but also nonverbal ones (Figure 15-6). Nodding the head shows agreement, dipping eyebrows shows confusion, or sucking in air deeply and blowing it hard shows exasperation. Feedback includes the following types:

Evaluative: making a judgment about the worth, goodness, or appropriateness of the other person's statement.

Interpretive: paraphrasing or attempting to explain what the other person's statement means.

Supportive: attempting to assist or bolster the other communicator.

FEEDBACK

- Verbal
- Nonverbal

- Evaluative
- Interpretive
- Supportive
- Probing
- Understanding
- Eye contact
- Facial expressions
- Gestures
- Posture
- Proximity
- Vocal

Figure 15-6 Verbal and nonverbal feedback

Probing: attempting to gain additional information, continue the discussion, or clarify a point.

Understanding: attempting to discover completely what the other communicator means by their statements (Clark, 1997).

The types of feedback listed above are ordered from the most frequently to least frequently used. Though counter to natural tendencies, communication is much more effective when listeners try to understand the message first before evaluating.

To improve the quality of communication, use nonverbal behaviors to reinforce the intended meaning of a message (Figure 15-7). These behaviors include:

Eye contact: This helps to regulate the flow of communication. It signals interest in others and increases the speaker's credibility. People who make eye contact are perceived as connecting with the receiver and are seen to convey interest, concern, warmth, and credibility.

Facial expressions: Smiling is a powerful cue that transmits happiness, friendliness, and warmth. Smiling is often contagious, and people often react favorably to it, wanting to listen more closely and carefully.

Gestures: Those who fail to gesture while speaking may be perceived as boring and stiff. A lively speaking style captures the listener's attention, makes the conversation more interesting, and facilitates understanding.

Posture and body orientation: Body language—the way one moves while speaking—communicates many intentional and unintentional messages. Standing erect and leaning forward communicates to listeners that someone is approachable, receptive, and friendly. Interpersonal closeness results when sender and receiver face each other. Speaking away from a receiver or while looking at the floor or ceiling comes across as disinterest.

Proximity: Cultural norms dictate a comfortable distance for interaction with others. Signals of discomfort, such as rocking, leg swinging, tapping, and averted gazes, are signs that others feel their space has been invaded. Looking out for these signs can help a conversation remain on track without the barrier of discomfort.

Vocal tone: Speaking includes nonverbal communication cues such as tone, pitch, rhythm, timbre, loudness, and inflection. For maximum speaking effectiveness, people can learn to vary these six elements in their voice. One of the major criticisms of many speakers is that they speak in a monotone. Listeners perceive this type of speaker as boring and dull.

Additional suggestions for clear and effective communication include:

- Check with listeners to ensure understanding through verbal questions and feedback.
- Ensure the listener has a chance to comment or ask questions.
- Consider the personal experiences and feelings of the listener.
- Be clear with the intended message—don't be vague or overly complicated.
- Look at the listener.

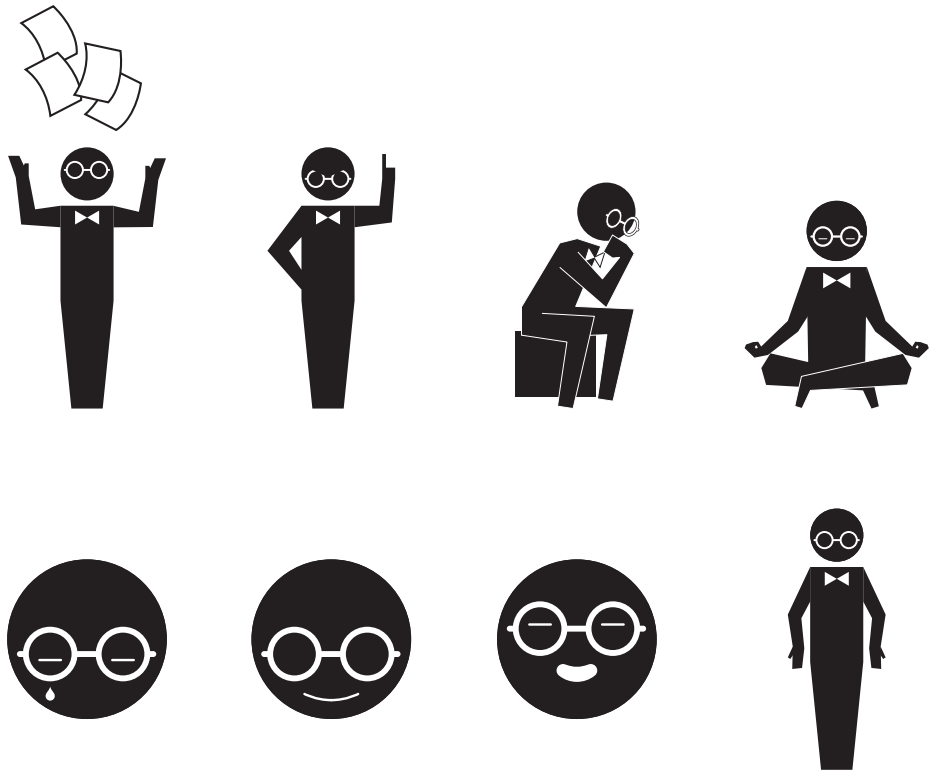

Figure 15-7 Verbal and nonverbal communication examples

- Make sure words match tone and body language.
- Vary tone and pace.
- Do not ignore signs of confusion.

The content of a message received is 55 percent visual (nonverbal cues), 38 percent auditory (tone, volume, and inflection), and only 7 percent actual content (spoken words or written message) (Figure 15-8), so understanding the impact of interpersonal awareness is invaluable to effective communication (Mehrabian and Ferris, 1967).

In general, when communicating, people should trust their instincts and not be afraid to demonstrate emotion such as excitement, compassion, and confusion, even in a professional environment. Effective communication requires authenticity and sincerity. Emotions not only guide decisions, they can also be read by others in order to aid in understanding and reacting to a message. In a project delivery team, communication is constant. Therefore, learning to communicate effectively creates a better working environment, less litigious partnerships, and a more efficient project delivery process.

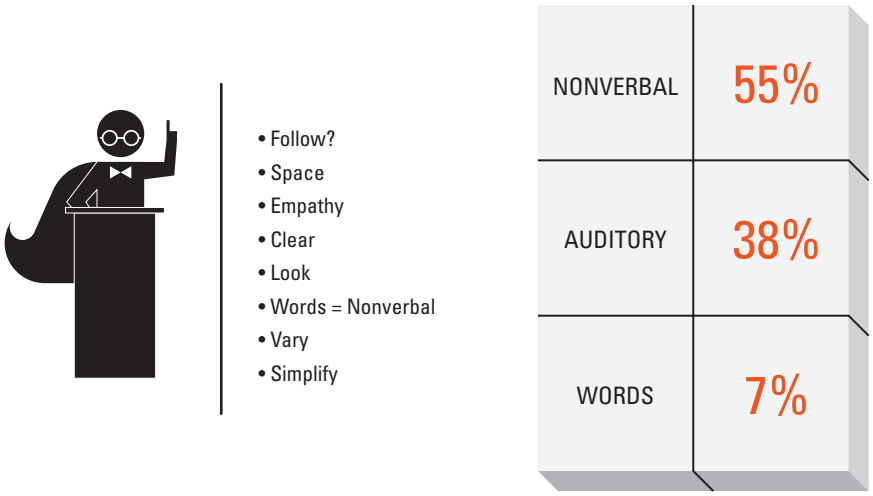

Figure 15-8 Communication channel effectiveness

COMMUNICATION ASSESSMENT

Leaders and team members are all involved in the act of sending and receiving messages. Listening is the key to receiving a message in the way it was intended. This exercise can be used to build awareness and ability in listening and perceiving nonverbal communication from others.

Perception Versus Consciousness

The ability to listen effectively is controlled by a number of factors that are conscious, unconscious, social, and biological. Architects are trained to be highly visually literate, which increases their ability to distinguish nuance and recognize patterns. To put this ability to use in communication, architects need to better understand the process of perceiving and becoming conscious of sensory information and utilize tactics for responding to it.

Of all the information flooding our senses every day, we are capable of consciously experiencing only a fraction of it. In fact, what we refer to as consciousness accounts for 0.7 percent of the information our brain takes in through all the senses (Figure 15-9) (William, 2006). The edited information responds to humans' base biology and can unconsciously influence reactions. Science has shown that the body responds a half second faster to stimuli such as having your finger pricked by a needle than it takes for your mind to perceive the pain.

Verbal and nonverbal communication is also influenced by the shared knowledge between people who are communicating. The shortest correspondence in history reportedly took place between Victor Hugo and his publisher. After writing *Les Misérables*, Hugo was anxious to learn how the book was selling and wrote a letter to his publisher. It simply said "?." His publisher replied "!" (Walsh, 1893). This conversation would not have the same meaning to someone without the same frame of reference. The information that we consciously or unconsciously leave out of conversations is referred to exformation (Nørretranders, 1991). The amount of additional information needed for a receiver to understand a message is thus dependent on context and

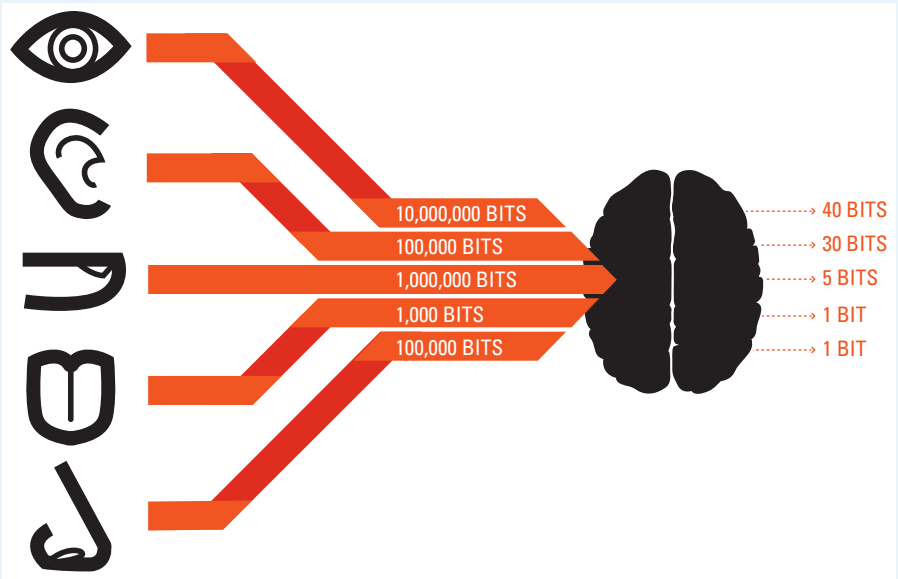

Figure 15-9 Perception versus consciousness

shared history they have with the sender. For example, "archi-speak" can often be easily understood by those in the discipline, but is incomprehensible to those outside of it.

Visual literacy is also a factor. Though many theories have been developed over time to explain visual perception, one of the most commonly accepted within the design discipline is Gestalt theory. This theory was developed in the 1890s by those who were known as the Berlin School of experimental psychology. It attempts to understand the way in which humans make meaning out of a visually chaotic world. German psychologist Kurt Koffka famously described the theory with the phrase "The whole is other than the sum of its parts."

Charles Darwin was the first to suggest that facial expressions of emotion were universal. Though there are some opinions to the contrary, psychologists have studied the universality of facial expressions, and accumulated strong evidence for the recognition of certain emotions—anger, contempt, disgust, fear, joy, sadness, and surprise—across cultures (Figure 15-10). The unconcealed and unaltered expressions of these emotions are referred to as macroexpressions and tend to stay on the face for 0.5 to 4 seconds. Microexpressions, on the other hand, are expressions that are involuntary and often indicate intentionally or unintentionally concealed emotion that last as little as 1/30 of a second (Matsumoto and Hwang, 2011).

Reading facial expressions of emotion, especially microexpressions, can aid the development of rapport, trust, and collegiality; they can be useful in making credibility assessments, evaluating truthfulness and detecting deception; and better information about emotional states provides the basis for better cooperation, negotiation, or sales.

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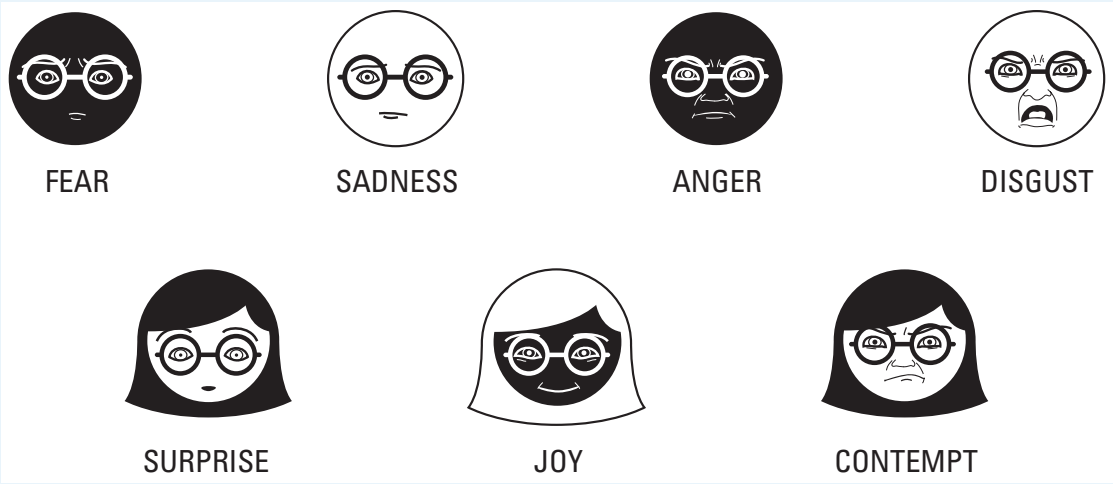

Figure 15-10 Seven common expressions of emotion *Adapted from Jourmana Medlej,* Drawing People. *Available at http://cedarseed.com/publications.html.*

Exercise

The following exercise and application are adapted from Matsumoto et al.(2001) and Patterson et al. (2012).

Comparing what a person says to the person's expressions can provide a more comprehensive approach to listening. Adapted from resources developed to help law enforcement professionals detect deception and businesspeople engage in difficult conversations (Lussier and Achua, 2013; Matsumoto et al., 2011; Patterson et al., 2012), the following exercise is intended to build awareness and ability in perceiving nonverbal communication from others.

It is important to distinguish myths from proven facts about the relationship between emotion and expression. It is a commonly held belief that someone with a shifting gaze, who fidgets, or whose voice indicates stress is not telling the truth. However, there is only weak evidence to support the association between these indicators and deception. It is the combination of how body language and expression relates to the verbal statement that is a more powerful way to interpret the actual meaning.

Evaluate the statements below each image in Figure 15-11 relative to the paired expression to determine whether or not the verbal and visual messages match.

Assessment

Though very simple examples of alignment or misalignment between visual and verbal forms of communication, these exercises are intended to increase your awareness of what people say versus what they may actually mean and encourage asking followup questions until the two are reconciled.

Expression 1. The visual cues and verbal statement carry the same message—the person said she is happy to see you and her expression is one of joy. She is likely speaking truthfully.

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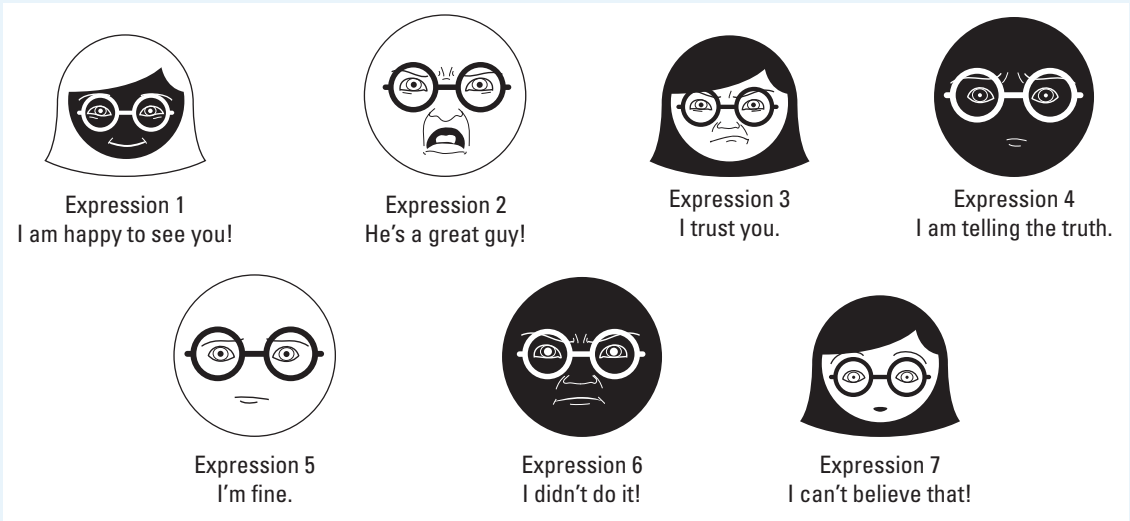

Figure 15-11 Verbal and visual messages

Expression 2. If someone shows a microexpression of disgust when talking about another person that contradicts his verbal message, he is likely lying about his true feelings.

Expression 3. A team member who flashes an expression of contempt when asked by a team leader to perform a task is nonverbally indicating that he or she does not trust the leader. The leader should spend time on relationship-building with this person.

Expression 4. When communicating with someone whose expression is inconsistent with his or her statement, particularly when that expression is fear, it is necessary for a leader to probe more deeply to determine the underlying message. The person might be lying, but might also feel intimidated by an authority figure or fear potential repercussions.

Expression 5. Saying "I am fine" is a common deflection tactic when someone doesn't feel comfortable communicating actual feelings or doesn't think the person asking the question sincerely cares to know. Working to find the source of her hesitation sometimes requires inviting the hesitant person to share her views. Look for ways to use curiosity to patiently move the conversation toward the issue, being sure to not rush to judgment, overreact, or turn the conversation to your own experience.

Expression 6. If someone exhibits anger when questioned about his or her actions, it might be best to back off and try another approach. Either the person honestly didn't do what he or she is accused of doing or is outraged at the prospect of a negative outcome.

Expression 7. When someone expresses surprise at a statement, it may be a sign that the person does not believe the information being conveyed.

Application

The information gathered from a more effective reading of verbal messages and facial expressions is not useful unless put into action. "Dealing

(*continued*)

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effectively with emotion information about others is also likely to be a crucial part of the skill set one must have to interact effectively with others. Knowing when and how to intervene, to adapt one's behaviors and communication styles, or engage the support and help of others, are skills that must be brought into play once emotions are read" (Matsumoto and Hwang, 2011).

The following are steps to encourage sharing and to draw out meaning when verbal statements and nonverbal cues are not aligned.

- **Ask:** Express interest in the other person's views.
- **Mirror:** Build a sense of safety with the other person by respectfully acknowledging the emotions people appear to be feeling so they feel comfortable sharing their true thoughts.
- **Paraphrase:** Restate what you have heard in your own words to ensure there are no breakdowns in communication. This also builds trust.
- **Prime:** When the other person continues to withhold, take your best guess at what you think he or she is feeling or thinking and ask for a response (Patterson et al., 2012:162–167).

If once the true message has been determined it is in opposition with the questioner's beliefs or facts, it is also important to begin providing feedback in a constructive way.

- **Agree:** Arguments typically take place between parties who agree on 90 to 95 percent of an issue. It is important to eventually resolve the issue, but begin the discussion by establishing points of similarity rather than points of contention.
- **Build:** Don't turn trivial differences into major issues. After pointing out areas of agreement, begin addressing aspects of disagreement incrementally.
- **Compare:** Where there is disagreement, compare rather than polarize the opposing views. Rather than assigning identifiers of right and wrong, work with the other party to articulate both positions and then compare their merits relative to a common set of criteria (Patterson et al., 2012:170–172).

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 16

Johari Window Model

In addition to basic tactics of communication, there is also an underlying psychology that is important to understand in order to be able to deploy those tactics appropriately. Created in 1955 by psychologists Joseph Luft and Harrington Ingham, the Johari Window model demonstrates the interdependencies between how people perceive themselves and how others perceive them with regard to the information that defines them—behavior, knowledge, skills, attitudes, deep-seated issues, and personal history (Luft, 1955; Luft and Ingram, 1969). A four-square matrix can be used to illustrate this model (Figure 16-1).

Open Self

The first quadrant of the matrix is called the open self. The open self is the information about a person that is known to them as well as to others. Examples of open-self characteristics include a person's height, what they are wearing, and what their job is—straightforward, easily accessible facts. When two people first meet, the amount of knowledge they have about each other is relatively small. Over time, as relationships build, they open up and share more, increasing the amount of information in this quadrant. The open self is the part of a person that others immediately recognize, because it is the part they choose to disclose (Luft, 1955; Luft and Ingram, 1969).

Hidden Self

The open self is complemented by the hidden self, which includes more intimate aspects of a person's history, beliefs, and feelings that they may be reluctant to reveal. Most people do not want to disclose things that they think might be inappropriate in a particular setting, such as the workplace, or that may in fact be risky to share with others for fear of the response. These topics include religion, sexual orientation, and political affiliation, among others. Boundaries between open and hidden-self areas are often relative and shift depending on the relationship. People often share things with friends and family that they do not with coworkers.

The hidden self includes information ranging from less risky topics to things that are so private that they are not shared even with close family members. As such, there is a wide range within the hidden self, and information from it is shared proportionally to the level of trust established (Luft, 1955; Luft and Ingram, 1969).

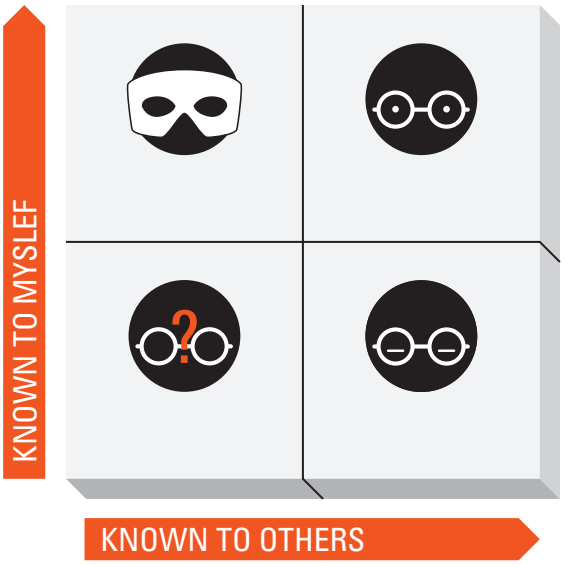

Figure 16-1 Johari Window model

The boundary between the open self and the hidden self is under a person's control and shifts as relationships develop. Some individuals choose never to share hidden-self information with others, making communication difficult among project teams as the underlying factors that affect their responses are difficult to understand. The opposite is also true: some individuals share too much information, having no filters between the hidden and open self. Such people inundate team members with personal information at the expense of productivity (Luft, 1955; Luft and Ingram, 1969).

Sharing personal information may seem inappropriate in professional settings. However, having a better understanding of team members' personal histories is critical to developing trust and better communication, which have been discussed as two of the most important interpersonal skills required for effective collaboration (Covey, 2006).

The hidden and open self are the conscious two quadrants of the matrix; the other two—closed and unknown—are aspects of a person's identity that are unconscious and outside of their control.

Blind Self

The blind self includes the aspects of a person that are known to others but unknown to them—i.e., the blind self is how others perceive a person. It may be uncomfortable to consider that such information exists, but people should be comforted that this is a normal aspect of interpersonal communication. Information about the blind self is communicated unintentionally and revealed through feedback from others.

One example of blind self feedback is when a person listens to their recorded voice. Most people admit that they do not recognize themselves speaking while others think it sounds familiar if not exactly like the person's voice. Similarly, in the hidden self, there is often a disconnect that prevents people from recognizing information that everyone else understands about them but they themselves do not.

Effective leaders seek out information about their blind self, soliciting constant feedback from others about how their verbal and nonverbal communication is being read (Chapman, 2003; Luft, 1955; Luft and Ingram, 1969). Unintended information is communicated through expressions and nonverbal behavior that people may not be aware of; they should therefore seek feedback on the blind self and point out such behaviors in others as well.

When individuals in a leadership position are completely unaware of their blind self, they often exhibit behavior that negatively impacts the people around them and prevents clear communication. Without actively seeking feedback, leaders rarely receive it from others, who might fear embarrassment or risk to their job.

Unknown Self

The last quadrant of the model is called the unknown self. This aspect of a person is unknown to many people, because they have never had reason

to engage it. For example, this is the way people respond—whether negatively or positively—in stressful or crisis situations when natural instinct takes over conscious action. There is not much individuals can do to develop this aspect of their personality other than to be aware of its existence and reflect on their actions in past extreme conditions in order to anticipate how they might respond in the future (Luft, 1955; Luft and Ingram, 1969).

When communicating, people send messages with their open self and their hidden self. The listener receives information from a person's open self and blind self. When two people have information they would like to share with each other, the best way to ensure effective communication is by reducing the unintended barriers of hidden and blind-self information through developing better interpersonal relationships and trust (expanding the amount of hidden-self information revealed) and providing feedback (expanding the amount of blind-self behavior of which a person is aware).

