

Facilitating Collaboration

in the Design Stage of Complex, Multi-stakeholder Projects

Bryan S. Coffman

Abstract

Complex projects that involve multiple stakeholder groups usually require a greater degree of collaboration than other types of projects. These types of projects can generally be seen as three major, overlapping processes: strategy, design-build, and operations. This paper focuses on how to facilitate the collaboration of diverse stakeholders through the design-build stage of the process. We believe that the most successful projects in the design-build phase should not be thought of as a series of linear steps, but rather as a web of interconnecting activities happening mostly in parallel, and overlapping with the strategy work that precedes it as well as the operations work that follows. This overlap is crucial to maintaining flexibility, because design of complex projects is really more of a learning process than a project management process. Therefore, learning processes require the ability to cycle back and adjust the design—otherwise there is no learning, and planners assume the risk of just hoping that the first design will work in execution. We offer notes on the difference between facilitation and management, and the necessity for both. The core of the paper addresses the Process, Methodology, and Guidelines for facilitating collaboration in complex projects. The Process section examines a set of generic stages of work that happen during design. The Methodology section explores the ways in which each collaborative exercise during the design is crafted and facilitated. It's a toolkit to help managers work through the design stage with multiple stakeholders. The Guidelines propose some of the counter-intuitive rules of thumb that we have found to improve the facilitation success of these types of projects.

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Definitions

We think of *multi-stakeholder projects* as those that typically require (or at least will benefit from) the incorporation of ideas and perspectives from the organization that is originating the project, plus organizations that will be providers and users of the project's results, plus individuals or groups involved in the ownership or governance of the originating organization, plus specialists or those with specific subject matter expertise.

We believe that *complex projects* comprise that subset of projects that exhibit these characteristics:

1. They are different in nature from other projects that the organization has experience with—they are unique. Either the organization has never attempted a project like this, or conditions surrounding this project are so different from past experience that any readily-available solutions should be viewed with skepticism.
2. They are composed of