SELF-AWARENESS ASSESSMENT

The Johari Window model demonstrates the interdependencies between how people perceive themselves and how others perceive them with regard to behavior, knowledge, skills, attitudes, deep-seated issues, and personal history—all of which can be barriers to effective communication and team performance. This exercise is intended to build awareness and ability in recognizing the different quadrants of communication and identify areas for improved self-awareness.

Scenario

Tensions arose in an AEC firm when a new project delivery approach was introduced on a project by senior leadership in an attempt to increase the firm's efficiency and profitability. By bidding the project early, the traditional shop-drawing phase could take place in lieu of traditional construction document detailing. Though the benefits of this approach—utilizing the expertise of contractors and subcontractors to work out constructible details that embody the architect's design intent—should be clear, the implementation and continued success of the approach is predicated on the ability of architects and contractors to work together collaboratively.

Architects and contractors were initially resistant to changing their traditional practices. Even though they were all employees of the same company, they had a deep-seated mistrust of each other based on past adversarial experiences in the profession. A strong leader who understands each party's preconceptions and can embody the collaborative principles required for the model to be successful is often necessary to mitigate the resistance to change.

In this case, a senior leader sat down with each of the team leaders and let them know that their financial compensation, as well as the overall project success, was contingent on all parties being successful. Team members slowly developed trust in one another, and the firm began a long history of successfully utilizing the approach to deliver projects on time and on budget.

Firm leaders continue to make a conscious effort to embody collaboration from the top-down and immediately address both petty differences and true issues among team members when they arise. When dealing with individual personalities, it is inevitable that disagreement will occur from time to time. However, through an understanding of how people perceive themselves and others, leaders can foster conversation and overcome conflict.

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Activity

The following exercise was adapted from Luft and Ingram, (1969).

Researchers Joseph Luft and Harrington Ingham (Jo-Hari) theorized that the communication process occurs at two levels: the overt level—what is actually said—and the covert or hidden level—what is meant. When the overt and covert levels of communication are viewed from the perspectives of the communicator and the listener, it provides four panes in the window on how people give and receive information about themselves and others (Figure 16-2). As discussed in this chapter, these categories include:

- Open self: Known to self and others. This is what we communicate to others.
- Hidden self: Known to self, but unknown to others. This is what we conceal from others. Sometimes there is a good reason for holding something back. At other times, it might be bad for the communication process.
- Blind self: Unknown to self, but known to others. Sometimes we communicate something we are unaware of. For example, I might say, "I'm not angry," while slamming my fist on the table.
- Unknown self: Unknown to self and to others.

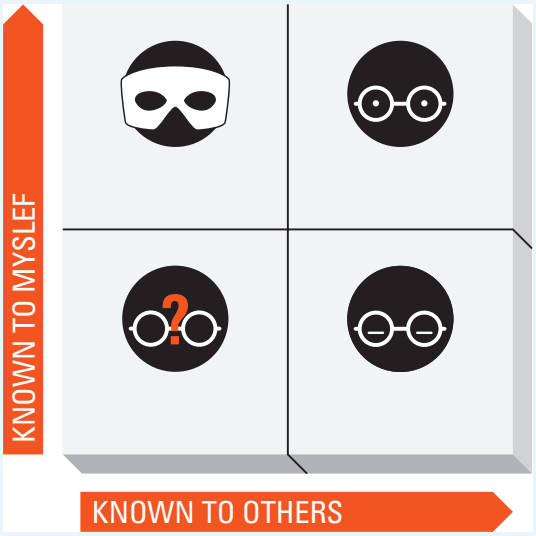

Figure 16-2 Categories of perception

Reflection

Considering the Johari quadrants, consider the following questions and corresponding answers:

Q1: What category can lead to confusion? Why?

A1: Hidden, as it may convey double meanings or confusion to others. For example, you tell your team to make decisions while you are gone, but you usually turn the decisions around when you get back.

Q2: What quadrant can lead to the most opportunities for improvement? Why?

A2: Unknown, as these can be thought of as windows of opportunity, including better communication processes, brainstorming sessions, learning to trust others, etc. This is where identifying and exploring previously unknown characteristics can be turned into the asset of new perspective and knowledge by making them known.

Q3: What is another reason that people might hold back and create a false facade?

A3: Lack of trust; we may have feelings we are not comfortable discussing with others until we get to know them well, when we do not want to hurt someone, etc.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 17

Feedback and Motivation

Feedback was discussed in Chapter 5 relative to teams; it is also an important component with regard to communication and individuals' interpersonal and professional development. To review, feedback is the objective evaluation of one's behavior by others. Coaching, a component of constructive feedback, is the process of providing specific, descriptive, positive feedback to others in order to maintain and improve performance. Because most people have reactionary responses to criticism, leaders must carefully consider the process for providing feedback in order to best ensure a positive rather than negative outcome (Lussier and Achua, 2013).

Steps to Constructive Feedback

Though they share a common basis, constructive feedback (Figure 17-1) is different from the feedback given by the receiver during communication, which helps the sender understand how their message is being received. Constructive feedback in the context of project delivery entails a leader giving a team member information about their performance and behavior with regard to objectives and provides positive suggestions about how to maintain or change that behavior. Constructive feedback may be used to reinforce positive performance, motivate growth and development, or to point out and correct inappropriate behavior or poor performance (Lussier and Achua, 2013).

Providing constructive feedback is a critical skill for leaders in team management and project delivery. Leaders should first recognize and understand that the feedback they provide is often regarding personal information that is "hidden" to the receiver. When criticism is warranted but the recipient is not self-aware of the negative behavior, there is cause for concern. As such, the process of providing feedback requires careful consideration regarding communication and interpersonal relationships (DeLisle, 2011; Luft and Harrington, 1955). The outcome of any feedback-based conversation, particularly those that address negative behavior, depends on the leader's ability to present the information in such a way that the receiver will understand the

Figure 17-1 Feedback

critique and its implications for them as well as the larger team, accept responsibility for their actions, and be encouraged to change by following specific suggestions given by the leader or developed in collaboration with the leader. Leaders are also responsible for following up on the conversation, as they take on just as much, if not more, responsibility for the suggested changes than the individual receiving the feedback (Blake, 1985; DeLisle, 2011).

When approaching a person to give feedback, leaders should consider several conditions (Figure 17-2). They should ensure the receiver is comfortable, not overly restricted on time, and not visibly disheveled. Basic communication feelers (such as, "How are things going?") can provide an indication of the other person's mindset. If the other person responds frantically, indicating they are rushed or under a deadline, this is not the right context for feedback (Kulik and Kulik, 1988). Feedback

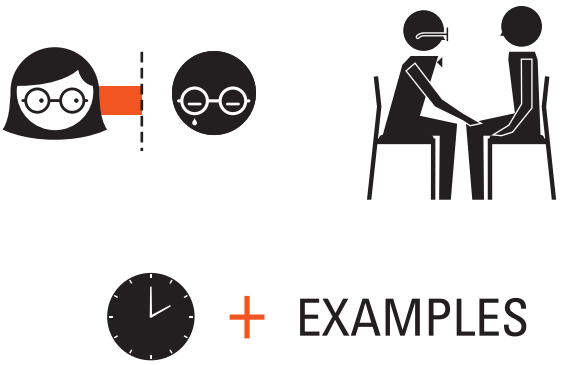

Figure 17-2 Factors in feedback timing

should be given honestly, sincerely, and objectively, in a positive climate, where receivers believe the information is being given for their benefit and that it is not a mere accounting of their task performance (Paswan et al., 2005).

Taking sufficient time to ensure that the receiver understands what he or she is being told is also critical and can be done by giving tangible examples regarding behavior in such a way that the receiver recognizes and internalizes the feedback. It is difficult to respond and alter behavior accordingly when feedback is vague, too general, and not explained with examples (Skube, 2011).

Initially, the receiver will understand the information emotionally (remember that information processes through the emotional portion of humans' brains before it reaches the rational part). However, if the leader has ensured that the receiver is as calm as possible at the moment, that the feedback is given in a sincere way, and that the conversation is given enough time that the receiver can process the information and turn it into a response plan, the chances for effective behavioral change are increased.

Feedback Style

Feedback is not always meant to correct negative behavior. Often it is intended to identify positive behavior, which can be equally difficult to communicate. People often shrug off comments about good behavior because they don't understand why someone would give them positive feedback unless there was some kind of an ulterior motive (DeLisle, 2011). Evidence shows that the better and more positive the feedback, the faster people grow, the more quickly they develop, and the better they feel about the work they are doing (Galvin et al., 2010). Effective leaders give positive feedback often, and they are sincere when they do it (Figure 17-3) (Paswan et al., 2005).

Figure 17-3 Positive feedback practices

Feedback is linked to *motivation*, which is anything that affects behavior with regard to achieving a stated objective (Lussier and Achua, 2013). Leaders need to understand what motivates individuals in order to influence stakeholders to meet or exceed expectations and project teams to collectively identify and accomplish project goals. There are many psychological models of motivation that explain why people do the things they do. Two of the most commonly accepted are discussed in the following sections.

Maslow's Theory

In 1943 Abraham Maslow, the founder of humanistic psychology, developed a model to describe the hierarchy of human needs on a spectrum from base to high-order. His model states that people are motivated by different things depending on which of their needs are currently being met. Basic needs include resources such as food, water, and shelter, physiological ones such as sleep, and psychological ones such as affection and security. High-order needs relate to self-esteem—responsibility, confidence, and achievement—and ideals such as justice, goodness, beauty, and unity. Basic needs must be met before higher-order ones can be pursued (Figure 17-4).

Key points of Maslow's hierarchy include:

- Only unmet needs require motivation.
- A need higher in the hierarchy will become a motive for behavior as long as the needs below it have been satisfied.

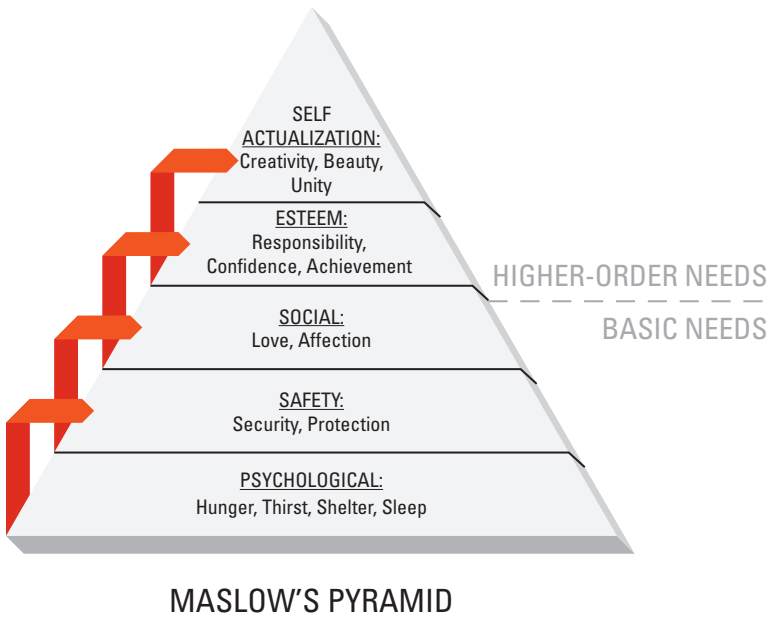

Figure 17-4 Maslow's hierarchy and feedback

- Rarely do people stay in one area of the hierarchy for an extended period of time; human behavior suggests that people constantly strive to move up the hierarchy while forces are pushing them down.
- Unless basic needs are met, it is difficult to move individuals into the realm of conceptual thinking, creative thinking, and problem solving (Maslow, 1954).

The goal of leaders should be to help people obtain the skills and knowledge that will help them move upward on the hierarchy by providing effective motivation and feedback.

Maslow revised his theory in 1971 to suggest that there are higher levels beyond self-esteem. According to him, self-actualization is something that all humans strive for subconsciously but rarely attain. Self-actualization is pursued by self-aware people who seek growth, achievement, and advancement (Lussier and Achua, 2013).

Self-aware people:

- Have better perceptions of reality and are comfortable with it.
- Accept themselves and their own natures.
- Lack artificiality.
- Focus on problems outside themselves and are concerned with basic issues and eternal questions.
- Like privacy and tend to be detached.
- Rely on their own development and continued growth.
- Appreciate the basic pleasures of life.
- Have a deep feeling of kinship with others.
- Are deeply democratic and unaffected by differences.
- Have strong ethical and moral standards.
- Are original, inventive, and less constricted than others (Clark, 1997).

The pursuit of self-actualization ultimately leads to self-transcendence, which is the desire to better all of mankind, not just the self, and relates to ideas such as ethics, creativity, compassion, and spirituality (Maslow, 1971).

Herzberg's Theory

In the 1960s, Frederick Herzberg proposed a model of motivation for the workplace that built on Maslow's hierarchy of needs (Figure 17-5). He collapsed the levels into two categories: base or "maintenance" factors and high-level or "motivation" factors. Maintenance factors are external and include pay, job security, working conditions, benefits, and other such factors that meet lower-level needs in the workplace. Motivational factors, on the other hand, are intrinsically persuasive and

Figure 17-5 Herzberg's theory and motivation

include achievement, recognition, challenge, and advancement.

In his theory, Herzberg suggested that humans are much more driven by intrinsic motivators than extrinsic maintenance factors. Counter to the traditional spectrum from dissatisfied to satisfied, however, he proposed that people range from dissatisfied to not dissatisfied with regard to maintenance factors and from not satisfied to satisfied with regard to motivation factors. Factors affecting maintenance are referred to as dissatisfiers and those affecting motivation are called satisfiers (Lussier and Achua, 2013).

Dissatisfiers include:

- Working conditions
- Policies and administrative practices
- Salary and benefits
- Supervision
- Status
- Job security
- Coworkers
- Personal life

Satisfiers include:

- Recognition
- Achievement
- Advancement
- Growth
- Responsibility
- Job challenge (Herzberg, 1966)

Herzberg claims that dissatisfiers must be present in a job for employees to achieve a neutral position before motivators can be used to incentivize. In other words, as long as the base maintenance needs are adequately met, enrichment can be built into a job by making it more interesting and challenging (Lussier and Achua, 2013).

Adequate Resources

According to Herzberg's theory, the reason a team member is not performing often has nothing to do with motivation at all. It may be that the individual does not have adequate tools, equipment, materials, supplies, or knowledge necessary to perform the task (i.e., maintenance factors). For example, unfavorable working conditions, inadequate time to accomplish a task, and unsupportive team members are all factors that cause demotivation and reluctance to take ownership of project tasks (DeLisle, 2011).

The necessity for adequate resources may seem obvious, but in many instances teams are hampered by lack of appropriate hardware or software, insufficient administrative or technical support, or insufficient time or other restrictions that distract team members from their primary purpose. Not only are such restrictions inefficient, they are frustrating, disheartening, and imply management disinterest. Team leaders should be sensitive to how team members' time is being spent and should institute processes that reduce unproductive activities that can be easily addressed through the acquisition of a tool (DeLisle, 2011).

The Motivation Process

According to Maslow and Herzberg (Figure 17-6), human behavior is the result of motivation. Factors affecting motivation can vary, but are the result of meeting one's needs and acquiring satisfaction, a sense of self-worth, and higher purpose. For many, this motivation is related to performance and an interest in career advancement. As those on project delivery teams learn to meet basic human needs, they can better understand what it is that motivates others around them and help others meet their needs, desires, and goals (Lussier and Achua, 2013).

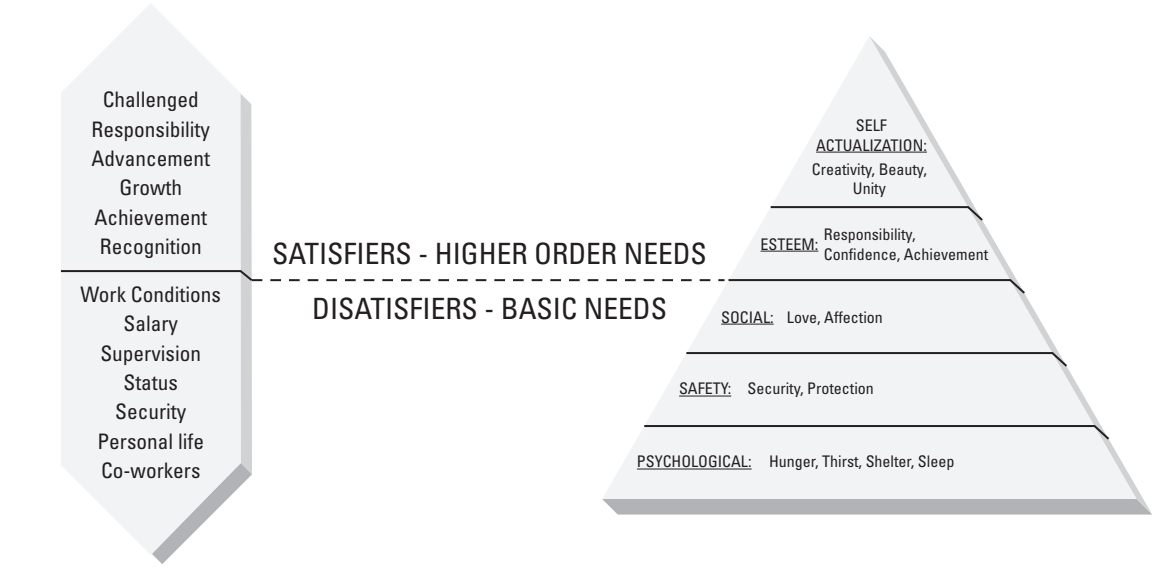

Figure 17-6 Maslow and Herzberg

Motivational factors can be mapped onto a series of actionable processes, creating models such as that developed by Edwin Locke and Gary Latham (Figure 17-7). In order to set a specific, actionable goal and develop a plan that outlines how to achieve it, leaders need to take the following into account:

- **Need:** The individual and team have needs that want to be satisfied.
- **Motive:** Selecting a specific behavior that will satisfy these needs.
- **Behavior:** The individual and team actions that will implement the behavior.
- **Consequence:** Feedback regarding the progress in attaining the goal.
- **Satisfaction:** Needs are met and individual and team satisfaction is high for a time until other needs emerge, requiring the process to begin again (Locke and Latham, 2004).

This model simplifies the information required for leaders to understand, allowing them to respond

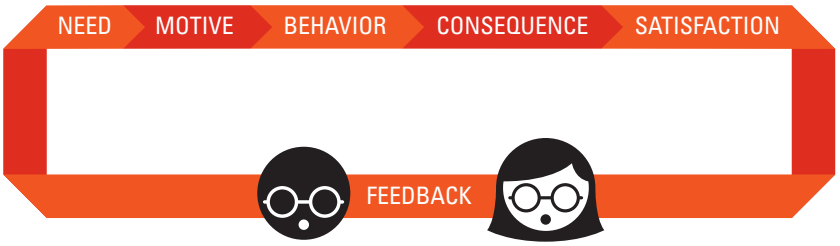

Figure 17-7 Locke and Latham's motivation model

to team members' behavior rather than always needing to dig down to underlying motivation or needs. Leaders only need to know which consequences result in people being motivated to perform in desired ways (Lussier and Achua, 2013).

Modes of Motivation

In Locke and Latham's model, leaders provide feedback or consequences to the behaviors that team members exhibit. The consequences can be simplified into four primary modes that exist on a scale from least to most noble (Figure 17-8).

At the bottom of the scale is the least noble: coercion. In this mode, people do things because they are forced to, or from fear of consequences or punishment. The result is motivation that may work to achieve the determined goals, but does not foster growth in individuals (DeLisle, 2011; Goleman, 2005).

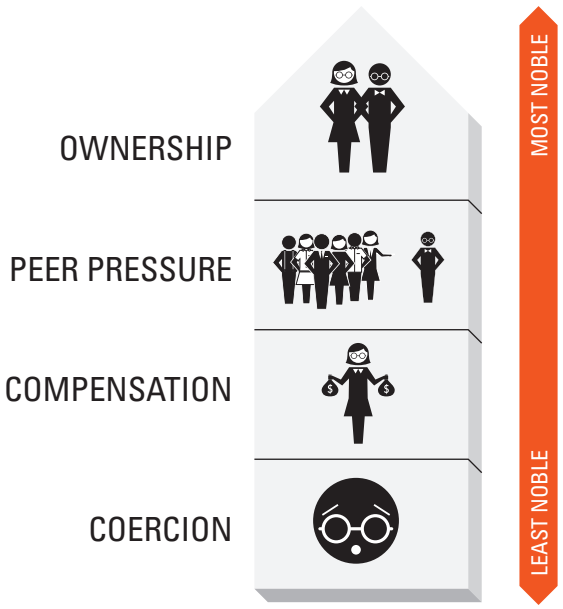

Figure 17-8 Modes of motivation

Sitting just above coercion is compensation. While it does not have a negative consequence, compensation does not engage the person as a whole being. This is a problem because even when employees have enough money to meet their basic human needs, there is no incentive for them to be motivated to achieve more than what is required. When project teams are structured around paying people to do things, there is a deadening effect over time with respect to team motivation. Individuals also don't respond as effectively to compensation as with other forms of motivation (DeLisle, 2011; Pfeffer, 1998; Duncan, 2001).

Coercion and compensation tend to cause people to become increasingly self-centered in their behavior. As a result, they either try to protect themselves from situations out of constant fear and looming threats, or to move away from situations where they feel they are being used or exploited by acquiring the means and wherewithal to leave.

Moving up the hierarchy, the next mode is peer pressure. This mode can be seen as positive because it begins to move the consideration of consequences away from protecting oneself and acting in one's own self-interest toward a sense of connectedness to other people, a sense of belonging, and a desire to be accepted by and create a common culture with others. When motivated by peer pressure, people want to be seen by others as collaborative and effective members of the project team. This connection to others gives people a personal identity within the team. Collaborative team members are proud of their work and proud of the team, because its goals coincide with their personal values (DeLisle, 2011; Laporta, 2003). Of course, this form of motivation is only effective when the peers providing the influence have positive goals.

The highest form of motivation is a sense of ownership. In this kind of motivation, a person recognizes that by engaging in the positive and proactive culture of a project team, he or she is rewarded with a sense of reciprocity. Reciprocity is a sense of responsibility beyond voluntary association with a person or group and approaching a sense of personal responsibility for the effectiveness and viability of the team. A person who feels ownership is motivated beyond those in any other mode, because that person is sincerely and deeply committed to the success of the enterprise and the outcomes of the team (DeLisle, 2011; Michie, 2002).

Motivation to Innovation

All projects require motivated teams, and many related to the work of project delivery teams also require innovation. It has been proven that the two are interconnected; when motivation is increased, innovation also increases (Figure 17-9). In order to build a culture of innovation, team leaders should start by creating a work environment that improves motivation and engagement and then add additional factors that stimulate innovation. It may seem simple to suggest that job satisfaction and job performance are related. However, many long-term studies also show a high correlation between employee engagement and productivity (Robbins, 2011).

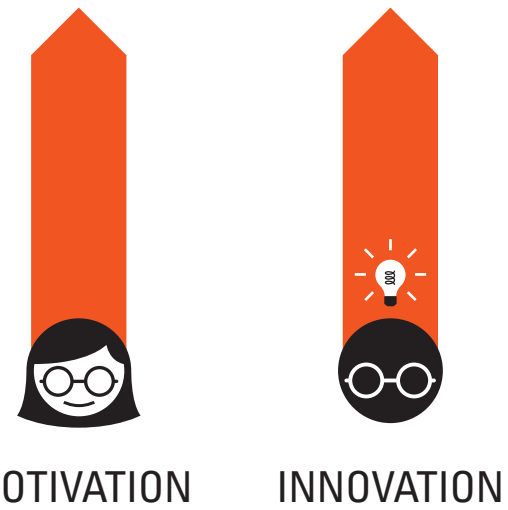

Figure 17-9 Motivation leads to innovation

Figure 17-10 Shared goals

Motivation also results from self-dependence, which occurs when project leadership does not need to convince the team of the value of a chosen approach (Figure 17-10). Another advantage, predicted by self-determination theory, is that if people feel they have control over which task to undertake, it will feel less like an obligation (Pink, 2009; Robbins, 2011). Regardless of who sets them, goals should be specific and relate to actual project performance (Katzenbach, 2005). False goals, false deadlines, or goals that are abandoned while the project is underway can lead to cynicism among the team, reducing motivation, innovation, and production.

MOTIVATION AND MAINTENANCE

This exercise is intended to provide better understanding of the factors that motivate behavior in order to provide appropriate feedback on individual and team performance.

Motivation Survey

Complete the following survey based on Herzberg's theory of motivation and maintenance to determine the factors that contribute to your job satisfaction or dissatisfaction and provoke you to higher levels of achievement (Figure 17-11).

Rank each of the twelve factors on a scale from 1 to 5 relative to their importance to you in your work environment, with 1 meaning not important and 5 meaning very important:

1. Interesting and enjoyable work
2. Fair and equal treatment of everyone by leaders
3. Receiving praise and other recognition and appreciation
4. Consistent workload and routine tasks
5. The opportunity for advancement
6. Impressive title
7. Responsibility and freedom
8. Good working conditions (safe environments, kitchen access, nice office)
9. Opportunities for continuing education and professional development
10. Emphasis on developing and adhering to rules, regulations, procedures, and policies
11. Achievable objectives in line with existing skills
12. Job security

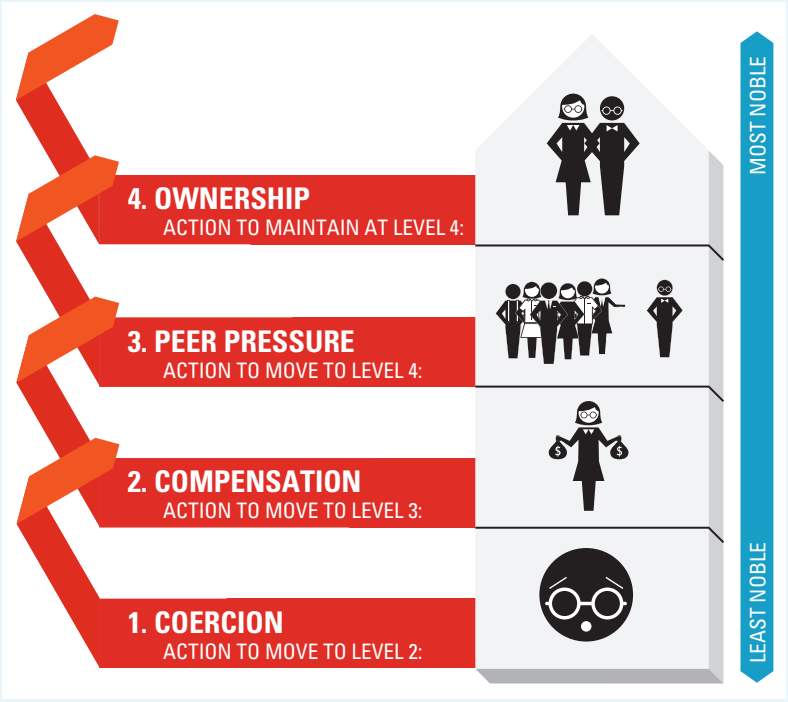

Figure 17-11 Motivation factors for advancement

(*continued*)

(*continued*)

Reflection

Add the scores for all of the odd questions (motivation factors) and all of the scores for the even questions (maintenance factors).

Motivational Factors Total (sum of odd questions):

Maintenance Factors (sum of even questions):

The closer each score is to 30, the more important the motivation factor is to you. The closer each score is to 6, the less important that factor is to you.

Herzberg's two-factor theory states that people are driven by motivators rather than by maintenance factors. Maintenance factors can also be called extrinsic motivators because the impetus comes from outside the person. Extrinsic motivators include pay, security, and working conditions, benefits, and relationships. These are lower-level needs, according to Maslow's theory.

Motivator factors are intrinsic, meaning the motivation comes from within as a person engages in the work itself. These are higher-level needs such as achievement, recognition, challenge, and advancement.

Application

Consider your scores.

Are intrinsic or extrinsic factors most influencing your behavior?

Which of your lower-level needs—job security, salary, benefits, work environment—are not being met in your current situation? How can these be addressed to allow you to pursue higher-level needs such as creativity, achievement, and autonomy?

How can you influence others to achieve higher levels of self-actualization and ownership?

Consider Figure 17-11. Each tier of motivation prompts for an action that would move a person to the next higher level. What is one thing leaders can do at each level to support team members' growth?

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CHAPTER 18

Conflict Management

Healthy Conflict

Recognizing and managing conflict is a necessary part of leaders' responsibilities, as conflict directly affects team productivity. Many times, conflict arises due to miscommunication—a lack of clear expectations on the part of one party or the other—or a lack of direction (Lussier and Achua, 2013). The way in which leaders manage conflict is varied and related to task and relationship behaviors discussed earlier.

Conflict is a state where two parties are in disagreement and can result from a lack of direction, communication, or feedback (Figure 18-1). This can occur among team members or between the leader and members of the team and can create opposition if not managed properly (Lussier and Achua, 2013). When a person's actions are misinterpreted, leaders can respond emotionally and choose a leadership style that is less effective for the circumstance (Joshi and Roh, 2010).

If we consider that all human relations are essentially emotional, then so too are professional relationships. Relationships are based on a psychological contract, or the expectations someone has about a particular situation. Many times, these expectations are unconscious, making people unaware that their expectations have not been met until after the fact (Hekman et al., 2009). In such a case, the psychological contract is broken because people fail to make their expectations known, or because they assume that others have the same expectation as they do (Kim et al., 2009). Awareness that everyone has underlying expectations, whether known to them or not, and communication of these expectations, are key to avoiding negative conflict.

The work of the leader is often to resolve conflicts that affect the team decision-making process. As discussed in previous chapters, conflict is not necessarily a negative behavior and can be functional and productive when opposing opinions or ideas support the team objectives as an overarching goal. Healthy conflict leads to better and more informed decisions being made for the sake of the project and is not only desirable but also mandatory in collaborative teams as a way to avoid falling into dysfunctional behavior (Fiedler, 2010).

Figure 18-1 Causes of conflict

Conflict Management Styles

When conflict exists, there are different management styles that leaders can use to address it (Figure 18-2). These styles can be mapped relative to each other based on two dimensions of concern. Measured along the *x*-axis is concern for one's own needs, and on the *y*-axis is concern for others' needs. Each leader uses one of the resulting behavior types—passive, aggressive, or assertive—more

Figure 18-2 Conflict management styles, Lussier and Achua, 2013

frequently based on their personality and leadership style. However, no one type of behavior will work for all situations; all types have some appropriate applications, and leaders can choose to behave in ways other than their nonpreferred style when required by the situation (Lussier and Achua, 2013).

Continued team effectiveness demands that leaders offer conflict resolution appropriate for the interest of the team and its performance. As with other models of behavior, there is not a single best conflict management style for every situation. However, each has advantages and disadvantages that should be considered relative to the context of the conflict (Lussier and Achua, 2013).

Avoiding

In the lower left corner of the matrix is low concern for others' needs and low concern for one's own needs. This is an avoiding conflict style that is exemplified by passive behavior. Someone using the avoiding style ignores the conflict rather than attempts to resolve it. Although on the surface the conflict may eventually appear to have abated if given enough time, the conflict is not actually resolved. Signs of such a style are mentally withdrawing or physically leaving a situation, and uncooperative behavior (Lussier and Achua, 2013).

An avoiding style should be used with great caution and only in situations where the conflict is trivial, the stakes are low, confrontation will damage an important relationship, there is not enough time to resolve the entire issue, or emotions are too high for those involved to be reasonable or logical. This does not mean team leaders should not engage in resolving the issue when time allows. Being afraid to confront, challenge, or disagree is not reason enough to avoid conflict. Over time, the root cause of unaddressed issues will remain and lead to reoccurring arguments that detract from the performance of the team.

Leaders may intentionally use this style in toxic environments or to dissipate an emotionally charged situation. However, continued passive behavior often leads to emotional outbursts of aggression when a member of the team can no longer avoid addressing the issue. Such passive-aggressive behavior has negative effects on both interpersonal relationships and team dynamics (Lussier and Achua, 2013).

Accommodating

An accommodating conflict management style is also a passive approach, where one party gives in to the other in order to avoid confronting the issue. Pleasing personalities often use this unassertive but cooperative approach in an attempt to satisfy others on the team while subjugating their own needs or beliefs. The main difference between accommodating and avoiding is that there are no real consequences to avoiding behavior, whereas in accommodating, one party agrees to something that they may not truly believe is in the best interest of the person, team, or project.

The advantage to using an accommodating approach is that relationships are maintained. However, over time with sustained accommodating behavior, these same relationships can be lost if it turns into a situation where one party continually takes advantage of the other. Disadvantages include the possibility that the solution preferred by the person who accommodated was actually the better one, and that the approach may lead to issues long term that could have been avoided if addressed earlier.

Accommodation should be used sparingly, though it is appropriate when the person accommodating prefers to follow rather than lead, when personal relationships are more important than the issue under consideration, when the issue is not

important to the accommodator but is to the other party, and when limited time would make fully addressing the issue difficult or impossible. People often accommodate when facing aggressive or coercive behavior from authoritarian leaders (Lussier and Achua, 2013).

Forcing

Someone with a high concern for their own needs and low concern for others' needs often uses a forcing conflict management style. They exhibit aggressive, uncooperative behavior and use intimidation, threats, and positions of authority to get their way at the expense of others. People who are unwilling to change or examine other points of view but who expect others to conform to their way are forcers. Over time, forcers engender resentment and hostility from others and have poor relationships.

There are a few instances where forcing creates positive results. It is appropriate in situations where an unpopular action must be taken on important issues related to the project, when commitment by others to the proposed action is not crucial to its implementation and they are likely not to be concerned with the decision, when maintaining relationships is not critical, or when there is limited time to resolve the conflict (Lussier and Achua, 2013).

Collaborating

The collaborating conflict management style is one in which a person has equal regard for others' needs as well as his or her own. They are committed to the team working cooperatively to resolve issues and pursue results that are in the best interest of all parties either by incorporating aspects of multiple solutions or by choosing the collectively agreed upon option. The defining characteristics of collaborators are that they are open and honest negotiators and are able to change their views on a subject if a better solution is provided or if more information is made available.

Collaboration leads to the best solution to a problem most consistently and provides the most benefit to the individual, team, and project. The disadvantage to this approach is that it requires time and the expertise to manage the process. It is most appropriate in situations where compromise may result in a lesser outcome on an important issue, when long-term relationships are important, and when there is time to implement it. It also requires members be willing to engage in the collaborative process, placing the interest of the team above their self-interest. Over time, the collaborative process will take less time as the team dynamic becomes stronger (Lussier and Achua, 2013).

Negotiating

The final style exists at the middle of the matrix—that of negotiating or compromising conflict management style. Those who are negotiators use a mix of assertive and passive behavior to pursue some issues and not others. The primary difference between a collaborative and negotiating approach is the presence of compromise. Negotiating may result in a quicker resolution than a collaborative approach, though the solution is likely less than ideal and may be unproductive over time.

Unlike the more passive and more aggressive approaches (avoiding, accommodating, and forcing), this approach helps the team remain unified and high performing. It is best used in situations where there are complex and important issues that have no clear solution, when there are equally passionate and influential parties with different suggestions, when the solution is temporary rather than a permanent result, and when time is short. It does, however, lead to negative results such as game playing if too frequently used (Lussier and Achua, 2013).

Conflict Management Model

Collaborative conflict management is the best way to address important issues. When working in project delivery teams, leaders and members can initiate conflict resolution whether they are in a position of authority or not (Lussier and Achua, 2013).

Step 1

Plan a behavior, consequence, and feeling statement—otherwise known as an "I statement"—that presents the problem from the instigator's point of view and invites the other party to help solve it (Figure 18-3). For example, there may be two competing viewpoints, represented by the architect and the contractor, on an important issue. By presenting the issue from his or her perspective, the architect is able to assert that the problem should be solved collaboratively while reducing defensiveness in the other party.

The instigating party should not judge the other party's behavior, place blame, or make statements regarding right versus wrong. Proposing definitive solutions, which can seem threatening at this early stage in the conversation, should also be avoided. Statements such as, "You are close-minded and only concerned about your own bottom line" (judgment), "I am going to tell the client that you are holding up the schedule" (threat), and "Why don't we just do it this way?" (solution) are not effective at this point in the conflict resolution process.

Listing as many points related to the issue under the categories of behavior, consequences, and feelings allows both parties to understand the other's perspective, creating empathy, breaking down defensiveness, and bridging disciplinary boundaries. For example, in the case of a conflict related to a detail where the

CONFLICT RESOLUTION MODEL 1

You initiate conflict resolution process

STEP 1. Plan a BEHAVIOR, CONSEQUENCE, and FEELING statement that maintains ownership of the problem

STEP 2. Present your BEHAVIOR, CONSEQUENCE, and FEELING statement and agree on the conflict

STEP 3. Ask for/give alternative conflict resolution options

STEP 4 . Make an agreement for change

DO:

Decide how to better resolve the conflict next time

DON'T:

Make the same mistakes again

Figure 18-3 Conflict resolution model 1

architect and contractor passionately disagree on the best solution, a collaborative resolution approach would begin with each party presenting the behavior, consequences, and feelings that arise from the issue. Representatives from both sides may say things such as "When you do this (behavior), this is the effect (consequence), which makes me feel (feeling)." The structure of the statement can vary depending on the anticipated response, but the shorter the statement during the early stages, the more likely it is that the other party will be able to understand the issue from alternate perspectives and empathize with the other person.

Step 2

Once the instigator has presented their perspective to the other party, it is the other party's turn to respond. If there is still a misunderstanding after this initial round of communication or if the other party does not acknowledge that the problem exists, the instigator should repeat the statement, but in different terms or using different analogies. Both parties should be assertive and not give up attempting to communicate issues. The instigator may choose to repeat the first step as many times as needed in order to create understanding or change their conflict resolution approach to another style such as accommodating or avoiding or even forcing depending on the importance of the condition to the project and the time left to enact the decision.

Step 3

During this stage, the instigator provides alternatives to resolving the issue and solicits suggestions from the other party. If the other party acknowledges the problem but is not making steps to resolve it, the instigator should appeal to commonly established goals set during the initial stages of the project. By showing how resolving the conflict meets these objectives, there is a greater chance of coming to a quick resolution.

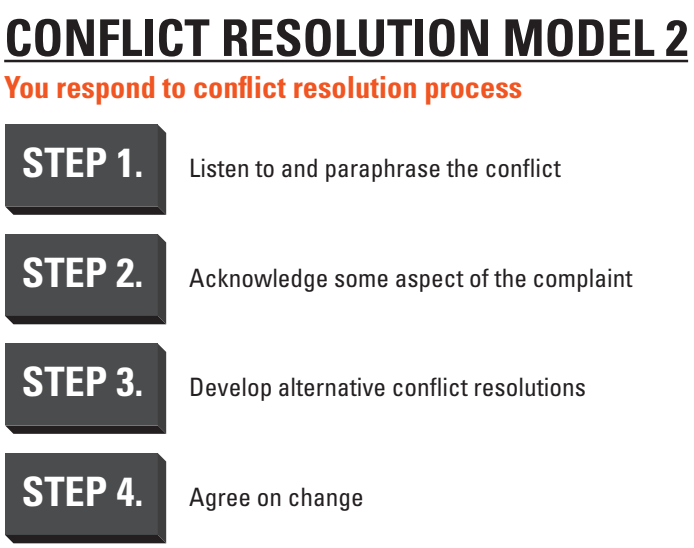

Figure 18-4 Conflict resolution model 2

Step 4

The final step of the model involves establishing a plan of action to resolve the issue and ensure similar conflicts do not impede project progress in the future. Reflecting on the process of resolving the conflict—what worked and what needs changed—will lead to better performance over time. The action items identified for the plan should be assigned to specific people.

The Other Side

The steps outlined above examine conflict resolution from the perspective of the initiator. From the perspective of someone being approached about a conflict, the process is slightly different (Figure 18-4).

First, the responder should listen to the problem statement (behavior, consequence, feeling statement) and paraphrase back what they hear. They should work to understand of the conflict if the two parties are not in agreement about fundamental issues and recognize that even if the issue stems from the other party, it affects the entire team. They should ask for and give alternative solutions and agree to make a change once a course of action has been collectively established (Lussier and Achua, 2013).

Conflict Management Leadership

The conflict management process is often facilitated by a team leader. When the leader is one of the involved parties, it may be necessary to assign a mediator to manage the steps of the conflict resolution process (Figure 18-5). An important first step for

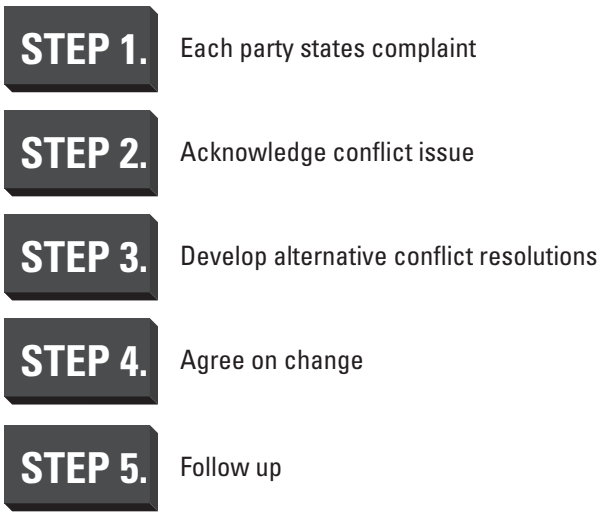

Figure 18-5 Conflict resolution model 3

the leader is to determine if a team meeting or individual meetings are required before resolution begins. If individual interviews and meetings are deemed necessary, the leader should take a coaching or mentoring approach and remain objective. Their primary responsibility is to the overall project goals with the intention of resolving the issue and moving forward.

The leader should also facilitate the development of behavior, consequence, and feeling statements on the part of the instigating party. In this role, the leader is a mediator and not a judge; they remain impartial and ensure that neither party is critiqued or embarrassed (Lussier and Achua, 2013; Ng et al., 2009).

When any stakeholder places blame, judges, threatens, or tries to find a solution too quickly, the leader is responsible for reiterating the purpose of the collaborative conflict resolution process. Instead of discussing the issues or personalities involved, the leader should focus on behavior and a logical approach. If the stakeholders cannot agree on a problem statement, the leader should step in to distill a statement from ongoing conversations and test it with all parties. Project delivery teams work well together most of the time. However, when necessary, leaders must assertively engage (Lussier and Achua, 2013).

CONFLICT MANAGEMENT AND RESOLUTION

This exercise was adapted from Leadership Dilemmas: Grid Solutions *(Blake and McCanse, 1991: 29), and Jay Hall,* Conflict Management Style*. Available at www.teleometrics.com/info/conflict.html. Accessed September 7, 2016.*

The purpose of this exercise is to understand the different conflict management styles to aid leaders in managing conflict.

Self-Assessment

The following survey identifies twelve situations that team members are likely to encounter in project delivery teams. Answer from the perspective of an architect participating in a collaborative project delivery team when responding to all situations. Do not try to presuppose the "right" answer. The results of the survey will be helpful only to the extent that your responses accurately represent your own behavior.

For each situation, carefully study each of the five possible responses or attitudes and allocate ten points among the responses to represents how you would most likely behave with the highest number of points indicating your strongest response. Any response can be answered with from zero to ten points, as long as all five responses for a given situation add up to ten points, as shown in the following example:

Example Situation: In responding to a request from another for help with a problem, you would:

Score	Possible response or attitude
4	A. Clearly instruct him or her how to proceed.
2	B. Enjoy the strategizing with them about the challenge.

(*continued*)

3	C. Help him or her take responsibility for addressing the problem.
1	D. Find the request unnerving but agree to help.
0	E. Avoid the invitation at all costs.
10	TOTAL

Situation 1: Upon experiencing strong feelings in a conflict situation, you would:

Score	Possible response or attitude
	A. Enjoy the emotional release and sense of exhilaration and accomplishment.
	B. Enjoy the strategizing involved and the challenge of the conflict.
	C. Become serious about how others are feeling and thinking.
	D. Find it frightening because you do not accept that differences can be discussed without someone's getting hurt.
	E. Become convinced that there is nothing you can do to resolve the issue.
	TOTAL

Situation 2: Consider the following statements and rate them in terms of how characteristic they are of your personal beliefs:

Score	Possible response or attitude
	A. Life is conquered by those who believe in winning.
	B. Winning is rarely possible in conflict.
	C. No one has the final answer to anything, but each has a piece to contribute.
	D. In the last analysis, it is wise to turn the other cheek.
	E. It is useless to attempt to change a stakeholder who seems locked into an opposing view.
	TOTAL

Situation 3: What is the best result that you expect from conflict?

Score	Possible response or attitude
	A. Conflict helps people face the fact that one answer is better than others.
	B. Conflict results in canceling out extremes of thinking so that a strong middle ground can be reached.
	C. Conflict clears the air and enhances commitment and results.
	D. Conflict demonstrates the absurdity of self-centeredness and draws people closer together in their commitment to each other.
	E. Conflict lessens complacency and assigns blame where it belongs.
	TOTAL

Situation 4: When you are the person with the greater authority in a conflict situation, you would:

Score	Possible response or attitude
	A. Let the others know your view.
	B. Try to negotiate the best settlement you can get.
	C. Ask to hear the other's feelings and suggest that a position be found that both might be willing to try.
	D. Go along with the others, providing support where you can.
	E. Keep the encounter impersonal, citing rules if they apply.
	TOTAL

(*continued*)

(*continued*)

Situation 5: When someone you care for takes an unreasonable position, you would:

Score	Possible response or attitude
	A. Lay it on the line, telling him or her that you don't like it.
	B. Let him or her know in casual, subtle ways that you are not pleased; possibly distract with humor; and avoid a direct confrontation.
	C. Call attention to the conflict and explore a mutually acceptable solution.
	D. Try to keep your misgivings to yourself.
	E. Let you actions speak for you by indicating depression or lack of interest.
	TOTAL

Situation 6: When you become angry at a close colleague on the deliver team, you would:

Score	Possible response or attitude
	A. Just explode without giving it much thought.
	B. Try to smooth things over with a good story.
	C. Express your anger and invite him or her to respond.
	D. Try to compensate for your anger by acting the opposite of what you are feeling.
	E. Remove yourself from the situation.
	TOTAL

Situation 7: When you disagree with other members of the project delivery team on an important issue, you would:

Score	Possible response or attitude
	A. Stand by your convictions and defend your position.
	B. Appeal to the logic of the team in the hope of convincing at least a majority that you are right.
	C. Explore points of agreement and disagreement and the feelings of the team's member, and then search for alternatives that take everyone's views into account.
	D. Go along with the rest of the team.
	E. Not participate in the discussion and not feel bound by any decision reached.
	TOTAL

Situation 8: When a single stakeholder takes a position in opposition to the rest of the delivery team, you would:

Score	Possible response or attitude
	A. Point out publicly that the dissenting member is blocking the team and suggest that the team move on without him or her if necessary.
	B. Make sure the dissenting member has a chance to communicate his or her objections so that a compromise can be reached.
	C. Try to uncover why the dissenting member views the issue differently, so that the group's members can reevaluate their own positions.
	D. Encourage the stakeholders to set the conflict aside and go on to more agreeable items on the agenda.
	E. Remain silent, because it is best to avoid becoming involved.
	TOTAL

Situation 9: When you see conflict emerging in the project delivery team, you would:

Score	Possible response or attitude
	A. Push for a quick decision to ensure that the task is completed.

	B. Avoid outright confrontation by moving the discussion toward a middle ground. C. Share with the team your impression of what is going on, so that the nature of the impending conflict can be discussed. D. Forestall or divert the conflict before it emerges by relieving the tension with humor. E. Stay out of the conflict as long as it is of no concern to you. TOTAL

Situation 10: In handling conflict between your team and another cross-functional team or your team and the core team, you would:

Score	Possible response or attitude
	A. Anticipate areas of resistance and prepare responses to objections prior to open conflict. B. Encourage your team's members to be prepared by identifying in advance areas of possible compromise. C. Recognize that conflict is healthy and press for the identification of shared concerns and/or goals. D. Promote harmony on the grounds that the only real result of conflict is the destruction of friendly relations. E. Have your group submit the issue to an impartial arbitrator. TOTAL

Situation 11: In selecting a member of your team to represent you in negotiating with another team, you would choose a person who:

Score	Possible response or attitude
	A. Knows the rationale of your team's position and would press vigorously for your group's point of view. B. Would see that most of your team's judgments were incorporated into the final negotiated decision without alienating too many members of either group. C. Would best represent the ideas of your team, evaluate these in view of judgments of the other team, and then emphasize problem-solving approaches to the conflict. D. Is most skillful in interpersonal relations and would be openly cooperative and tentative in his or her approach. E. Would present your team's case accurately, while not making commitments that might result in obligating your group to a significantly changed position. TOTAL

Situation 12: In your view, what might be the reason for the failure of one team to collaborate with another?

Score	Possible response or attitude
	A. Lack of a clearly stated position, or failure to back up the team's position. B. Tendency of teams to force their leadership or representatives to abide by the group's decision, as opposed to promoting flexibility, which would facilitate compromise. C. Tendency of teams to enter negotiations with a win/lose perspective. D. Lack of motivation on the part of the team's membership to live peacefully with the other group. E. Irresponsible behavior on the part of the team's leadership, resulting in the leaders' placing emphasis on maintaining their own power positions rather than addressing the issues involved. TOTAL

(*continued*)

(*continued*)

Reflection

Step 1: When you have completed all scenarios, write the number of points you assigned for each of the responses in the appropriate columns on the scoring form (Figure 18-6).

Add the total number of points for each column and check that the totals for each column add up to 120.

Step 2: Transfer your column total scores onto the form showing the style form (Figure 18-7).

SITUATION	A	B	C	D	E	TOTAL
1						10
2						10
3						10
4						10
5						10
6						10
7						10
8						10
9						10
10						10
11						10
12						10
TOTAL						120

Figure 18-6 Scoring form

STYLE	COLUMN	SCORE
COLLABORATING	C	
NEGOTIATING	B	
ACCOMMODATING	D	
FORCING	A	
AVOIDING	E	
	TOTAL:	**120**

Figure 18-7 Style form

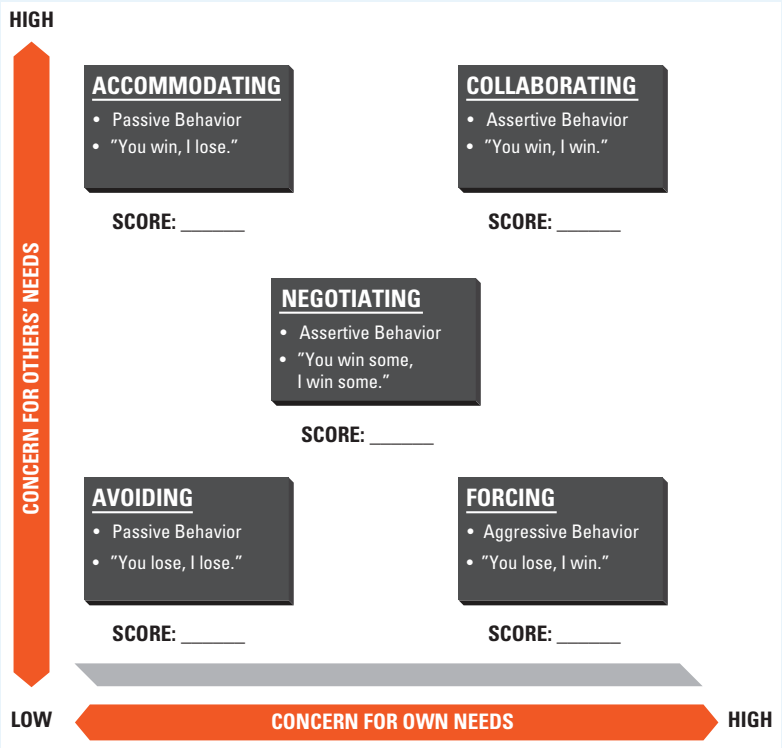

Figure 18-8 Conflict management style graph

Step 3: Transfer the style scores to the appropriate blanks on the conflict-management style graph (Figure 18-8).

The higher the score is in one area of the graph, the more closely this approach aligns with your natural conflict management style.

Avoiding: unassertive and uncooperative—does not engage in conflict

Accommodating: unassertive and cooperative—yielding to others, selfless, obedient

Forcing: assertive and uncooperative—power oriented

Negotiating: moderate in both assertiveness and cooperativeness

Collaborating: both assertive and cooperative—the opposite of avoiding

Your response to conflict on project delivery teams is a result of your personal predispositions and the specific factors related to the situation. As discussed at the beginning of this chapter, each person is naturally predisposed to certain types of behavior more so than others, but can choose to adopt other approaches to best respond the situation.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

PART 5

LEADERSHIP IN PRACTICE

Part 5, "Leadership in Practice," looks more broadly at the workforce and practice landscape of the future—how the changing demographics of the workforce will impact firms' recruiting strategies and corporate culture, how architects can use different types of leadership to strategically respond to changing societal forces, and how firms can consider adapting or changing the structure of their practice in order to best anticipate future markets.

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CHAPTER 19

The Value of Inclusion

While *diversity* is a term that is used to describe the ways in which people differ, *inclusion* is the way in which those unique qualities are brought together in a beneficial way. "Inclusion puts the concept and practice of diversity into action by creating an environment of involvement, respect, and connection—where the richness of ideas, backgrounds, and perspectives are harnessed to create business value. Organizations need both diversity and inclusion to be successful" (Jordan, 2011).

Beyond the proven financial benefits, firms must also embrace inclusivity in response to ethical and legal dimensions. From a humanistic perspective, inclusion rather than exclusion based on a person's background or history is a simple matter of fairness and dignity. From a legal standpoint, exclusion has other ramifications when a company uses unfair hiring practices, does not provide for employees with disabilities, or discriminates based on age, race, gender, or sexuality (Lussier and Achua, 2013).

Defining groups of people by a common factor such as the year they were born, ethnic heritage, or gender is a technique that analysts use to discuss broader population trends and cultural habits through demographics (Fry, 2016). Although this process can be helpful in understanding broad factors that affect the workplace, it does not take into account the unique backgrounds and experiences that shape each person's development. Leaders must develop personal relationships with each of their team members in order to best shape their approach.

With these caveats in mind, it is nevertheless helpful to examine general distinctions in age, race, gender, and culture that have and will continue to shape the workforce. Each of the topics discussed in this chapter is rich and nuanced enough to warrant exploration through several books. Thus, the following sections are by no means comprehensive. Instead, they intend to provide a general overview of key themes of inclusion as they relate to project delivery teams. To help build an organization's inclusivity, firm leaders can engage in the following steps:

Step 1. Support the leader's interpersonal skill development and emotional intelligence so they are attuned to their own and others' conscious or

unconscious biases and motivations, allowing them to better understand, influence, and motivate across cultures—national, regional, ethnic, generational, religious, and organizational.

Step 2. Advocate for diversity and champion initiatives that make inclusion an organizational priority. Identify fundamental issues that may be limiting opportunities for diverse team members to succeed and then discuss these openly with the team and ultimately address them.

Step 3. Ensure organizational effectiveness by recognizing that diversity may lead to less initial harmonious teams, but should not be minimized. Instead, leaders often need to champion diversity at the outset of a project in order to recognize and discuss the factors causing the issue and discuss the benefits of diverse backgrounds, communication approaches, and work styles.

Step 4. Once the benefits of greater diversity begin to manifest in a team through stronger innovation, strategic thinking, adaptability, decision making, and strategic planning, leaders should leverage the team's success to promote greater inclusivity organization-wide.

Step 5. Finally, firms should capitalize on the benefits of inclusivity not only to benefit specific projects but also to promote their brand for development and recruiting purposes. It can also help firms enter new markets and expand into new locations (Tapia and Lange, 2016).

The Changing Workforce

In the spring of 2016, the millennial generation officially overtook the baby boomer generation as the nation's largest. This group of people born in the 1980s and 1990s continues to grow as immigrants from other countries join the U.S. workforce (Fry, 2016). By 2020, millennials will comprise half of the global economy[1] and by 2030, they will represent 75 percent of the country's workforce (Fromm, 2015). Millennials are more culturally diverse than previous generations, with 25 percent speaking English as a second language (PwC, 2011). This shift is meaningful; the boomer generation has had a significant impact on the workplace for the past half century because they represented such a large part of both the population and labor force, which is the number of people working or looking for work (U.S. Dept. of Labor, 2015).

The first boomers reached retirement age in 2008 and began to leave the workforce. The population of the country is growing more slowly than it has at any time in the past and getting older as a whole. The gap between the representation of men and women in the workforce has been closing, along with the steady rise in the number of nonwhite workers (U.S. Dept. of Labor, 2015).

Nationally, business leaders report increasing concerns over the current and future availability of workers with the unique skill sets needed to maintain and grow their practice. "The workplace and workforce are going to change pretty dramatically as we look forward. The entire concept of work is going to become more flexible. The skills needed in the workforce are going to be less about IQ and a little bit more about EQ, because if you think about it, a lot of IQ knowledge is going to be available at our fingertips through hand-held devices and the computer and technologies that we have at our disposal" (PwC, 2011).

The AEC industry in particular is experiencing a shortage of staff with 5–10 years of experience as a result of the generation that was forced out of the profession due to lack of jobs during the recession of 2007–2009.

[1] See "Generations in the Workplace." *Catalyst Quick Takes*, www.catalyst.org/knowledge/generations-demographic-trends-population-and-workforce.

This "recession gap" is creating an incredibly competitive market for firms looking for architects with this level of experience (Ipsen, 2015). Architecture, the profession that experienced the highest rate of unemployment during the recession (Carnevale, 2012), still has not yet returned to prerecession numbers. The prospects for future work are high, though, with an anticipated 7 percent job growth rate.

In terms of sheer numbers, the millennial and post-millennial generations will have a significant impact on the workplace. Their career aspirations, attitudes about work, and technological savvy will challenge traditional hiring and management practices (PwC, 2011). The post-recession talent gap and near-future drop in number of projected college graduates both mean that firms will need to respond to the younger generations' changing desires in order to attract and retain the top talent.

Diversity and Creativity

While there is no exact recipe for building creative teams, there are proven ways to increase a team's ability to design innovative solutions for complex problems. Most design professionals (and thus most project-delivery teams) have strong skills in creative problem solving. The challenge for team leaders is often removing barriers that keep teams from achieving their full creative potential (Ashcraft, 2011).

Motivation and creativity are interrelated qualities in collaborative teams. Leaders should begin by building a team culture of intrinsic motivation and engagement—such as interdependence among team members; clearly defined, interesting, challenging, and meaningful work; and proper feedback, coaching, recognition, and mentoring—then add factors that increase innovation (Ashcraft, 2011). Fostering creativity sometimes requires that leaders radically change the ways in which they build and interact with teams in order to change the team or organization culture (Amabile, 1998).

"Creativity is often associated with dramatic achievements in art or science, with breakthroughs and stunning structures. For IPD teams, creativity is developing efficient and elegant solutions at every level of execution and encompassing revolution and evolution. Properly managed teams are an essential component to increasing project creativity" (Ashcraft, 2011). Creativity is a function of three components: technical expertise, motivation, and creative thinking skills (Amabile, 1998) (Figure 19-1).

On most projects, there is not enough time to develop a team member's conceptual ability with creative thinking, but there is usually the ability to build in time to get a team member up to speed technically, particularly if the team is composed of a group of people with diverse experience and skills. Intrinsic motivation is most quickly and easily influenced by the work environment (Ashcraft, 2011). (See Chapter 17 for more on motivation.)

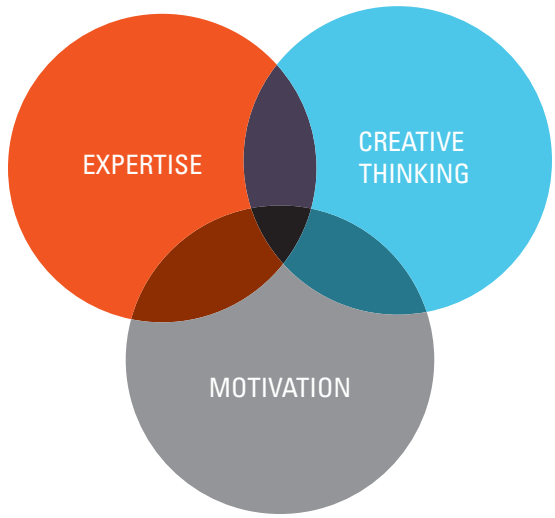

Figure 19-1 Components of creativity *Adapted from Amabile (1998)*

Diversity and creativity are also linked; when one increases, so does the other. However, without a shared commitment and excitement about the team goal, dedication to the collective effort, and valuing of each member's unique contribution, creativity is not assured. As previously discussed, teams should be assembled not only for their technical skills but also for their interpersonal skills and willingness to engage in collaboration—a process that takes time. The alternative is a homogeneous team that may reach solutions more quickly with less debate, but does so with little creativity or innovation (Amabile, 1998).

Empathy

Empathy is a social skill that is foundational to emotional intelligence. In collaborative teams, empathy is used for several reasons, the most fundamental of which is to thoughtfully consider other team members' thoughts and feelings when making decisions. Empathetic leaders and team members have the ability to understand other people's emotions and anticipate how best to engage and influence based on their reactions. Empathy is critical to recruiting and developing talented team members, cross-cultural sensitivity when working in an increasingly global world, and understanding and interpreting the needs of team members, clients, and stakeholders (Goleman, 2006).

Generational Traits

For the first time in history, four generations are working together in firms (Sujansky, 2010). There are differences between the characteristics and behaviors demonstrated by a particular age group and those of a generation that should be taken into consideration when leading or working in a collaborative team. It is important, though, to understand the common characteristics shared by those of different generations to avoid miscommunication and conflict.

Generations Defined

There are many definitions as to the beginning and end of a generation, and the definitions constantly shift as analysts determine what factors affect the boundaries between them (Figure 19-2). The Pew Research Center defines the generations of those currently living in the United States as follows:

- **The G.I. or greatest generation:** born before 1928—came of age during the Great Depression; fought in World War II.
- **The silent generation:** born between 1928 and 1945—were children during the Great Depression; fought in the Korean and Vietnam wars.
- **The baby boom generation:** born between 1946 and 1964—marked a significant increase in population (76 million as opposed to 47 million in the silent generation and 55 million in generation X); began to retire in 2008.
- **Generation X:** born between 1965 and 1980—experienced the transition from analog to digital technology.
- **The millennial generation:** born between 1981 and 1997—sometimes referred to as generation Y or "digital natives," this group currently constitutes the largest percentage of the workforce.
- **Post-millennial generation:** born after 1997—this group is sometimes referred to as generation Z and is on track to exceed the size of the greatest generation (Fry, 2016).

"A multigenerational workforce is composed, by definition, of individuals who are at varying career

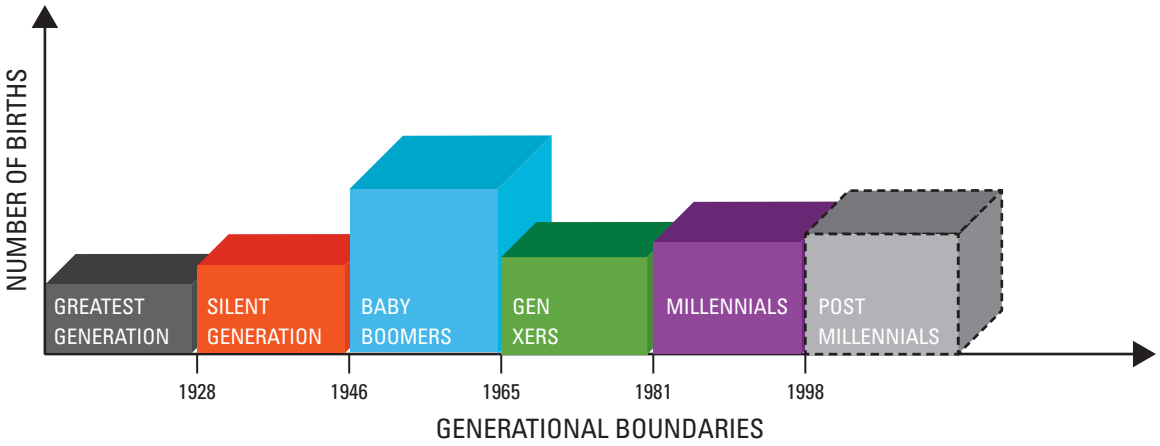

Figure 19-2 Generational timeline

stages. With one generation preparing to exit the world of work and another generation just entering it, the middle generations are juggling issues with job stability, career growth, and work-life balance." Leaders and members of collaborative teams should recognize the capabilities, values, and needs of each generation in terms of leadership, professional development, and coaching in order to foster empathy and communication across generational lines (Sujansky, 2010).

Shared Traits

The historical, cultural, and social experiences people share during their formative years have an impact on their viewpoints and perceptions long-term. Members of the silent generation who survived the Great Depression are said to be loyal and dutiful, are often described as traditionalists, and typically have one employer throughout their professional lives. Members of this generation are from an era where authority was respected and leaders were seldom questioned. They look for a workplace environment where there are clear rules and structures.

Members of the baby boom generation who lived through the Korean and Vietnam wars are often described as workaholics who have a love/hate relationship with authority and are idealistic and optimistic. This generation came of age in an era of social unrest and often challenged established practices. Boomers saw hard work as an opportunity for social and economic advancement and sought meaningful engagement with organizations in their professional lives.

Those in generation X are the "MTV generation," independent and result-oriented, skeptical, and at times cynical. This generation came of age at a time when the economy was booming and technology was advancing rapidly. Personal and professional institutions changed significantly during their lifetimes, with the economic downturn and rise of divorce rates. They watched their parents lose careers to downsizing and restructuring and had to redefine their sense of family. Gen Xers consequently began to decouple their careers from their self-definition and became pragmatists instead.

Finally, the millennial generation began life in a time of unprecedented prosperity prior to the Great Recession, which hit at the time when many were

entering the workforce for the first time. They are technologically savvy and socially engaged, and they expect to have many employers—and possibly even multiple careers—during their lifetimes. Millennials are used to positive reinforcement from teachers and families. They are skilled collaborators, goal-oriented, and eager to learn and succeed (Sujansky, 2010).

Feedback Needs

When working with transgenerational teams, leaders need to tailor their approach to the unique training, development, and coaching needs of each team member. This individual approach will help foster intrinsic motivation in team members who feel valued as a result. Across all generations, the fundamentals of feedback remain consistent: set clear goals, connect the goals to the organization's mission, provide recognition and reinforcement, offer regular feedback to correct problem behavior and underperformance, and encourage continued development and growth (Sujansky, 2010).

Silent generation members are experienced and skilled in many ways but need training in new working methods and technologies. Coaching for this group should come from a place that allows the team member to see how their work can support the larger organizational goals. Baby boomers readily engage in training and development for the organization and their own benefit. Gen Xers came of age at a time of radical technological change so are familiar with the process of learning new tools and techniques. They see this as an opportunity to increase their marketability as well as benefit the larger organization. Millennials have strong technology skills and are confident (sometimes overly so) in their abilities to learn quickly on the job. They are sometimes impatient if they do not see how the process directly benefits the project or their own advancement (Sujansky, 2010).

Intergenerational Communication and Conflict

Communication happens on many channels when working with transgenerational teams (Figure 19-3). A leader must communicate the larger organizational and project goals, ensuring that each team member knows what is expected of them. Technology plays a variable role in communication depending on each generation's comfort level with the tool and the extent to which it was used when they first entered the workforce. Communication in offices today is more immediate and less personal than it was in previous decades and continues to evolve rapidly. Leaders should help establish expectations for teams regarding communication and response times.

Additionally, communication is critical to managing conflict that may arise due to differences in values, skill sets, ambitions, mindsets, and demographics. Examples of such causes of tension include communication style, timeliness, flexibility of schedule, and ambition. When conflicts arise over issues related to generational differences, leaders should:

- Focus on facts.
- Find common ground.
- Relate back to larger organizational or project goals.
- Respect multiple perspectives.
- Solicit agreement on a course of action to resolve issues (Sujansky, 2010).

Diversity can at times be seen as creating discord within a team. "This social categorization leads to intergroup bias with team members having less liking for, trust in, and cooperation with dissimilar others. Diversity, from this perspective, disrupts performance" (West, 2012).

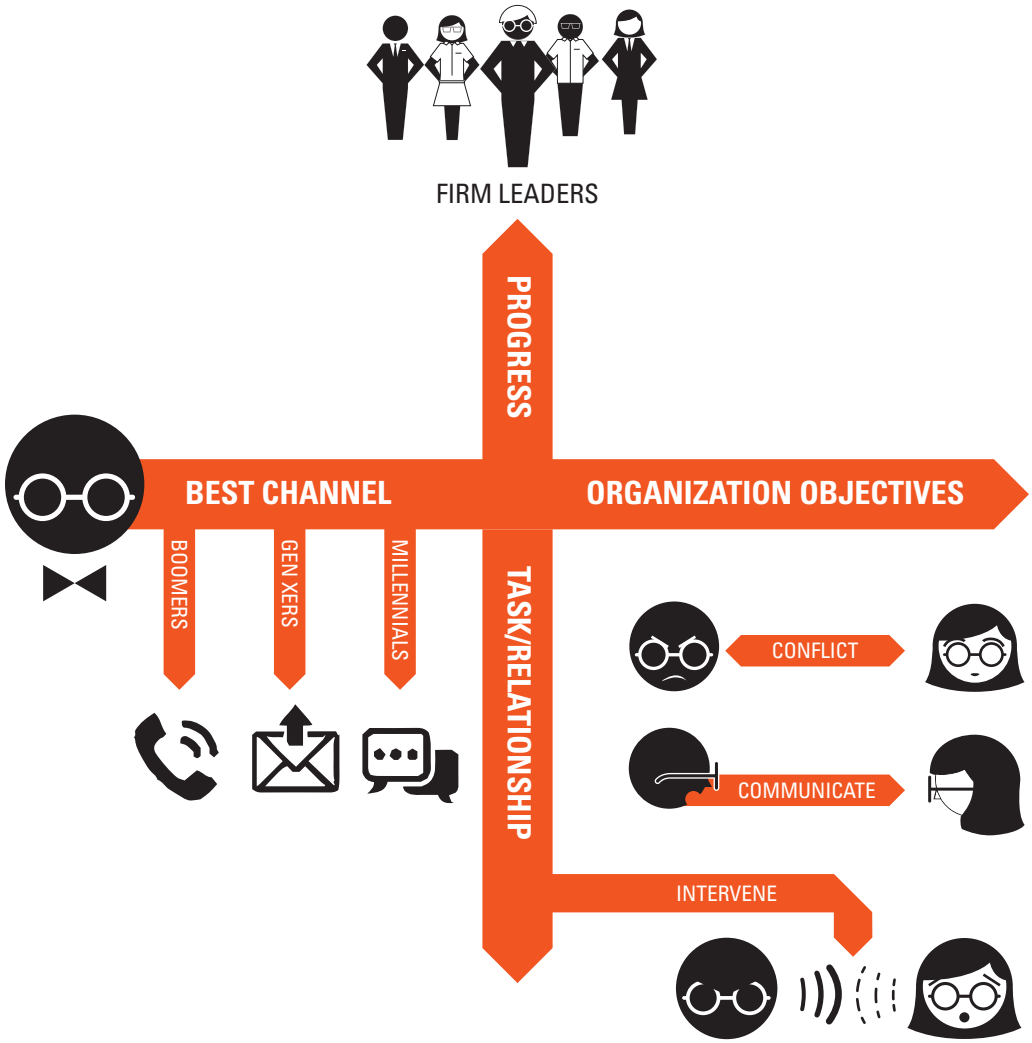

Figure 19-3 Communication in multigenerational teams

Researchers have identified two ways in which diversity impacts teams, both positively and negatively with regard to productivity. The first looks at task-based elaboration of relevant information, providing additional experiences and perspectives that increase the team's ability to address issues and problem-solve effectively. In the second, social categorization, the team collectively processes the knowledge held by each team member to combine and improve upon individual viewpoints and create more creative and informed decisions (van Knippenberg, 2007).

Elaboration has the potential to negatively affect productivity by biases and categorization by conflict. In this case, the team's effectiveness is lessened and in the worst cases stopped entirely. "Diversity

may have positive effects on performance to the extent that it engenders the exchange and integration of task-relevant information (elaboration). At the same time, diversity may be detrimental to performance to the extent that it engenders "us-them" distinctions (social categorization) and intergroup biases—especially because these intergroup biases disrupt information elaboration processes" (van Knippenberg, 2007).

Van Knippenberg developed the Categorization-Elaboration Model (Figure 19-4) (van Knippenberg et al., 2004) to foster positive team performance relative to diversity by capitalizing on the value of diversity to provide information resources. Team members exchange, process, and integrate information relative to the task at hand in order to enable the most effective decision making. The leader's role is to coach team members to communicate as such and to reduce subdivision and bias in favor of a collective identity. Van Knippenberg and his colleagues have proven that when team members recognize the value of diversity, they perform better and have better outcomes (West, 2012).

Millennial Myths

Though much has been written about the characteristics of millennials, research has shown that much of this is anecdotal or extrapolated from small focus group studies (Lindzon, 2016). There are quantifiable differences in terms of the demographics of this group, which was the one most significantly impacted by the Great Recession in 2008. The unemployment rate of 16- to 24-year-olds in 2013 was 15.5 percent and 14.2 percent in 2014, thus many young people in this age range were unable to afford to live on their own. They are purchasing homes and getting married later and less often compared with previous generations and have significantly higher student loan debt—student loans being the only type of debt that has increased since the start of the Great Recession (Berridge, 2014).

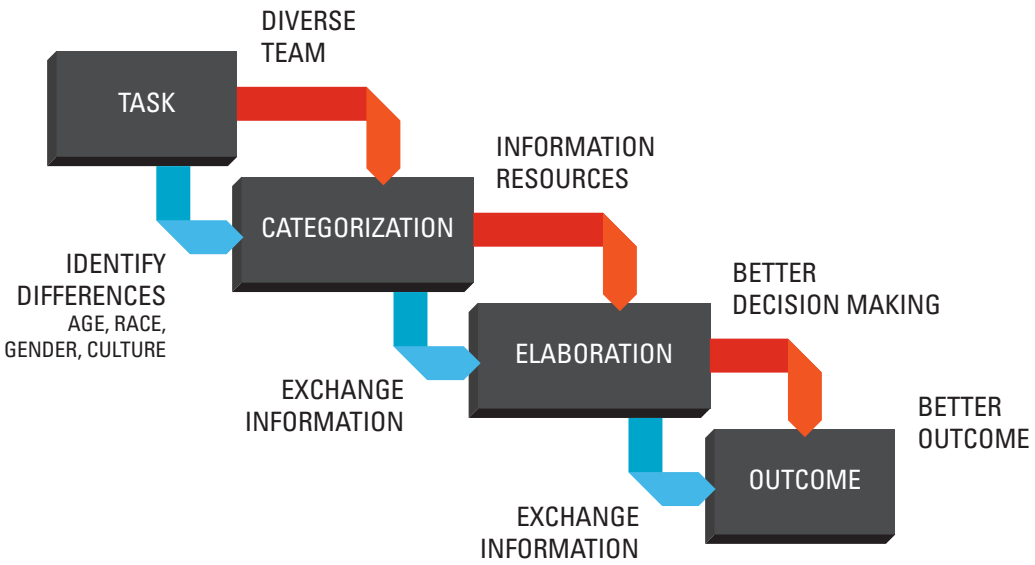

Figure 19-4 Categorization-Elaboration Model

Millennials are clearly differentiated from previous generations by their technical savvy. They have grown up as "digital natives," never knowing a world without cell phones, the Internet, or social media. As a result, they are the first generation that has entered the workforce with more technical skills than many of the senior-level practitioners they encounter. Of course this skill is only valuable when coupled with experience, but the potential to innovate and revolutionize the profession is higher than ever before, as a result (PwC, 2011). Research shows that these findings are not limited to younger people but shared widely across generations, indicating that traditional models of hierarchical, task-based work will need to transform in order to remain relevant in the future.

Though there are some differences between millennials and older generations—such as older workers prioritizing transactional needs such as control over work, development opportunities, and salary where millennials value social needs such as team cohesion, supervisor support, and flexibility more highly—they share many common values. The following are characteristics of the millennial workforce of the future:

- Thanks in part to the ubiquity of information, they are efficient problem-solvers and effective critical thinkers.
- They value personal relationships and are not interested in adhering to traditional hierarchical business structures—they want mentors, not bosses.
- They want consistent feedback rather than annual reviews and value knowing how their work benefits the company as well as the greater good.
- They are more likely to change jobs if they feel they are not being individually supported or do not have the opportunity for personal and professional growth.
- They believe that excessive work demands are not worth sacrifices to their personal lives; they want balance and flexibility rather than the promise of future benefits or advancement.
- They seek out companies that fundamentally value diversity and inclusion whose work is interesting and meaningful.
- They are more interested in working internationally than previous generations.
- They base performance on outcomes rather than hours and do not want to waste time on tedious tasks.
- Though many indicate that they would like the flexibility to work remotely at times, almost all indicate a preference for face-to-face communication related to personal and professional development (Fromm, 2015; PwC, 2011, 2013).

"As the most collaborative and inclusive generation to date, these young adults expect their place of work to embrace the same idealism and values" (Fromm, 2015). Companies wanting to attract millennials will become more employee-focused, supportive and creative work environments that value technology and a balanced lifestyle (PwC, 2011).

Gender and Leadership

Representation in the Profession

Women have been statistically underrepresented in the architecture profession throughout its history. The AIA's 2014 Firm Survey Report shows that while progress on the scale of a 1 to 3 percent increase has been made in the past decade, women continue to represent a disproportionately small contingent of the profession. At the highest levels, women constitute 17 percent of leadership positions in firms, 28

percent of the workforce, and 38 percent of those on the path to licensure. Ten percent of firms are woman-owned (AIA, 2014b).

A recent survey by the American Institute of Architects shows that there are discrepancies in the perception of gender parity among men and women, with men perceiving a much higher level of representation by women in the profession than women, who strongly believe there is not gender equity (Figure 19-5). The report identified challenges to career advancement such as comparable pay, likelihood of promotion, job potential, and encouragement to pursue alternate fields such as interior design. In addition to the difficulty of achieving work-life balance, respondents reported factors contributing to retention issues for women over time: women receive fewer professional development opportunities, struggle to catch up with technology after returning to the workforce from maternity leave, lack role models, are paid less, and are less likely to be promoted (AIA, 2016).

By the numbers, women make up:

51 percent of the U.S. population

43 percent of students in NAAB-accredited architecture programs

42 percent of NAAB-accredited architecture degrees granted

40 percent of those taking the Architecture Registration Exam

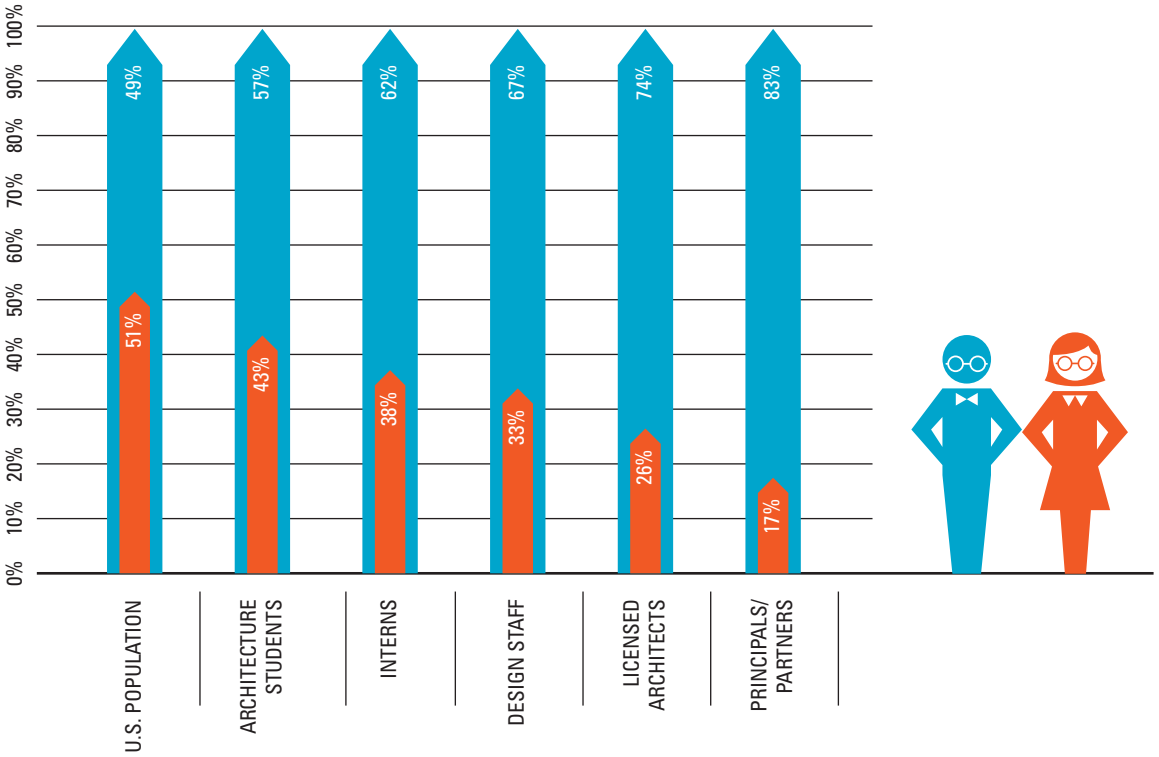

Figure 19-5 Representation of women in practice *Adapted from AIA (2014a)*

40 percent of those taking part in the Intern Development Program

30 percent of Associate AIA members

25 percent of practitioners

21 percent of licensed architects

17 percent of principals and partners in architecture firms

5 percent of Pritzker Prize recipients

3 percent of AIA Gold Medal winners (Chang, 2014)

Recent statistics show progress in the areas of education and licensure. Women now graduate from architecture programs at almost the same rate at which they are accepted and pursue licensure at almost the same rate as they graduate. However, a third of these women—or what is often referred to as "the missing 32 percent"—do not remain in the workforce past their 30s.

> These are the gender gaps that suggest that we need to change, and not simply wait, if we want more women succeeding at the highest levels of the profession and academia. If our goal is to find ways to support women in progressing and achieving within the discipline and profession of architecture at rates more equal to those of men, the data [suggests] that we should focus particularly on two areas: first, what happens before applying to and enrolling in architecture school; and second, what happens at higher levels in the profession, academia, and related practices. (Chang, 2014)

Leadership Styles and Gender

Architecture is not alone in its lack of gender parity. Women in leadership positions across the spectrum—heads of state (5 percent), politicians (13 percent), and corporate leaders (16 percent)—are significantly outnumbered by men. Women also often face harder choices regarding family planning and work-life balance, fail to negotiate for themselves regarding salary, and attribute success to external factors as opposed to men who take credit directly. "No one gets to the corner office by sitting on the side, not at the table, and no one gets the promotion if they don't think they deserve their success" (Sandberg, 2010).

Research shows that of the most important leadership traits—honesty, intelligence, decisiveness, organization, compassion, innovation, and ambition—women and men are seen as being equal in intelligence and innovation as well as ambition and decisiveness. Roughly, a third of people surveyed associate honesty more with women than with men and almost half believe women to be more organized. The biggest difference is in compassion, with fully two-thirds of people attributing this quality more to women than to men (Fry, 2016).

Women often have different leadership styles than men (Figure 19-6) (Forsyth, 2009). Men generally assume an agentic leadership style, by exercising their agency for prolific results. They are task-oriented, active, decision focused, independent, and goal-oriented. Women, on the other hand, are generally more communal when they assume a leadership position; they strive to be helpful toward others, warm in interpersonal relations, understanding, and mindful of others' feelings. They tend to be penalized if they express agentic behaviors or emotions—those that indicate mastery or power—in the same way as men because gender stereotypes contradict leadership stereotypes (Livingston, 2013).

In general, when women are asked to describe themselves to others in newly formed groups, they emphasize their open, fair, responsible, and pleasant qualities. They give advice, offer assurances, and

manage conflicts in an attempt to maintain positive relationships among group members. Women connect to group members by smiling, maintaining eye contact, and responding tactfully to others' comments (Livingston, 2013).

Men, conversely, describe themselves as influential, powerful, and proficient at the task that needs to be done. They tend to place more focus on initiating structure within the group, setting standards and objectives, identifying roles, defining responsibilities and standard operating procedures, proposing solutions to problems, monitoring compliance with procedures, and finally, emphasizing the need for productivity and efficiency in the work that needs to be done. Men are primarily task-oriented where women tend to be both task- and relationship-oriented.

"Research has demonstrated that communal behavior is required of women and that agentic behavior is prohibited for women. This presents a problem for women leaders because the roles themselves involve (and require) agency." This "catch-22" that women face, of needing to express agency in order to be consistent with the leadership role while being unable to express agency in order to avoid backlash associated with perceived violation of gender roles, is another challenge to equity in the workplace (Livingston, 2013).

TASK > RELATIONSHIP

- Agentic
- Proliferation
- Task/Goals
- Independent

WHAT THEY SAY

- Influential
- Powerful
- Proficient
- Structure
- Standards
- Roles/Responsibilities
- Efficient/Productive

TASK = RELATIONSHIP

- Communal
- Warm
- Understanding
- Mindful

WHAT THEY SAY

- Open
- Fair
- Responsible
- Pleasant
- Advice
- Manage conflict
- Positive

Figure 19-6 Leadership style by gender *Adapted from Forsyth (2009)*

Again, it is important to note that these gender differences only represent tendencies and do not consistently manifest themselves within men and women across all groups regardless of person or situation. This distinction is intended to aid leaders in critically evaluating their natural style regardless of gender and to help them compensate for shortcomings or edit their behavior when necessary as each situation warrants a unique style of leadership.

Race and Leadership

The statistics regarding racial diversity are equally, if not more, dire than those concerning women in the profession, though racial and ethnic minorities have seen larger gains over the last decade. Racial and ethnic minorities now account for 16 percent of licensed architects and 21 percent of interns. In addition, 11 percent of firm leaders were identified as minorities in 2013, up from 8 percent in 2005. People of color report similar results to women regarding the perceived lack of opportunity for advancement and slightly lower discrepancies in pay equity.

The factors identified as impacting minority representation include difficulty affording the cost of architecture education, lack of role models, predisposition toward careers with greater earning potential in order to help support families, and little awareness of architecture as a career option (AIA, 2016).

Though most research on leadership styles has historically focused on white men, the resources that do exist on minorities tend to examine white women or black men. Neither of these groups can relate directly to their gender or race counterparts, however. To be successful, black leaders cannot exhibit overly aggressive agentic behavior in order to mitigate the perceived threat they pose to the dominant (i.e., white male) group patriarchy (Livingston, 2013).

Black leaders tend to adopt leadership styles that are nurturing, inclusive, dynamic, engaging, and inspiring, which typify transformational leadership. Transformational leaders often work in direct opposition to the dominant culture, inspire and respect their subordinates, are able to connect with others in a meaningful way, and are honestly invested in the advancement of those around them.

Some researchers suggest that white leaders are often blind to their own privilege and thus less aware of the impact of their leadership style on others, while black leaders do not share this characteristic. Others suggest that historical and contemporary racism and discrimination have played a role—whether consciously, or more likely unconsciously—in shaping the way minority leaders behave. The result of this past would allow minority leaders to turn historical mechanisms of oppression into instruments for productive change, making them more genuine and engaged with their subordinates as well as more likely to define clear goals and objectives (Okozi et al., 2009).

Black women, who are nonprototypical leaders in both race and gender, do not engender the same combined prejudice and penalties as their black male and white female counterparts. Instead, research shows that because they are "dual subordinates," black women take on marginal positions in both their racial and gender groups. They do not suffer from the same stigma as black men with regard to agency, and they are perceived as more masculine than white women, allowing them to express dominance without the same backlash.

Despite having similar latitude as white men with regard to agency in leadership positions, black women occupy the smallest percentage minority of political and corporate leadership positions. Researchers suggest this is due to the suspected unfair disadvantage black women have with regard to mistakes and a more nuanced examination of types of agency.

A more nuanced definition of administrative and ambitious agency reveals that black women are penalized for demonstrating ambitious behavior. "Administrative agency" is assertiveness or willingness to be independent, proactive, or forceful in getting a task done, while "ambitious agency" is competitiveness or the tendency to promote oneself in the service of status attainment, power-seeking, or personal ambition. Although black women are thought to be strong, independent, and assertive, when they begin to demonstrate ambitious agency they are seen as threatening.

The term *intersectionality* was coined in the late 1980s to describe how different forms of discrimination can overlap, illustrating how black women were often marginalized based on both their gender and their race. Since that time, the definition of intersectionality has broadened to include a number of social factors that contribute to a person's identity in relation to power (Figure 19-7) (Emba, 2015; Crenshaw, 2015).

This brief overview of two traditionally underrepresented groups shows that there are nuanced and complex factors that define the perception of gender and racial minorities. These groups also are perceived differently than dominant groups when exhibiting traditionally defined leadership characteristics. A further examination of other minority groups, such as Latina, Muslim, or Asian, and sexual orientations would yield different results. For example, lesbians are often perceived as having more masculine characteristics (relieving them of the bias against women who express agentic behavior) but are stigmatized and marginalized in other ways (Livingston, 2013).

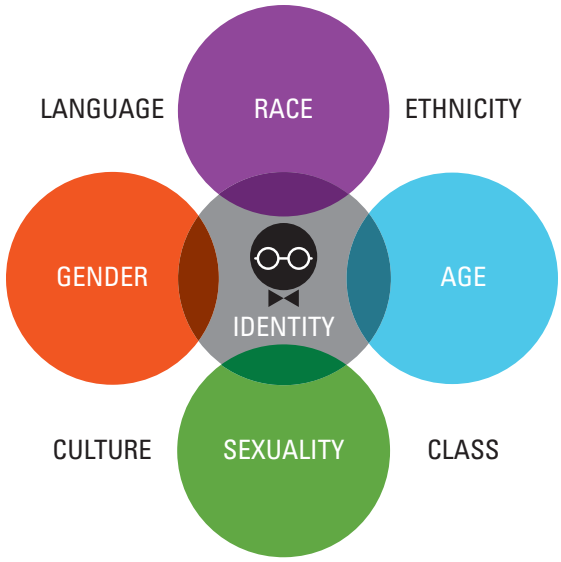

Figure 19-7 Intersectionality and identity

BUILDING LEADERS AND DESIGN/BUILD—INTERVIEW WITH EMILIE TAYLOR WELTY

Emilie Taylor Welty, AIA, is a professor of practice at Tulane's School of Architecture and the design/build manager at Tulane City Center, the school's community design center that brings together creative makers to advance community-driven ideas through collaboration, design education, and scrappy problem-solving.

Taylor's education includes a technical building background at the University of Southern Mississippi followed by a master's degree in architecture at Tulane, and work with BILD design in New Orleans. Through the City Center, Emilie leads the development of projects and partnerships that provide opportunities for faculty and students to engage real issues in the community through design. She is actively involved in the national dialogue regarding university design-build and advocates for the

engagement of such programs with the local community.

Emilie is also part of a multidisciplinary design firm, Colectivo, pursuing a link between creative professional practice, academic research, and active community engagement. With a broad focus on design, the firm takes on projects of multiple types and scales to bring social consciousness and a little bit of fun to the design process. Emilie spoke with us about how high seas can make you turn in a direction other than the one you planned and her work in running community-engaged design-build projects. She did this while running errands, demonstrating her ability to juggle coffee, purchase orders, and cohesive thoughts—all of which seem to be equally consuming tasks in her daily life.

Erin Carraher: You wear many hats—architect, educator, mother, design-builder, fundraiser, and advocate, to name just a few. Did you always imagine yourself engaging in a nontraditional form of practice?

Emilie Taylor Welty: When I was in grad school studying architecture, I just imagined the typical career for myself. I would work in a firm and maybe try to go to Europe and find a job. I had all these ideas about how I would be a normal designer and that I would make some sort of adventure out of that.

Before the storm [Hurricane Katrina], we had wanted to do design-build at the school, but we were just trying to figure out how that could work and if we as a group of grad students could be part of getting that off the ground. I had never really built anything. I thought it was cool what they were doing at [Auburn University's] Rural Studio. And then when the storm hit it was suddenly this moment of "Oh, maybe going to Europe and trying to find a job on the down-low is not what I want to be doing. Maybe I could be contributing, in some small way, to the recovery of the city and this place. I should instead stay put and be a useful piece of this recovery process."

That is what motivated me early on to stay in town and be part of the Urban Build program launch. From there, that transitioned into a steady job with City Center as it was coming into its own as well. Everything kind of pieced itself together out of a desire to stay in town and be part of the recovery post-storm.

Through that, I worked on the projects, did some volunteering, and learned from Byron [Mouton, program director of Tulane's Urban Build studio], Sam [Richards, Urban Build construction codirector], and other people about how buildings are built—how there are twenty different ways to build something we just happen to be doing in this one particular way. Being exposed to all that, I think, has helped shape what I'm doing right now.

I think especially with the work of the City Center, a little bit in practice as well, we see ourselves not so much as designers of buildings, but more as creative problem-solvers and collaborators. We call ourselves scrappy problem solvers not because we use duct tape to fix things but because we as designers bring a certain skill set and expertise and also an ability to convene people around a common problem to think of and enact solutions. With our community partners at City Center, we sit down and talk before the project kicks off about what the desired outcome is and what success would mean for that project. Sometimes a building is not success; success is an advocacy campaign or a mobile food truck or an education effort for the community so that they can combat a giant developer in a way that is informed and intelligent and doesn't sound like upset NIMBY neighbors. Success is different for each project, but we can be creative problem solvers that bring solutions to the table that would not come about otherwise.

(*continued*)

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Carraher: Absolutely. You're pretty involved in the national discussion regarding public interest design. Can you talk a little bit about how this affects your work?

Welty: I do design-build, but I also do public interest design and I teach design at a school of architecture—it's all intertwined. It's hard to clearly talk about what's what and what each is; in my mind, it's one big ball of yarn. To me, what public interest design is trying to do is find ways to make architects and architecture more relevant to society in general. It's about finding ways that we can be useful not only to the folks that can afford designers but to everyone, and trying to be clever and find ways to invite those voices into the conversation and see projects in a way that's not just for commercial good but also for the general public good. You'll ask ten different people and get ten different definitions of what public interest design is. I think it's still trying to figure itself out. To me, it's about expanding architecture to be more relevant to more people.

Carraher: Through design-build projects and experiences like students have in your class and through City Center, I'm sure that they become advocates and leaders for that conversation going forward into their professional careers.

Welty: Yeah. We're also making our community partners advocates for design and design classes because they often times don't know what architects do, but after they go through the process of building a bookstore, or a pavilion, they do. We're proving our value in a real "on-the-ground" sort of way. Granted, we're doing small-scale projects, nothing giant and monumental, but it's consequential in that it makes a difference in the lives of the people we are interacting with. It's not wide, but it's deep. We're both making students aware but also making the public we're working with aware of what's possible and what architects are capable of.

Carraher: With your experience in education and practice, you see collaboration from different sides. Every team seems to have its own dynamic. Are there any best practices to setting up a project in order to support collaboration?

Welty: When I'm leading a studio, the most important thing within the first week is to establish a culture that both respects each person's creativity, but also lets the students know that they have to give room for people to talk because you get some personalities that fill up the space and others that are a little more hesitant. If you create a studio atmosphere, it's just understood that everyone has a chance to speak and share their ideas. Also, when there are critiques made, they are never about the person, they are about the idea. Setting that up from an early stage is the best way to get productive work happening in terms of collaborative design, as is setting up that kind of safe zone and respecting each other.

The other key thing that happens the first week or two is making sure that the students recognize our community partner is just not our client, but they are also an expert in their own right. You never set up a situation where we as experts are benevolently providing services to our partner; we always frame it as a discussion among equals. If anything, the partner is more of an expert than we are, especially since the students are still learning. We need to make sure the students are hearing the community partners and responding appropriately. That's some stage-setting that happens early on. It's really important to making a project go well or not. It might seem like simple stuff, but it's really important to cover right off the bat.

Carraher: I think those are the type of things that seem simple, but if you don't invest the time in making sure that people are consciously doing them, it can be disastrous for the project.

Welty: Absolutely. We are doing a bookstore right now, one of a few African-American owned stores in the south that acts as a community space and conversation space around topics of the African Diaspora and modern African American life. It's just an interior renovation, but before we jump into designing we asked the partner organization to help us find a couple of readings that help explain their work as part of a larger picture. We're not just thinking about how many books we need to hold and display, but we're thinking about framing around larger issues like access to information, creating a space for conversation, and diversity representation for kids and young adults—it's understanding more deeply what the big picture is before we jump into the details and get absorbed.

To me, the successful practices out there do a lot of that, too. They never just design a house, they think about the house in terms of how it fits into a larger context. It's never just about the relationship of one bedroom to another, it's about what the materials or massing strategy or spatial relationships mean to the streetscape, the city, the environmental implications—all those scalability issues.

Carraher: Does that become a touchstone that you can go back to if the students get a little myopic?

Welty: Absolutely. Right now, at this moment in time that's the big question for Sue (Mobley) and I—she's our Communications Lead at City Center. We had on our tentative schedule this week to circle back to those bigger picture discussions. But right now, we're in the middle of trying to demo and get some work done. We just had a conversation yesterday—we don't want to lose that discussion of bigger ideas, but we also have to get this thing built. It takes consciously carving out time for that conversation to happen. It's hard, but you gotta make time for it.

Carraher: Is it the same process when you are working on a design concept together as a group for a project? Is it important to make sure there is a clear sense of what the group is trying to do before you dive in to demo?

Welty: Yes and no. We have to have a larger vision and idea so that as the details get worked out, they are always referencing that bigger idea. Having said that, we have fourteen weeks from the start of the conversation to delivering a final project. Conceptually, yes. But in reality, it's always a little more frantic than I would like it to be.

They're students and they've never built anything, but they desperately want to do something with their energy and talents. Motivation doesn't seem to be an issue because they are all genuinely excited and just want to do something and get something built and do well by the community partner, but the most problematic studios are when we have a few hardheads that have design ideas and don't want to budge on them. They treat it like a competition—they want their idea to win. Even if the partner organization and the whole team in general are leaning toward a different direction, they still will try to jam in their ideas or Frankenstein their ideas in. That's when it gets problematic and I have to pull people off to the side and say, "This is not about you and your ego. Think about what you're doing and what's right for this project and this partner."

Carraher: Though I'm getting a little better at it, I struggled early on in teaching to find the right way to give a student a critique on how they communicate or what their body language conveys. It felt uncomfortable because it wasn't an "architecture skill" so I wasn't sure it was appropriate to address, though obviously I know how important it is now. How do you have that conversation when it's not about their design skill but how they're interacting with other people?

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Welty: Probably my fault as a teacher is that I'm a little too casual, I'm almost their buddy. When someone is acting like a real jerk I have to pull them aside and say, "This is not helpful for getting this project done; it's the opposite of helpful. I need you to find ways to still plug in and use your skills, but not in the way you're doing it right now."

Sometimes people are as they are and we have to find workarounds, but other times having that conversation to keep them in check is useful because, like most people when you point something out, they can be self-reflective about it and understand that they're not a helpful part of the equation.

It's awkward. I hate those conversations. I'm horrible at them.

It's back to the whole concept of tackling the idea, not the person. Sometimes if somebody is really adamant about this idea they've got, it's about pulling them to the side and outlining the reasons this idea is problematic: Number one, it's not functional. Number two, It's not responsive to our partner's needs. Sometimes people are more responsive to you picking an idea than they are to feedback like saying, "Hey, you need to stop acting like an ass."

Carraher: Do you find that sort of egotistical behavior fades? In most studios, students are still taught as individuals. Do you find this makes your work harder when you begin working with the students as a team?

Welty: I really do believe that with the way the profession works these days, you have to be able to collaborate or else you're going to be miserable or fired pretty quickly.

I think it's important for students to get exposed to this early on, and it happens with our design-build studios. It's in this fun way where we get to build something. That's not what practice is like in general, but creating that crucible where you have to figure it out as a team is really useful in general. Setting the stage, letting folks know what they're in for in future design careers whether they're going to be working in film or architecture or whatever—it's important to let them know they are going to be collaborating in practice and problem solving and communicating constantly.

The other piece is understanding how collaboration works, not just within the design team, but with the client or community partner that you're working with. When I think about collaboration, it goes two ways: one is the internal design team collaboration and the other is making sure that the end users are part of the process of design so that the project itself is more successful both in terms of its day-to-day function, but also the public's investment in it and their willingness to maintain it, keep it going, and make it part of their life.

Carraher: Would you say that collaboration generally adds value to the design process by bringing more voices? Are those voices usually good, or is there a point at which too much collaboration gets in the way of productivity?

Welty: Collaboration definitely always gets in the way of productivity in the sense that it's just a little less efficient, but I think in the end, the outcome is most always better. There's a perception in the profession that collaboration or allowing in community voices somehow waters down the design outcome. We've been trying to prove that is not the case. You can still have design excellence in a collaborative process, it's just a little bit harder needle to thread and it requires good designers to make both of those things happen concurrently.

Carraher: Do you consider yourself a leader? Do you feel that there are certain qualities that define someone as a leader regardless of their job title?

Welty: Titles always weird me out. I don't think of myself as a leader. Certainly as someone who is in charge of a design-build studio or who's helping managing a project, I think that there are behaviors that you can model or things that you

can do that pave the way for a better process. I guess in that way that's leadership.

I think there's something, too, to controlling what you can control and leaving room for spontaneity. Design-build projects are not like some rigid recipe. It's more like a "go with it" kind of thing. There are definitely some projects there that are more successful group collaborations than others. And it's hard to pin down what part of that equation makes a project successful. There are so many dynamics at play. Part of it is just how cohesive a group is and how the members interact with each other. And some of it is setting the stage so that everyone understands how to respect each other and their ideas and give room for people to voice their ideas without taking over. So that's part of it, setting some ground rules early on. The other part is if you happen to have a magical set of people that are just going to make this happen, or it's going to be a fight the whole way. And some of it is just out of your control and you wrangle them as best as you can.

Carraher: The studios you teach are option studios. What do they see as the value of working on a design-build project and learning to be a more collaborative designer?

Welty: For our students, the design-build studio is not required, which adds a different dynamic to the group when everyone wants to be there and is enthusiastic about the task at hand. For many of the students, a built result they can put into a portfolio is a big motivator, and also that interactive bit with working with the community partner to come up with a design, that's something they haven't done in school. It's an eye-opening moment for them. They're taught in school to talk like an architect, but as soon as they have to present their idea to a community partner, they have to shift their language. They're not becoming salesmen, but they are calibrating their message to their audience in a way they haven't had to do before. That's always an eye-opening moment for them.

In terms of collaboration, they haven't to this point in their education worked on a truly collaborative project. What I tell them in the first two weeks of class is that this is how practice operates—you're very rarely, unless you're working for a small firm, the only one designing a project. You're often times designing with a group of people.

It's a struggle for some of them to work collaboratively. It depends on the group. My group this semester is well meshed, they're pretty tight in general because they have been together for almost four years now. But some groups are not nearly as cohesive. It's more of a struggle for them. They don't have that level of trust and understanding of each other, and know each other's strengths and weaknesses. Even when it gets rough, I just try to reiterate that they have to work through it because, if they can't work through it now, they will have some real issues down the line in practice.

Like right now, I just left the students onsite doing demo. They've got the scaffolding set up, and they're going to town. This project is a funny one. It is an interior renovation, and the space is a little over 2,000 square feet. That's a lot of cabinetry work for our fledgling makers to be making. When you've got fourteen people working on one project, there's always that moment of wanting to make sure everything is cohesive and feels like part of the same design. For now it's a little like steering a ship full of wily pirates. In the end it will be cohesive, but right now there's still a lot of wiggling and shifting and wrangling.

You know, there's this great quote Brian Bell remembers from Sam Mockbee. When asked about how the Rural Studio projects maintained such a high level of quality, he answered: "We beat the bushes until the good ideas emerge, and then we grab them." Some days it feels like there's lots of beating and waiting!

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 20

Leadership and Change

The design and construction industry, like all professional disciplines, is currently grappling with an increasingly global, digital, and market-driven world in which both the means and methods of practice are in flux. The types of leaders who will thrive in this new context are those who are able not only to problem-solve but also to challenge the very nature of the problem. "The new economies demand a deeper conception of talent and the organic nature of our lives demands it, too. What we become in the future is deeply influenced by our experiences here and now. Education is not a linear process of preparation for the future: it is about cultivating the talents and sensibilities through which we can live our best lives in the present and create the best futures for us all" (Robinson, 2011).

If today's more and more diverse workforce faces a future where the only certainty is change, if firms will be tasked with challenging existing models of practice to define new ways of critically addressing the complex issues of our time, if design professionals are motivated to work across disciplines and value the collective mind over the individual genius, then today's leaders need to develop ability in integrative, synthetic thinking, empathetic entrepreneurship, and deeply collaborative problem solving. Today's practitioners need to find problems interesting to be motivated to spend the time exploring them. They need to feel that the work they are doing—at however early a stage in their career—is relevant and of benefit to others.

The 2014 *AIA Foresight Report* outlines the forces shaping the future of practice:

> Even for an era marked by an accelerating pace of change, we seem to be approaching an hour of profound transformation in the design and construction industries.
>
> After six years of recession and tepid recovery, the economy at last seems poised for a significant rebound, with unemployment falling and stocks, construction activity, and demand all returning to precrisis levels. At the same time, long-developing trends such as urbanization, climate change, and income inequality are reaching a tipping point, and fostering a reawakening of—and renewed commitment to—fundamental values in our field. Those values are resiliency, sustainability, equity, and

> social conscience. New technologies, from 3D printing to mobile and cloud computing, are spurring innovation and transforming the way we work, create, and structure our firms. The needs of an increasingly diverse workforce are challenging traditional management and human resource models and bringing new voices to the table (AIA, 2014b: 2).

In a complex and uncertain context, organizations must be flexible, nimble, and adaptable in order to succeed. Practice in such an environment requires strategic leadership in order to align internal firm and team structures with external forces to result in well-designed, rewarding, and impactful projects and processes. Architects need to be both rooted in the present but also forward-thinking in order to not just respond to current conditions but also shape the future context in which they will operate. "The firm of the future is constantly evolving and will be one that is seen as innovative and visionary where that vision creates a competitive edge. The firm of the future will also leverage technology in creating and communicating design, and it will be truly committed to sustainability, which will become a mainstream requirement" (AIA, 2014b: 15).

Foundations of Innovation

The designer of the future will need to embrace new skills to address twenty-first-century issues. Translated processes like systems thinking and design thinking from fields ranging from industrial design to business to the social sciences will define new frameworks for practice. Design thinking is a human-centered approach to design that identifies opportunities for innovation based on the integration of human needs, technological feasibility, and business viability. The three primary stages of the process—inspiration, ideation, and implementation—overlap as part of a cyclical, iterative approach (Figure 20-1) (Brown, 2008). The

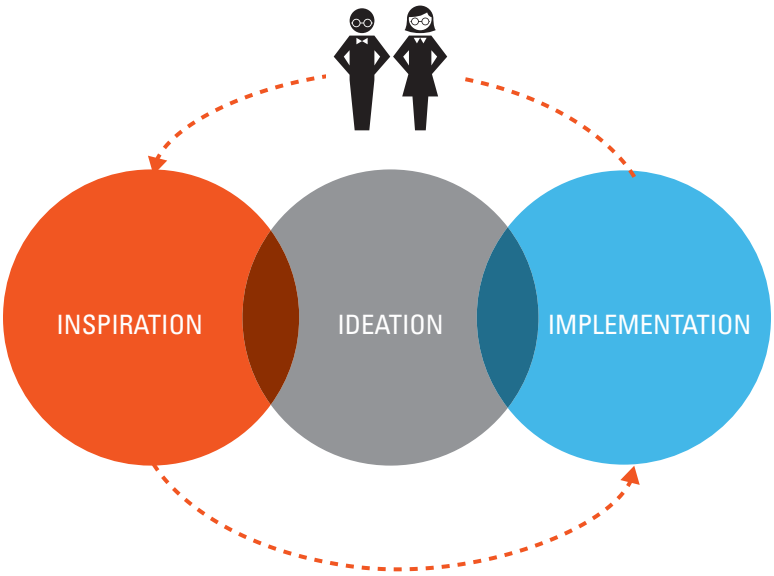

Figure 20-1 Design thinking process

process requires that designers have emotional intelligence; be able to incorporate a systems thinking approach; creatively imagine, iterate, and prototype; and evaluate and learn (AIA, 2014b).

The principles of design thinking have been further translated as possible tenants for the twenty-first-century designer:

- Contextual awareness: a state of constant curiosity that spurs innovative solutions and disrupts markets by researching underlying contextual forces that affect a problem.
- Creative craft: skill and tenacity to develop any idea through prototypes to prove concepts.
- Rapid iteration: faster feedback on multiple prototypes through the incorporation of digital manufacturing processes.
- Empathy: the ability to interpret social, cultural, racial, and behavioral factors other than one's own that affect end users.
- Entrepreneurial sustainability: understanding the relationship between the creative and business factors of a design to balance value, benefits, resources, and costs (AIA, 2014b).

Systems thinking examines the nature of cause and effect of systems on each other as well as how they contribute to an interconnected whole (Figure 20-2). "From a very early age, we are taught to break apart problems, to fragment the world. This apparently makes complex tasks and subjects more manageable, but we pay a hidden, enormous price. We can no longer see the consequences of our actions; we lose our intrinsic sense of connection to a larger whole… Thus, after a while we give up trying to see the whole altogether" (Senge, 2010).

Not only practitioners but also practices will become more adaptive learning organizations, the idealized version of an organization where work patterns, structures, and routines are open to continuous adaptation and improvement; where the culture fosters continuous learning; and where strategic decision making is informed by and responsive to relevant data analysis and feedback. Learning organizations are skilled at creating, acquiring, and transferring knowledge, and at modifying behavior to reflect new knowledge and insights (Lussier and Achua, 2013; Senge, 2010).

Characteristics of learning organizations include:

- Open, productive, and creativity-centered culture
- Flat, horizontal structure organized around workflows or processes rather than specializations
- Interdisciplinary teams working collaboratively
- Loose, flexible, and adaptive roles and structures that promote innovation and creativity
- Adaptive environments that encourage continuous improvement and development

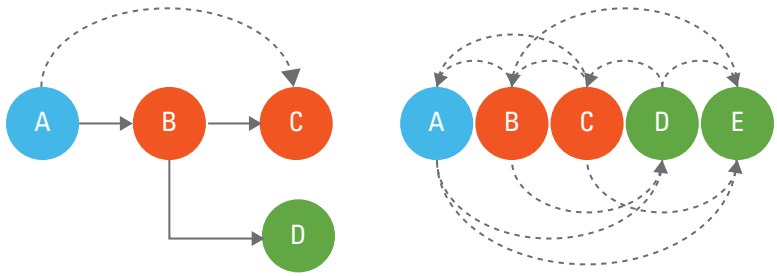

Figure 20-2 Systems thinking

- Strong interpersonal relationships and clear communication
- Belief that "failing" is a necessary part of risk-taking (Lussier and Achua, 2013)

Complex Environments

A complex environment is characterized by a change in task and relationship behavior that rapidly increases in complexity from linear and incremental to nonlinear and discontinuous. A complex environment is ambiguous, uncertain, and unpredictable. It constitutes a break from conventional practices and established models and requires the recognition and assimilation of new behaviors and response mechanisms.

Leaders are conditioned to believe that control (or at least the outward appearance of control) is the mark of competence. Complex environments don't work in traditional ways, however. Those who attempt to keep things under control in such a rapidly changing, discontinuous, nonlinear environment usually end up reorganizing at a lower level of functionality. Their logic is that controlling the situation is more important than responding to the unique nature of the problem. They convince themselves that the risk of being out of control is greater than the risk of embracing the full complexity of the issue. Hence, they do less, consolidate their resources into smaller more tightly controlled functions, and are generally unwilling to diverge from traditional best practices.

The dilemma is that the environment is truly changing at a rapid tempo. Regardless of a leader's level of competency or experience, they will not be able to control all things in a project. Being able to accept and engage with complex environments and reflect on experiences before moving on is a critical skill for contemporary leaders.

Strategic Leadership

Strategic leadership is a leader's ability to anticipate, envision, maintain flexibility, think strategically, and work with others to initiate changes that will create a viable future for an organization. Strategic planning and management are the collective practices used to align internal factors—vision, mission, goals, capabilities, strengths, and strategies—with external forces such as the economy, environment, technology, and society. Leaders are responsible for interpreting external conditions and adapting and evolving organizations in order to succeed when faced with significant change (Lussier and Achua, 2013).

A model for effective strategic leadership involves establishing a team or firm's goals and direction, building competencies that support this direction, identifying and removing obstacles that may impede forward development, fostering the development of team members, building and maintaining a collaborative culture, implementing the plan, measuring progress, and revising and adjusting the plan as needed (Goodstein, 2010).

The following capabilities of strategic leaders align with a framework that outlines the steps needed to achieve organizational goals and objectives (Figure 20-3):

- Anticipate the impact of external conditions on practice.
- Build and maintain competitive advantage by aligning firm strengths with appropriate markets.
- Plan, implement, and evaluate strategies and results systematically.
- Assemble highly effective, efficient, and motivated teams.
- Foster, develop, and mentor talented team members and leaders.

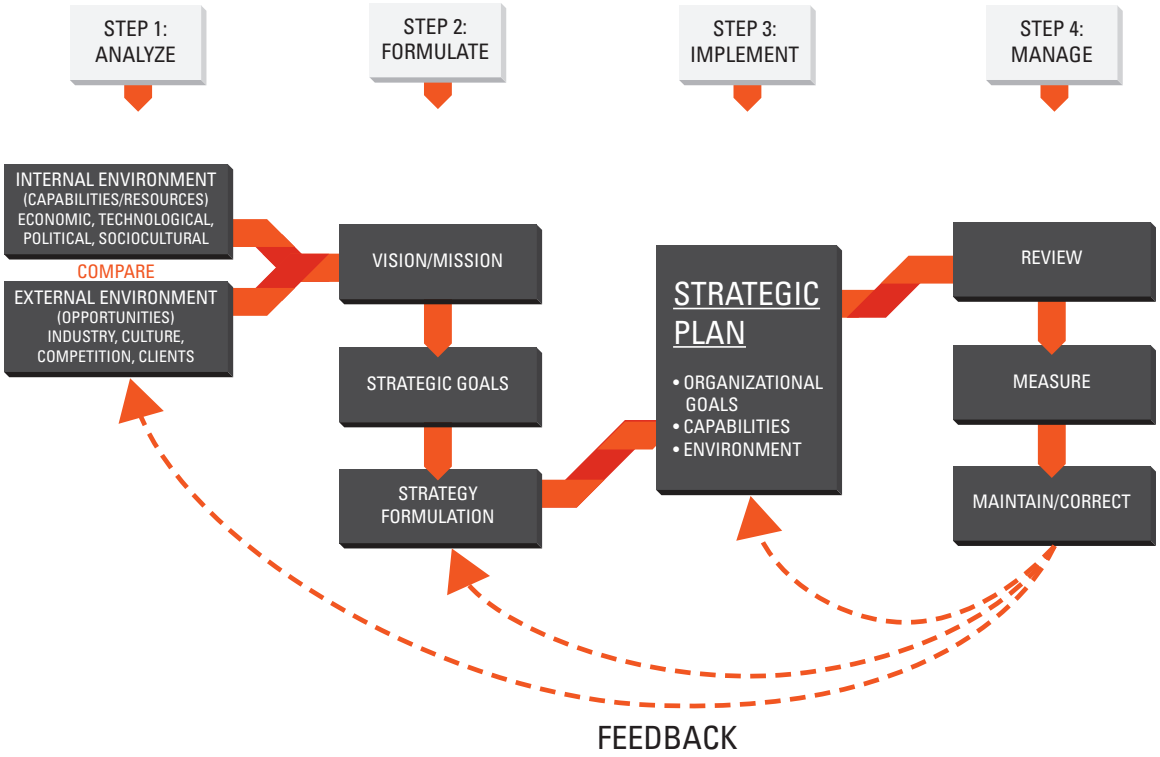

Figure 20-3 Strategic management framework *Adapted from Lussier and Achua (2013)*

- Set appropriate goals and priorities.
- Communicate clearly and effectively (Lussier and Achua, 2013).

Within the framework, there are four steps that define strategic management: analyzing the environment (internal and external), strategy implementation, strategy evaluation, and maintenance. Once the environmental forces are determined, leaders formulate strategies beginning with the development of mission and vision statements. Tools such as a SWOT analysis can be used to identify the strengths, weaknesses, opportunities, and threats of a firm or team's internal capabilities and limitations as measured against external forces and challenges (Figure 20-4) (Lussier and Achua, 2013).

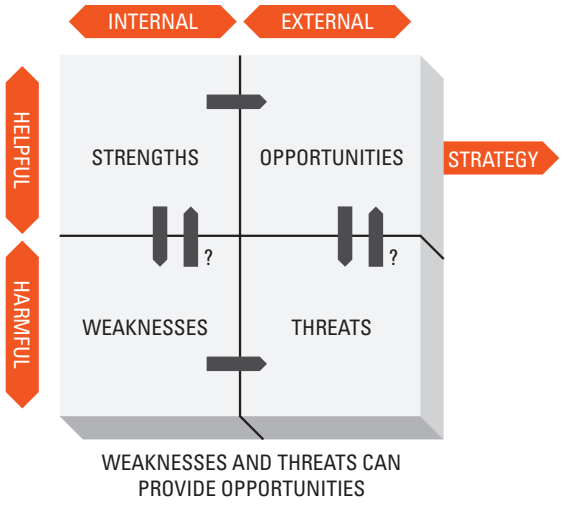

Figure 20-4 SWOT analysis matrix

Change Management

Strategic leaders approach change management through a process of influencing others in order to achieve organizational objectives. Leading the process of change can result in renewed energy and innovation; not doing so can lead to failure and irrelevance. Change is not easy—whether incremental or transformational, it requires an alteration in human behavior to do things differently. "In today's turbulent environment, where change is a fact of life, organizations must constantly cope with unfamiliar events or situations in order to survive and stay competitive. Implementing change in an environment characterized by increased complexities and uncertainties makes it much more difficult and challenging" (Lussier and Achua, 2013).

Change is disruptive; however, it is essential for growth and sustainability. Disruptive innovation describes a process by which a new product, process, or technology eventually displaces the established one (Figure 20-5). Online video streaming services versus retail video store chains, cellular phones versus landlines, and BIM versus CAD are examples of disruptive technologies that quickly captured significant market share or made previously established models effectively obsolete (Christensen, 2016).

Leaders should be conscious of or establish mechanisms to ensure that they do not fall into routine actions or accept the status quo in order to constantly seek greater efficiency where possible. Additionally, they should endeavor to minimize the cultural resistance to change through effective communication before, during, and after change takes place; provide adequate resources and training to support team members in the new context; and adjust existing process, policies, and structures as needed (Lussier and Achua, 2013).

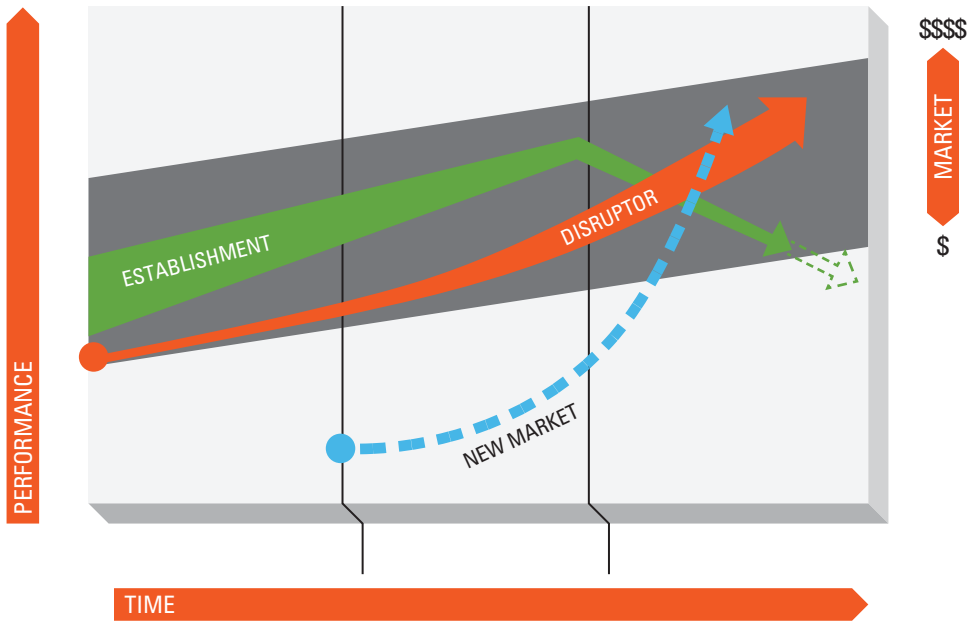

Figure 20-5 Disruptive innovation

Social Leadership

Stewardship and Resilience

"Resource scarcity and climate change will require that we create buildings and environments that are resilient and minimize impact on the planet's natural resources" (AIA, 2014b). Resilience is the capacity to adapt to change or disturbance while maintaining or effectively rebuilding vitality (Abendroth and Bell, 2016). There are several systems that have been enacted over the past decades, such as LEED, Cradle-to-Cradle, Living Building Challenge, and Passive Haus, that represent an industry-wide move to more sustainable and affordable building practices.

Sustainable design seeks to reduce negative impacts on the environment and the health and comfort of building occupants, thereby improving building performance. The basic objectives of sustainability are to reduce consumption of nonrenewable resources, minimize waste, and create healthy, productive environments.

Sustainable design principles include the ability to:

- Optimize site potential.
- Minimize nonrenewable energy consumption.
- Use environmentally preferable products.
- Protect and conserve water.
- Enhance indoor environmental quality.
- Optimize operational and maintenance practices (US GSA, 2015).

Utilizing a sustainable design philosophy encourages decisions at each phase of the process that will reduce negative impacts on the environment and the health of the occupants, without compromising the bottom line. It is an integrated, holistic approach that encourages compromise and tradeoffs. Such an integrated approach positively impacts all phases of a building's life cycle, including design, construction, operation, and decommissioning (US GSA, 2015).

Beyond the achievement of a rating, contemporary sustainable practice is tasked with stewardship of the environment. "We define environmental stewardship as the responsibility for environmental quality shared by all those whose actions affect the environment. This sense of responsibility is a value that can be reflected through the choices of individuals, companies, communities, and government organizations, and shaped by unique environmental, social, and economic interests" (Johnson, 2005).

Agency

Existence is spatial, and space is historical. It must be understood as such. This insight invites us to situate human agency as well as the agency of things, ideas, time, and technology within the discussion of contemporary practices. Can designers, by recognizing the power of spatializing action and examining the agency of space in stimulating and debilitating that action, achieve the goals of not only reproducing society as it is but also proposing an alternative future? "Architecture is always between ideology and utopia. Today we are faced with a renewed question of criticality, because architecture is in a real need to redefine its political agency and to reposition itself… I think that what we're looking for is a new ideology, a new standard regime or belief about architectures' agency in the world at large" (Lash et al., 2009). The same can be asked of all disciplines that shape the built environment.

Contemporary discourse on architecture's agency is influenced by the Marxist legacy and often carries an implication of affecting change against societal structures (Lash et al., 2009). Work of those like Diébédo Francis Kéré, Design Corps,

and the Rural Studio focus on improving the social condition of underrepresented populations through design's agency. All types of architectural agency are not the same: digital processes open up an additional avenue for advancing the design professions' impact technically, politically, and socially by embracing the influence of design to affect and be affected by the activities that occur within the spaces it creates.

However, advancement happens through disruption. In the critique of normative structures of practice, the alternative modes of operating propose new paradigms. "Traditional architectural practice may be associated with predetermined action, or of anticipating the world dogmatically, through its habit of playing out established themes. Against this emerges a critical practice or rather to use the accepted word—'praxis'—which starts with an open-ended evaluation of the particular external conditions, out of which action arises with no predetermined outcome but with the intention to be transformative" (Awan et al., 2011). By questioning architecture's agency, the public can be engaged in ways that broaden the discussion of how the built environment can benefit society.

Public Interest Design

"In every corner of the world there are orphans of war, victims of colonization, and refuges of social, economic, and environmental crises that need places to live and work." Public interest design (PID) engages people and communities in a democratic decision-making process as an integral part of the design of buildings, environments, products, and systems. "Public interest designers advocate for an issue-based approach to problem solving and in doing so are able to confront and resolve more than a single design problem during any given project. Connecting design problems to human issues (social, economic, and environmental) helps establish the value of design to a broader audience and provides designers with a much-needed platform for affirming the value of this work" (Abendroth and Bell, 2016).

A key tenant of PID is addressing the needs of all populations, particularly underserved communities. This value is central to PID's mission statement: "Every person should be able to live in a socially, economically, and environmentally healthy community."

Designers engage communities in a reciprocal relationship rather than imposing their design will in order to uncover the deep connection to place, creativity brought about by limited resources, and history of culture, art, and tradition exemplified by indigenous populations. These resources serve as a foundation for the creation of a mutually beneficial exchange "based on the idea that the most effective way of creating adaptable, innovative, healthy, strong, resilient, and hopeful places to live, play, pray, and work is by taking simple action" (Abendroth and Bell, 2016).

Thought Leadership

Thought leaders are people who are competent, curious, and insightful about a particular subject and have the influence to enact change on an existing system. They see possibilities and make associations that others do not. They are "change agents," pushing their firms and the profession to improve, innovate, explore, and differentiate (Walter, 2013b). "The shifting tides of the economy as well as the competitive pressures among professional fields have led many firms to reshape the contours of their practices. Many have incorporated or expanded new realms of services (from distinct specialty niches to expansion into design/build) or sought to enhance collaborative relations with other professional specialists" (Groat and Wang, 2013).

The result of this shift in the culture of practice is a departure from the type of project-based exploration that has been conducted throughout architectural history (Groat and Wang, 2013). Though all design is to a certain extent the creation of new knowledge, firm-wide investment in formal research outside of specific projects has been less common until recently. "In the last decade, we have seen an increase in practices that are integrating research into their design processes and services. The current technological innovation and complexity of design processes are requiring more research and integration between specialists" (Davis, 2015).

In architectural practice, thought leadership includes research, testing, and knowledge sharing, specifically that which is independent from any one client or project for the purposes of enhancing the firm's offerings or its reputation. Approximately 55 percent of firms surveyed in a 2013 report had some form of thought leadership, research, or innovation component as a discrete part of their practice. Many of these in-house think tanks were started during or soon after the 2008 recession (Walter, 2013b). In the latter half of the twentieth century, firms incorporating architectural research largely conducted studies on occupant comfort and environmental parameters. Those in the early part of the twenty-first century explored formal, technological, and material advances that impacted building systems and forms. Additionally, specializations such as health care, advanced structures, prefabrication, and resilience have led to work in modeling, prototyping, and monitoring (Pati, 2011).

Sustainability is one of the largest subject areas being explored in firms' research and one in which results are shared most readily with the industry. "This is driven by an interest in making real improvements to the built environment's contribution to climate change by the industry as a whole" (Walter, 2013b). Technological research is the second most common topic, with business practices, design process, project delivery, market sectors, and project types rounding out the list of top considerations (Walter, 2013b).

Thought leadership has quantitative and qualitative benefits to firms. More than 65 percent of firms with dedicated in-house research group can make a correlation between the program and new work. The impetus for starting such a program varies from firm to firm, but the one common denominator among all research groups is the need for leadership support. Passionate advocates for exploring ideas who have the authority to authorize the investment in resources to do so are critical to a firm that aspires to the rank of thought leader in practice (Walter, 2013b).

CASE STUDY EXCERPT: GIRL SCOUTS OF UTAH SUMMER CABINS

The Public Interest Design (PID) process involves stakeholders and communities as integral partners in a reciprocal design process to address social, economic, and environmental issues. A key tenant of PID is addressing the needs of all populations, particularly underserved communities and traditionally underrepresented social groups through simple, honest buildings.

Project Details

Architects: Jörg Rügemer and Erin Carraher, Integrated Technology in Architecture Center (ITAC), University of Utah

(*continued*)

(*continued*)

ICLT fabricator/contractor: Euclid Timber Frames P.C.

Key stakeholders:

ICLT research: ITAC—Ryan E. Smith

Steel fabrication: Wasatch Steel, Kingdon Sheet Metal

Location: Provo Canyon, UT

Project type: Residential—Public interest design

Project duration: 2012–2014

Size: 600 SF, 3 cabins

Budget: $274,000

Project delivery: Integrated Design Process

Introduction

Project: ARCHITECTURE is a partnership between the Girl Scouts of Utah (GSU) and the University of Utah (UofU) intended to raise awareness of careers in the built environment for women through hands-on education and outreach activities, engagement in discussion regarding social and environmental issues, and the creation of opportunities for architecture students to meaningfully participate in community engagement and mentoring activities.

In 2014, construction on the inaugural built project resulting from this mutually beneficial partnership—three cabins for the GSU's Trefoil Ranch Camp in Provo, Utah—was completed (Figure 20-6). The project demonstrated how outreach activities, university-industry partnerships, and public interest design can be utilized to leverage academic resources for the broader good.

"The project was a win-win situation for all involved," said Marin Smith, an architecture student who was integral throughout the multiyear outreach process. "Professionals taught and mentored architecture students and Scouts. Architecture students were exposed to real world projects and the applications of technology in addition to mentoring and teaching Scouts about architecture. The Girl Scouts were excited to learn about architecture and were able to see the direct results of the design built at their camp" (Figure 20-7).

Figure 20-6 Completed cabin exterior *© ITAC, 2014 | Photo Credit: Nicholas Steffens*

Figure 20-7 Site visit and fabrication shop tour *© ITAC, 2014*

Outreach And Engagement

The need for engagement with young women is critical to building the pipeline of future practitioners in design and construction fields. Research suggests active recruiting and mentoring may be required to raise awareness and support the development of women practitioners.

Women in the workforce in Utah are more likely to work in service-related fields, be unemployed, and work fewer hours than their male counterparts. They marry younger and have more children than the national average and have the fourth highest wage gap of any state at 70¢ on the dollar. The representation of women architects in Utah is equally well below the national average—14 percent compared with 28 percent nationally (AIA, 2014a).

Carraher and Rügemer, as ITAC project directors, integrated opportunities for Scouts to engage with college students, faculty, and practitioners throughout the participatory design process. Girl Scout programming reaches 8,000 girls in Utah, making this organization a uniquely well-suited partner to address gender equity in education and career exploration.

Demonstration and Innovation

The focus of the Integrated Technology in Architecture Center (ITAC) is to develop and disseminate new knowledge regarding building technology in ways that serve architecture students, faculty research, and community groups. Leveraging the collective resources of the university, the project team was able to integrate aspects of all of the above-mentioned activities in the project.

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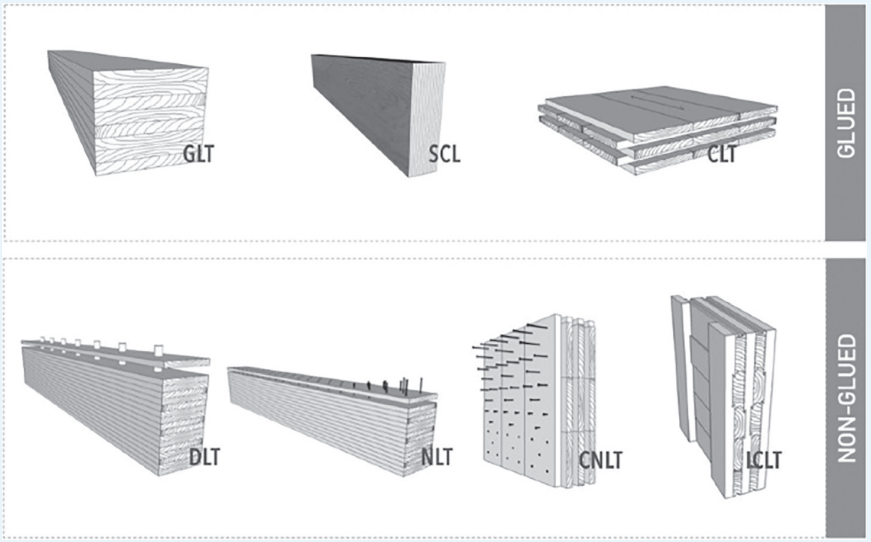

Figure 20-8 Solid-wood assembly techniques *ENU, COCIS; © ITAC, 2015*

The cabin site is located on a wooded site at the upper end of Provo Canyon (elevation 6,040') in Utah's Cold Climate Zone. Due to the warm, dry summers and cold winters with a heavy annual snow load, the camp's use is restricted to the summer months only when it offers diverse activities during daily, weekend, or weekly camps to the GSU population. A significant environmental issue affecting the region is the recent outbreak of the mountain beetle. This invasive insect has killed over 46 million acres of forest in the mountain west, leaving standing dead trees that significantly increase the risk of forest fire.

The cabin project served as a demonstration opportunity for a building system in development by one of ITAC's industry partners, Euclid Timber Frame PC. Interlocking cross-laminated timber (ICLT) is a prefabricated cross-laminated solid softwood wall, floor, or roof panel system that is fabricated from two to seven layers of alternating direction pine stock milled from waste or beetle-killed pine wood using a robust, CNC-controlled process. Originally developed in Europe, cross-laminated timber (CLT) uses adhesives or mechanical fasteners to assemble solid softwood timber stock into structurally sound, cross-laminated building components and panels (Figure 20-8).

The cabins were designed and built in close collaboration with Euclid Timber, who, in addition to developing the ICLT system, is also a general contractor focusing primarily on timber construction using natural building methods. The assembly method of choice for certain components was adjusted during the design process and through collaboration with the structural engineers, as the designs were part of a prototyping process for this new system.

Outreach and Engagement

Faculty project managers hosted a year-long series of outreach events to expose Girl Scouts directly to women practitioners, provide female student mentors in design-related programs,

offer opportunities to visit architecture firms and construction sites, and repeatedly invite girls to events on the university campus.

The GSU involvement in the project was twofold: there was a leadership group of middle- and high-school-age Scouts who followed the project through all stages by participating in workshops, site visits, design charrettes, and firm tours, and a broader audience of Scouts aged five through eighteen who participated in a day-long event that used hands-on activities specific to the cabin design to demonstrate general principles about architecture, urban planning, and landscape architecture (Figure 20-9).

Figure 20-9 Engagement and education programming *© ITAC, 2014 | Photo Credit: Nicholas Steffens*

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Participatory Design Process

The collective, integrated design and construction process applied by the team consistently involved all stakeholders—building authorities, students, Scouts, contractors, and trades. "Designing and realizing the three prototypical cabins as part of the larger Project:ARCHITECTURE for the Girl Scouts of Utah was an incredible and challenging experience in a very positive way," said ITAC project codirector Jörg Rügemer. "The project was conducted in a highly interdisciplinary effort, in which we incorporated Girl Scouts of all ages and predominantly female students within the School of Architecture. Through charrettes, workshops and seminars, those had a direct influence on the building's functional layout and design, making the cabins better fit for their specific purposes and more economically viable. On the project development side, we worked in very close collaboration with the client, the jurisdiction and planning department, the engineers and contractor, to ensure this explorative project became a success."

Groups of SoA students and Girl Scouts were involved throughout the design decision-making process to ensure a functional architecture that would become the most useful solution for its occupants (Figure 20-10). During design meetings, the number and shape of the beds were discussed and reconsidered, shifting from the default of space-consuming single beds to more efficient bunk-beds oriented parallel to the walls through the Scouts' suggestions, which also allowed the team to stay within the given construction budget by reducing the overall cabin size by approximately 25 percent from initial schemes (Figure 20-11).

The regionally rooted typology adopted for the cabins is simple, clearly defining the project as sustainable from a design as well as a material standpoint. It echoes the regional, functional design of vernacular farm buildings in the canyon as well as the typology of the camp's old wooden tent platforms, which were originally erected on simple CMU piers (Figure 20-12). Said Rügemer, "Using ICLT as a very-low environmental impact, partly prefabricated material on a difficult-to-access location, allowed us to have a minimal impact onto the site, and to work around the harsh winter conditions. Through their simple architectural configuration, the cabins have already had a considerable,

Figure 20-10 Design charrette *© ITAC, 2014*

Figure 20-11 Completed cabin interior *© ITAC, 2014*

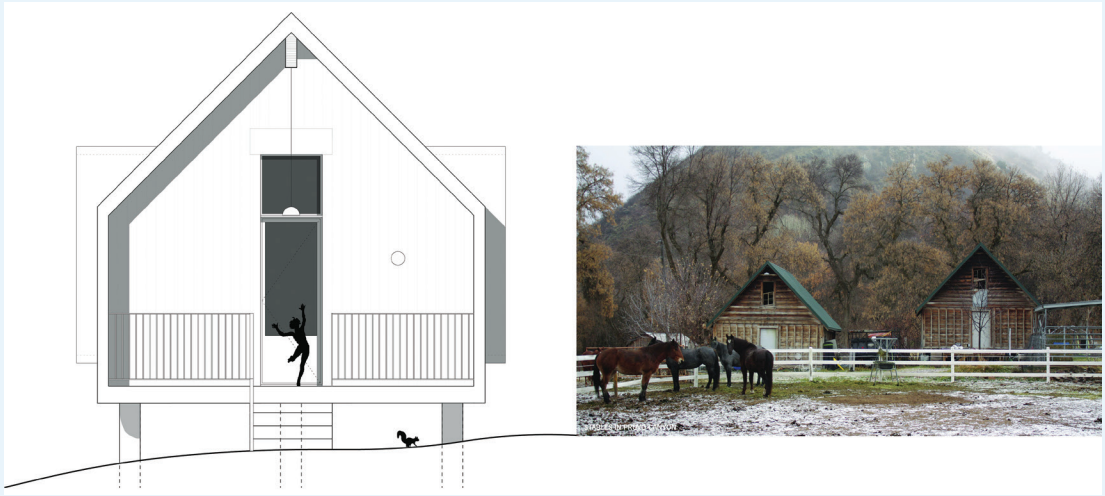

Figure 20-12 Vernacular typology *© ITAC, 2014*

long-term impact on the Scouts' understanding of what minimal and highly sustainable architecture and space can contribute toward a better-built environment."

Measurable Impact

Student engagement is critical in creating rich collaborative partnerships such as Project: ARCHITECTURE. Not only do the students gain

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valuable experience in design and construction projects but they also get the opportunity to serve as teachers and mentors to younger children, reinforcing the value their education and experience can bring even at an early stage in their development. According to graduate architecture student Sarah Winkler, "Designing and fabricating a table for the new Girl Scouts' cabin and working with a real client was an empowering experience for us as graduate architecture students." Trusted with responsibility, students take ownership over the process and are advocates and assistants in realizing the best possible end result.

Through anecdotal accounts and more formal metrics, the project has been incredibly successful at achieving the immediate goals of elevating the dialogue about good design in the broader community, developing relationships with potential applicants, and creating more meaningful connections with the practicing community. Time will tell if engaging with these middle- and high-school students will lead to an increase in university admissions applications from the Scouts who self-identified as being interested in a career in architecture.

The project demonstrated the architectural, social, and publicity benefits of collaborative projects through engagement with forward-thinking clients and built the case for future partnerships with other collaborators. By focusing this project on outreach and education to women (though not excluding men), the project had the additional advantage of serving an underrepresented population of current and future architecture students.

"What a wonderful opportunity for these girls. It was so fun to hear conversations from some of our older girls saying they didn't even know this was a possibility, but they were for sure going to be architects now!" said Carly Ann Cahoon, GSU Outdoor Program Specialist and Project:ARCHITECTURE Liaison. "I also heard so many positive praises coming from our parents. I saw one girl in particular, who has been so quiet through this Leadership Group process, come alive when she realized she could utilize her passion for art with a profession in architecture!"

Parts of this text were originally published in "Project: ARCHITECTURE," by J. Rügemer and E. Carraher, The International Journal of Sustainability Education *12(1), and "The Girl Scouts of Utah Interlocking Cross-Laminated Timber Summer Cabins," J. Rügemer, and E. Carraher,* Proceedings of the 31st International PLEA Conference, *Bologna, Italy 2015.*

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

CHAPTER 21

Practice Leadership

Architects are trained to think differently than most other professionals; they engage in "reflective practice," an iterative, probing exploration of a complex project. As the architect works through design iterations, the project "talks back." This process takes on a reflective conversation between the architect and the situation by reframing the problem to address local and global issues and factors. The designer uses tools unique to his or her profession during this process, a metalanguage that combines drawing and talking, an examination of the impact of choices on an interconnected system of variables, and a shifting stance toward the design that allows unbiased examination of various alternatives. This process is unique in its ability to question "the problem of the problem" through an "inquiry in action" approach. Though architects are intuitively reflective in their process, they are not reflective about their reflectiveness, making it very easy to miss underlying patterns and trends (Schön, 1983).

The reflective nature of the design process needs to become a conscious and active part of practice in order to address the changing nature of the professional context. In response to the drivers of change discussed in the previous chapters, exploration of new models of business practice that support more responsive forms of project delivery has begun. "We need new business models that address optimum ways to deliver building projects in a digitally enabled, integrated way. This includes models that will accommodate a new set of relationships between the stakeholders in a project. These new relationships will affect roles, timing, risk, and reward, realigning the industry in a very significant way" (Jonassen, 2006).

Culture and Organization

Culture and organization are two separate concepts in business. Culture is something that may be hard to define; it is amorphous and affected by countless factors. Nevertheless, some researchers believe that culture is a more important driver of results than strategy or organization (McGinn, 2014). Because it is somewhat nebulous, culture is often overlooked in favor of more immediate and quantifiable strategies. Factors that prevent firms from effectively building

culture are silos, lack of clarity from leaders about overall goals, insufficient fact-to-face communication, and avoidance of conflict (McGinn, 2014).

Organizational structures also have an impact on productivity and must be aligned with the firm's business model. "Successful business models reflect the culture of the organizations that employ them. To develop a model without understanding the culture essential to make that model work is counterproductive, so discussion of the business models and the culture essential to their success go hand in hand" (Jonassen, 2006).

Changes in practice bring about industry-wide shifts in culture. The rapid rise of BIM and integrated project delivery were the technological and cultural models needed to bring about such a change. Change typically impacts the near-term business model first with temporary or place holding adjustments—the charge of BIM models as an additional service (and thus additional fee) that architects could offer their clients, for example—and affect the long-term business model with regard to broader issues such as intellectual property, evolving contract structures, and the changing dynamic of staffing (Jonassen, 2006).

A responsive and collaborative cultural model that supports the technical and practical structures is needed. Beyond merely "working together," collaboration as examined in this book refers to a much deeper commitment to a respectful, co-creative process that includes a multiplicity of people, processes, and tools and allows each project team to effectively, efficiently, and elegantly respond to and project beyond contemporary contexts. In such an environment, all team members' opinions are valued and engaged as early as possible in the development process. "The business model for this will likely be plural, but it is the ideal opportunity to align risk/reward with performance value delivered…based absolutely on value delivered over time…The basis for this pricing can be directly tied to agreed-upon metrics… The cultural model is highly collaborative, widely inclusive, and very entrepreneurial" (Jonassen, 2006).

Practice Management Components

Leaders are responsible for adapting to business and management influences in order to achieve success in contemporary practice by being openly and passionately invested in the firm and authentically supporting its mission and vision. Though they may not have formal training in business practices, leaders must be engaged in the business practices of their firm and, ideally, in the business practices of their clients.

Marketing and networking skills are critical in today's society. Firm leaders and aspiring leaders should all strive to consistently and intentionally serve as a champion of the firm's work. "People, especially clients, form opinions about a firm's culture and business practices based on the behaviors and personal presentation of the people who work there. What you say or do, even off-the-cuff, in-house in front of employees, or out in the world, can shift others' perceptions of the firm" (Sprankle, 2014).

Personal investment in the firm, the development of emotional intelligence skills, and a sincere interest in team members are key to an employee's advancement, as is a continued commitment to development and engagement in the firm and in the professional community. Those wanting to remain relevant and valued in times of economic downturn or in the face of industry competition should look for opportunities to develop an improved approach to an existing process or create innovative ways of expanding existing services (Sprankle, 2014).

In entrepreneurial architectural practice, success is the result of the right clients, right talent, and right set of skills that allow a firm to make the best choices in the areas of accepting work and hiring talent.

Clients—The "right" clients share values with the firm; are collaborative, compensate the firm fairly for the value delivered; and challenge and encourage the firm to achieve excellence. Some say that "Having the right client is more important than having the right project."

Staff—Staff are those who are hired for reasons that best serve the firm, not for availability, friendship, cost, convenience, or superficial diversity.

Leadership—An entrepreneurial leader aligns talent, defines standards, sets the tone, attracts clients, and inspires performance.

Culture—As discussed above, culture is critical to fostering a nurturing environment and includes the attitude, values, collegiality, communications, and accountability commonly expected from all the members of a firm.

Process—The commonly understood methods that a firm uses in daily practice.

Management—The way a firm deals with administrative tasks, including operations, finance, and IT.

Resources—The allocation of technology, facility, material, and other resources with the right situation; the investment in business practices as well as design excellence; and the alignment of staff with the best position to benefit the individual and the firm (Hochberg, 2007).

Managing Meetings

Collaboration is often incorrectly equated with meetings. Creative people, designers, programmers, engineers, and inventors need long stretches of uninterrupted time to accomplish a task. The reflective practice of an architect is one that involves complex, interrelated systems and an iterative process. "You cannot ask somebody to be creative in fifteen minutes and really think about a problem. You might have a quick idea, but to be in deep thought about a problem and really consider a problem carefully, you need long stretches of interrupted time. And even though the work day is typically eight hours, how many people … ever [have] eight hours to [his or herself] at the office?" (Fried, 2010).

Meetings are an important part of the collaborative process, but they are also incredibly expensive (in terms of cumulative man-hours spent) and disruptive. "It's like the front door of the office is like a Cuisinart, and you walk in and your day is shredded to bits because you have fifteen minutes here and thirty minutes there and then something happens and you're pulled off your work and you [have to] do something else" (Fried, 2010). Firm leaders need to ensure a balance between the information and feedback that is only possible from project team meetings with the need for each person to be able to successfully address his or her assigned tasks in a reasonable schedule.

Team leaders spend much of their time scheduling and running meetings. In order for this time to be used effectively, leaders should ensure they are managing the group process in order to increase productivity and not disruption. Meeting leadership skills are based on preparation. Leaders should identify the meeting objectives and logistics—date, time, location, and participants—in advance of the meeting and delegate responsibility to participants

regarding agenda items. During meetings, leaders most often serve as facilitators, guiding the process but not influencing the outcome. Leaders should also align the appropriate process with the appropriate agenda item. Disseminating information, soliciting feedback, and engaging in discussion are all appropriate methods depending on the situation but vary widely in the time invested and type of result (Lussier and Achua, 2013).

Structure and Business Models

A firm's business model affects its structure. An awareness of business models allows firm leaders to strategically develop a structure that aligns with their goals, ensure staffing meets production needs most efficiently, and ultimately increase profits. Business models are the organization of staff relative to the way a firm operates financially. The two must be balanced for the firm to operate effectively (Klein, 2013a).

The type of business model a firm has adopted or aspires to adopt can be determined by evaluating the type of work, distribution of experience, and desire for growth (Klein, 2013b). Three basic triangular models scale proportionally to describe most firms, regardless of size (Figure 21-1).

- Efficiency—bottom heavy, production-oriented, repeatable project type, fast timeline.
- Experience—balanced, experienced but adaptable, unique, and complex projects, profitability depends on good management and efficient use of resources.
- Expertise—top heavy, specialists, technical experts focused on high-profile nonroutine projects, high consulting rates (Klein, 2013a).

Firms must constantly evaluate the distribution of staff at multiple levels—junior staff, project managers/project architects, and partners/principals—relative to their desired growth in order to maintain a balance of staffing levels and opportunities for career advancement. The most likely cause of

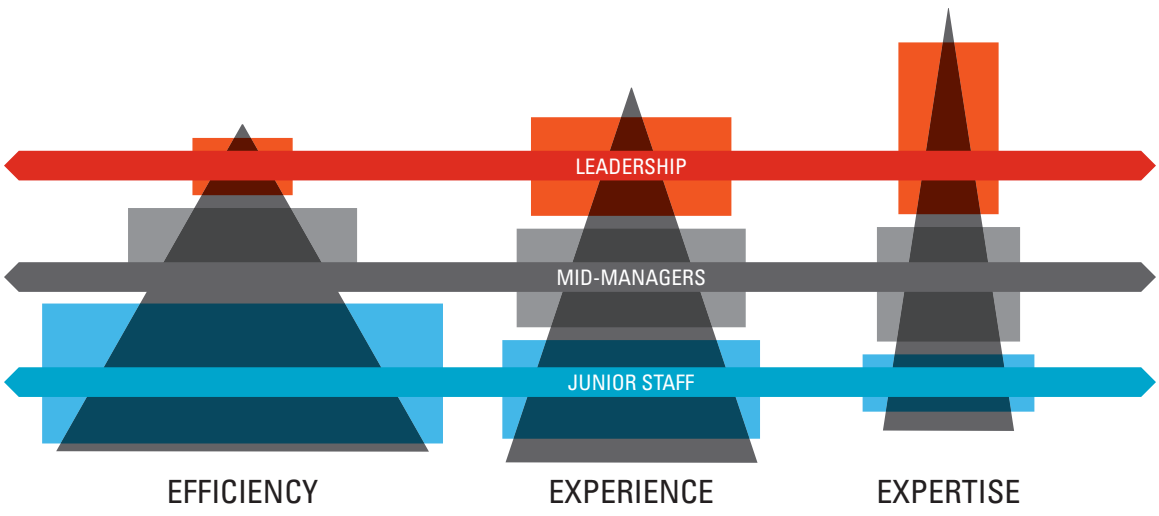

Figure 21-1 Business models relative to staff distribution

imbalance is an overpopulation of experienced, mid-career staff relative to the number of leadership and junior staff.

For a firm that wants to grow, a slight imbalance allows for cultivation of future leaders among this group of highly valued employees who are well-versed in the firm's practices and committed to its success. Alternatively, a firm that chooses to remain stable may lose many of these valuable architects to other opportunities, which has implications on the firm's productivity in terms of the loss of institutional knowledge and cost of training new staff (Klein, 2013b).

In integrated practice, several financial principles have been identified as supportive of project success (Figure 21-2):

- Fixed profit—profit not based on hours, materials, or project cost.
- Variable costs—owner pays for actual costs with no cap, no contingency needed, and profit may be used to pay for contingencies.
- Profit based on outcome—fixed profit (100% at risk) is based on project outcome, shared risk, and reward.
- Reduction of change orders—business model and joint decision making during process eliminate or limit change orders, which can only be filed for specific reasons (Ashcraft, 2014).

The Leadership Cycle

Sometimes referred to as the "leadership pipeline," "succession planning," or "talent development," the process of identifying and cultivating leaders

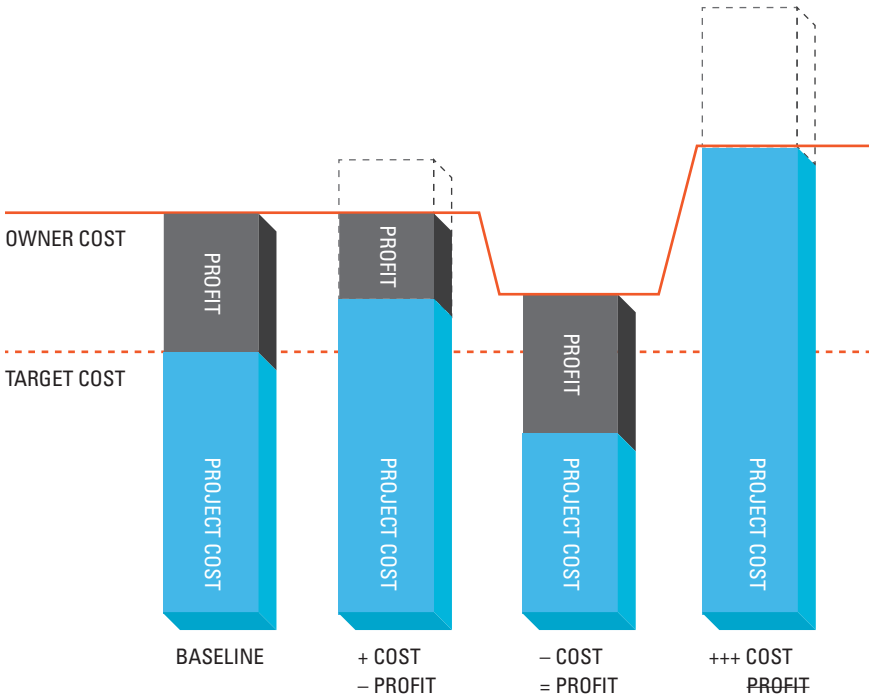

Figure 21-2 Shared risk/reward profit potential based on project outcome
Adapted from Ashcraft (2014)

at multiple stages in their careers is an important part of maintaining the long-term viability of a firm. This process may entail recruitment, development, retirement planning, and performance management. As the market picks up momentum and hiring becomes more competitive, more and more firms are developing formalized processes for acquiring and sustaining the best possible staff.

Though the application varies, one definition describes the process of managing talent as "a holistic approach to optimizing human capital, which enables an organization to drive short- and long-term results by building culture, engagement, capability, and capacity through integrated talent acquisition, development, and deployment processes that are aligned to business goals" (Paradise, 2009). Essentially, this process can be thought of as a cycle of continual renewal and reinvestment.

Most organizations have historically struggled with or not engaged in firmwide leadership training, mentoring, or development programs. In such situations, top performers are rewarded with promotions to positions of leadership. Those with some "natural" ability survive and even thrive; those without flail, and become frustrated or disheartened, and are ultimately reassigned. The balance of new managers falls into the latter category. "It's not simply that new managers lack the talent or skills for the job. They fail because their companies' development approaches fail *them*" (Griffin, 2010). Common types of potential future leaders include:

Reluctant: Appear to others to have leadership potential but have never imagined themselves in a leadership role.

Arrogant: Believe they already possess all the leadership skills they will ever need.

Unknown: Have the right mix of qualities to be a future leader but have not developed relationships to have their potential recognized.

Workaholics: The most common of the future leader profiles, they have been rewarded for putting work above all else and spending excessive hours at the office (Griffin, 2010).

Each of these categories requires a different development approach, and each person, regardless of category, requires a further-personalized mix of support, training, and opportunity. With the composition of the labor force rapidly changing to represent a younger, more culturally diverse, and more gender-balanced group (Fry, 2015, 2016; PwC, 2011; U.S. Dept. of Labor, 2015), the stereotypical definitions of leaders of the past—and particularly the traits and behaviors used to identify potential leaders that did not take into account factors of gender, race, culture, and experience—are also evolving. This requires those currently in leadership positions to develop better intercultural awareness, emotional intelligence, and empathy in order to evaluate each person's unique background and behavior.

Reluctant architects with a lack of self-confidence need mentors who will help them recognize and challenge their tendency to self-sabotage due to indecisiveness, risk aversion, and conflict avoidance. Mentors should also provide coaching and consistent positive reinforcement, while formal training can be used to address conflict management and decision making.

Arrogant personality types are brazen, loud, or cocky. This behavior is the least common attribute for those in leadership development programs and often masks insecurity through deflection or over compensation. These designers are often savvy self-promoters who were tapped for a leadership development program because they exhibit the type of expected behavior to the right people. To break through their shell of disillusionment, training and feedback of another sort are required. Often "tough

love" and harsh critique or threats of dismissal are required to get arrogant people to self-reflect. If they begin to show progress toward change, training in empathy and teamwork will be needed.

Roughly a quarter of the composition of future leaders is ambitious, competent, and yet guarded. Often identified as "quiet" or "introverted," this group of unknown potential leaders requires training in relationship building, networking, and communication. Mentors are most helpful at helping such designers make connections and engage in new situations where their leadership skills can be developed and utilized.

Finally, workaholics—comprising almost half of those seeking to develop their leadership skills—come in many forms. Some are anxious, have addictive personalities, and develop bad habits with regard to personal health and wellness. Others truly love their jobs and work long hours without the negative results. In either case, acute workaholics are more likely to suffer from burnout, stress, chronic fatigue, high blood pressure, and other harmful health conditions than those with a more balanced approach. Rather than rewarding or heroising such behavior, it is important for current leaders who are seen as being in positions of authority to model more sustainable and balanced approaches (Griffin, 2010).

Training and Development

Architecture firms are beginning to catch up to other businesses with the development and implementation of in-house leadership training programs. In some cases, firms have developed formalized, multitiered programs that begin by recruiting top graduates out of school and continue to identify and support talented individuals at various stages of their careers (Figure 21-3).

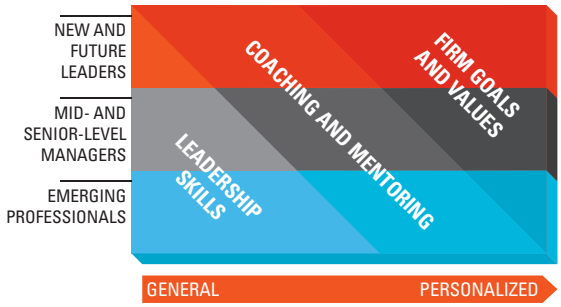

Figure 21-3 Leadership development program structure

The leadership cycle often focuses on young staff members and fails to provide support beyond initial advancements. As has been shown in previous chapters, talented individuals can be "novices" at any time depending on the situation and require support and feedback to grow in their new role. Even those in the most senior leadership positions should not assume they no longer have need for continued training and development. On the contrary, as the baby boomer generation has recently begun reaching retirement age, they are choosing to work longer and retire later than previous generations.

Firm leaders should not wait until they are considering retirement to think about the future of their organization. Through practices of "legacy planning" or "succession planning," firm leaders can engage years earlier in the process of imagining alternatives to retirement—such as transitioning from the CEO to a director position or cashing out their partnership and moving into a senior advisory role—while ensuring there are strong leaders at each tier of development to fuel the long term vitality of the firm (Paradise, 2009).

REFLECTIVE PRACTICE—INTERVIEW WITH Z SMITH

Z Smith, Ph.D., AIA, LEED Fellow, is a principal and the director of sustainability and performance at Eskew+Dumez+Ripple (EDR), a multidisciplinary fifty-person firm in New Orleans, LA. The firm engages in an authentic, collaborative process, both during the design and construction phases as well as long after occupancy to monitor how buildings perform, particularly in the area of energy usage. This information is used to optimize existing systems and inform future innovation.

Smith brings a robust background in physics, engineering, renewable energy, and information technology to the practice of architecture (earning a bachelor's degree in physics from the Massachusetts Institute of Technology and Ph.D. in electrical engineering and computer science from Princeton University before returning to academia years later to pursue a master of architecture at the University of California, Berkeley). The influence of his scientific roots can easily be seen in his nationally recognized leadership and scholarship on topics of sustainability.

He has served as a project architect for carbon neutral, net-zero energy, and net-zero water use buildings, and taught sustainable design courses at universities in the United States and Canada. Smith now brings his scientific rigor to incorporate sustainable design and energy efficiency at the core of each project in the firm, whether it is a small interior renovation or a large urban master plan. He also teaches at Tulane's School of Architecture and lectures and advocates regularly on sustainable design issues. Smith graciously spent some time speaking with us about his scientific roots, EDR's unique firm structure, and what means to take a "deep dive" into issues of practice.

Developing New Knowledge

EDR's commitment to an informed design process has led to the establishment of formalized research practices within the firm supported by 2 to 3 percent of annual revenues, including an annual year-long fellowship program that allows recent graduates to focus on the in-depth study of a topic that supports the firm's values. Fellows have the opportunity to interact with ongoing projects within the firm in order to test and vet their research, generating feedback loops for continued learning and refinement. The Fellows are expected to share what they have learned with the firm and with the design profession. Past fellowship topics include sustainability, resilience, community engagement, healthy environments, and holistic site design.

Erin Carraher: You did not take a traditional path to architectural practice. How do your engineering and physics roots inform your work in evidence-based design?

Z Smith: We all know the scientific method from high school, where you have a hypothesis, make observations, and then learn from the data you've collected to adjust your hypothesis on how the world works. I was intrigued to find when I started my architectural education that architects make all kinds of hypotheses but they almost never go back to test to see if any of them were true.

The emergence of evidence-based design from an area in architecture that has the greatest degree of data, which is health care, is intriguing, but I think there is a much larger scope for the notion of going back and looking to see if your ideas worked and learning from them. There is tremendous apprehension in the architectural community to this approach. Architects think of themselves primarily as designers, and designers by definition are involved in a projective process. They make hypotheses, they come up with designs, and then they move on to the next project where they make hypotheses and come up with designs. I think that with the changing nature of the construction industry and

architectural practice, it's going to be required that architects become more involved over the life of their buildings and learn from them. The ones who refuse to do it because they think that such a process somehow exposes them to risk or makes them do something they weren't trained to do are going to have a smaller and smaller influence in shaping the nature of what gets built.

Carraher: When you began integrating this feedback loop at EDR, how do you go about it? Did you model structures from other practices?

Smith: The process started for me at my first job at a large firm. After going back and getting my architectural degree, my wife and I moved to Vancouver, where I got a job at one of the premier green building firms in Canada, Busby Perkins + Will, which is now Perkins + Will Canada. I'd been there a couple of months and they had announced a couple of awards for some of their green buildings. I asked, "What do we know about how those buildings are really doing?" The answer was, not very much.

There was a certain point where work was a little bit slow and the firm was looking for the proposals of interesting things to do for about two weeks. I said I'd like to go and do a deep dive on some of these buildings, get the utility bills, and compare them with the energy models. I got a lot of questioning looks, but was given the go-ahead to do the work. So that's where the process started.

Going forward, as I started to be given more and more responsibility within that firm for design, I was intrigued by the notion that we could go back and ground-truth our designs. We had, for example, a daylight simulation model for a project. I said, "Why don't we build a physical model of the space, run the daylight simulation model, and then go measure the space after it's been built?" Again, there were eyebrows raised. "Why would you do that if you have the simulation model?"

What's that expression—all models are wrong but some models are useful? The nature of the matter is that you have to make simplifications to make models practical. What we're always wondering about is whether the simplifications we've made have done violence to the facts on the ground. So grounding the thing lets you understand the results.

Carraher: Why did EDR decide to make a commitment—both personnel and financial—to incorporating research formally into the practice?

Smith: Right after I arrived at EDR in 2009, our first LEED Gold project received certification. The building had been completed in 2006, but as LEED sometimes works, the sausage took a long time to work through the factory. I said we should go get the data and figure out why. What we learned really surprised us: the building had taken almost eighteen months to start working properly, and we had not been very involved in the process. *Why* is a long story.

The building had been fully commissioned, and for the first month or two, it ran beautifully. Then the building controls firm came by and installed an upgrade to the operating system software, and it overwrote all the settings. So the building was running flat out, and its energy use doubled. The client had no mechanism for fixing the problem. They called up the commissioning agent and said, "What's going on?" The commissioning agent, who was a thousand miles away, said he would love to help. If the building owner could just buy the plane ticket, he would come on his own time at no charge. The owner didn't have a budget for that and kind of limped along for another six months. Then a local energy auditor came by and wanted to help. He made some educated guesses, changing all the settings somewhat blindly. The energy use shot up another 50 percent and a mold bloom happened, at which point they

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had to scrub the building down. The owner then found the $300 for the commissioning agent's plane ticket. He reset everything to its commissioned values, and the building has outperformed its energy model ever since.

That story showed me a lot about the nature of architectural practice. We work really, really hard on a design to squeeze another 2 or 3 percent out of the energy model, and yet there are these factor-of-two swings in real-world performance due to how variable our occupancy and operations can be. One attitude on the part of the architect is that it's not our problem. The other attitude is that the architect is the owner's trusted advisor. We're a kind of interpreter between all of the people who make buildings and the owner. Sometimes, I call us the C-3P0; we're in human-cyborg relations, bridging between the mechanical world and the world of normal people. It's a great privilege to be in that position in the world of construction. It implies a sort of responsibility. As buildings have become more complicated and systems have become more complicated, I think, sometimes, we're the only ones there for the owner, supporting their needs.

Another employee, a rising young associate in the firm, proposed to the principals that we should have a research scholarship. We were investigating little questions in a one-off way whenever work was slow for two weeks. But, what if we did it in a principled way? What if we built some protection around a research program so that staff couldn't be scavenged for picking up red lines? This was four years ago. Since then, we've had at least one staff person [as part of the firm's annual Research Fellowship], whose job it is to advance our long-term knowledge and be an advocate for any particular topic.

The program is keeping us honest. It's usually someone fresh out of school, so they don't bring a lot of direct experience of architecture, but they bring an enthusiasm and a passion and a focus on the topic. Every year we pick a new topic. You can see the arc of each year having a different fellowship. In everyday practice, we can have a question, and normally between meetings and deliverables and project deadlines, there's no time to [explore it in depth]. It's such a privilege to be able to be able to say, "Let's take a look at this. What do we see?" We learn a ton.

Developing Talent

The firm received the 2014 AIA Firm Award—the highest honor the professional organization can bestow on a practicing architecture firm—in part due to the recognition of the firm's long-standing commitment to build a practice culture centered on mentorship and the development of young talent—earning the firm two AIA National Intern Development Program (IDP) Outstanding Firm Awards.

Carraher: The firm has a strong commitment to mentorship and cultivating talent. Do you see the research fellowship as a kind of bridge between education and practice, or is it coincidental that it is directed toward those at the beginning of their careers?

Smith: I do see it in the former sense. When you are in architecture school especially, you're expected to take a deep dive, a conceptual dive into a project. There's this whiplash that most new hires get when they jump into a firm. Suddenly, they find themselves in situations where a project manager is saying, "Yeah yeah yeah. All that theory about the nature of negative space is nice, but we've got toilets that need to be placed." The real danger is that intellectual inquiry is like a muscle; if you don't use it, you lose it. You need some commitment that drives people forward while also connecting them back [to a more exploratory process].

The firm's commitment to developing young talent [the firm has won two AIA National Intern Development Program (IDP) Outstanding Firm Awards] long predates my arrival in 2009. What people tell us about working for us versus working with other firms is that while we have a very rigorous approach to design, we also have a very collaborative studio culture. Yes, there are some people who are looked up to as design leads or people with great technical expertise. But it's not those people handing a napkin sketch to the junior staff person and saying, "Just draw it up, please."

Ultimately, the problem with that model is that the people at the top are indispensable. They can never leave the room, and they can never take a vacation. If we [firm leaders] want to have a life, we need to hand more responsibility to our younger staff. The trick to that is that can be both empowering and frightening. That's why we invest heavily in trying to get them licensed really fast. We encourage them to take part in training and get additional education, and we host a lot of internal and external lunch-and-learns, because, otherwise, they can feel like lives are at stake or financial ruin is at stake if they draw something wrong and be hesitant to engage [in taking on new responsibilities]. It's a commitment that has to go both ways, however. It's no accident that our commitment to developing young talent, moving them through licensure, and giving them great responsibility is on parallel with our commitment to research. Because [cultivating young designers] is all about giving people access to information that helps them make informed choices and have a conversation about where a design should go rather than merely having them execute a design developed in somebody else's brain.

Collaborative Structure

Like many firms in New Orleans, EDR experienced a rapid influx of work after Hurricane Katrina. Over time, the traditional studio model, where design principals directly lead project teams, began to break down as the firm reached a critical mass of projects. Through an initiative brought about by younger staff members, the firm transitioned into a new organizational model, where principals could maintain engagement on projects, but where design teams would have more autonomy.

Smith: You know how the notion of the old days—a secretarial pool, a bunch of secretaries sitting in the big open bull pen, and you could go ask whichever one you wanted to type your letter? We have a principal pool. The principals don't have their own studios; they are there as a resource to be called on as needed by any of the project teams. The technical staff are organized into five project teams of roughly five to six people. Then, there is administrative support, technical support, such as BIM managers, energy modelers, and so on. Each project team is led by a senior associate, an associate, or a junior principal. Those project teams might have a "bucket" of four, five, or six projects. They can, as needs and deadlines slosh around, adjust within the team or borrow resources from other teams when there is a real push. Instead of a top-down structure, the idea was to build a team-based structure. They call in a principal when they need help, guidance, someone to go toe-to-toe with a contractor, or someone to negotiate a delicate issue with a client.

What we've found is that you get a different mix of skills with different people. Some people are really excellent managers and maybe aren't the leading design talent. We also have very young employees who are great designers and

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who want to keep on doing design. They're worried that the only path to advancement through the firm is to become a project manager. What we try to convey is the notion that you can be a project architect in a great team where you're taking a leading role in design and you've got a great project manager who will be held in equal regard. It's not that you have to become a paper-pusher in order to rise in the firm. We all became architects not to go to meetings, we became architects to make great buildings.

Carraher: Has your decentralized firm structure had any impact on the way that you address project delivery? Have you used IPD or other collaborative delivery models?

Smith: We deliver great projects under all the delivery mechanisms, and we've had projects from hell under each delivery mechanism. We don't like to believe that how you structure the delivery will determine whether the project can be good or bad. In the end, the delivery mechanism is no better than the people and the relationships you've built.

As an example, we've done a lot of projects using DBB and a lot of projects using CM at-risk. I will say that, all things being equal, I enjoy the CM at-risk approach, because it is a much more collaborative structure. There's not that lurking question about whether the contractor is hiding something or steering the conversation a certain way because he'll make more money.

We have tried to talk clients into doing IPD or IPD lite, but we haven't yet succeeded in doing it. We are incredibly interested in doing it, because it actually links back to evidence-based design and becomes an outcome-based design. It's outcome-based in terms of performance, but there is also strong incentive to find economical solutions and a really great feedback loop. I just wish there were more examples of how to do it with smaller-scale projects. As mid-size practice, we do a lot of small-scale projects. The normal response that we're given is that the legal overhead, the transaction costs of setting it up as true IPD, is so great that it only works for large projects.

Carraher: The theme of the 2014-2015 research fellowship was "Community Engagement" with a focus on tools and formats for designers to conduct meaningful public outreach around architectural and urban placemaking projects. How is this research influenced by or influencing the work in the office?

Smith: We've been trying to formalize how we think about community engagement, because we've historically done it intuitively. This is the high-level message with sustainability and building performance, with how we think about resilience, community engagement, and healthy environments. In each of these cases, we've done the work intuitively—we like to think we're making the right choices.

What happens once we apply more rational tools is that we find the answer is sometimes—yes, we were right. But, sometimes, our intuition led us entirely in the wrong direction. So, the integration between fellowships from all of those topics, including community engagement, has been trying to develop a set of processes that we can reproduce, so that we're not at the whim of our intuition. That's the role of research—quantifying what was learned, giving it away, and then moving on to the next question. That's why we are excited about it and continue to invest in it.

Leading Collaborative Architectural Practice
By Erin Carraher, Ryan E. Smith and Peter DeLisle

Conclusion

In a society as complex and technologically sophisticated as ours, the most urgent projects require the coordinated contributions of many talented people. Whether the task is building a global business or discovering the mysteries of the human brain, one person can't hope to accomplish it, however gifted or energetic he or she may be. There are simply too many problems to be identified and solved, too many connections to be made. And yet, even as we make the case for collaboration, we resist the idea of collective creativity. Our mythology refuses to catch up with our reality. We cling to the myth of the Lone Ranger, the romantic idea that great things are usually accomplished by a larger-than-life individual working alone. Despite the evidence to the contrary, we still tend to think of achievement in terms of the Great Man or Great Woman, instead of the Great Group.

Warren Bennis, *Organizing Genius: The Secret of Creative Collaboration*, 1997

Toward a More Collaborative Practice

Why collaborate? Because you can't afford not to. In a global society that is more complex, connected, and technologically advanced than any in history, collaboration is a strategy that can harness the collective knowledge of individuals to achieve otherwise impossible results. Collaboration is also a culture; it creates more engaging, challenging, and enjoyable working conditions than isolated (or contentious) workplaces of the past.

It is important, however, to invest the time needed to develop and maintain individual and group interpersonal skills, establish a collective culture, and instill the type of disciplined approach needed to take advantage of collaboration's full potential. Good collaboration leads to more successful outcomes than any individual effort would be able to achieve; bad collaboration results in worse outcomes than no collaboration at all (Hansen, 2009).

Collaboration is not necessary at all times in all situations. Over-collaborating can be detrimental to productivity. This is because collaboration takes time and resources (financial and human) to be done successfully. However, collaboration does have measurable benefits and demonstrates a high return on investment when used appropriately. Leaders play a critical role in determining when collaboration is appropriate and when it is not. Morten T. Hansen outlines a model of 'disciplined collaboration' that he defines as "the leadership practice of properly assessing when to collaborate (and when not to) and instilling in people both the willingness and the ability to collaborate when required" (Hansen, 2009) (Figure C-1).

When collaborating, teams need organizational and communication structures in place in order to

Figure C-1 T-shaped leadership model *Adapted from Hansen (2009)*

operate effectively. Leaders serve as the fulcrum, providing communication to the broader project or firm management while allowing teams to operate with autonomy. This "T-shaped" model maintains connectivity within the larger organization as well as ownership within the team. This model also applies to intra-team organization, allowing for both individual efforts and collective contributions to be high.

If collaboration is the collective effort, leadership is the driving force that aligns the factors needed for creative, diverse teams to thrive. In a collaborative context, leadership is not confined to those in positions of authority or power. Leadership is instead situational and fluid. All members of collaborative teams take on leadership roles at different times in the project, regardless of their position or authority.

Leadership is critical to the success of collaborative teams and to the success of organizations. Leaders are responsible for shaping the structures and communicating the vision that sets the direction for collaborative teams' efforts. Regardless of a team's effectiveness, if their work does not result in outcomes that address people's needs, are technically feasible, and are achievable relative to cost, the organization will eventually fail. This means that leaders need to be as creative with the design of their business models as they are with their building projects in order to envision new and innovative structures that will thrive in the new world order.

The people who take on leadership positions and build teams are beginning to look different than they did in the past. The country's workforce is rapidly diversifying and making much-needed change inevitable in a profession that has historically been largely homogeneous with regard to race and gender. By breaking down barriers to diversity, the profession has the opportunity to become more inclusive and develop a broader base of knowledge and perspectives. By expanding the scope of work to include the other 98 percent of the population that has not traditionally been able to afford the services of an architect, practitioners will also benefit from reciprocal relationships with populations and cultures outside of the establishment norm.

Design professionals have the potential to leverage collaboration and leadership as tools to impact traditionally underserved populations; shape innovation in technology and manufacturing; and translate the powerful combination of creative, systems-based thinking, technical expertise, and broad understanding of multiple disciplines that the architecture profession has long cultivated internally to serve the greater good.

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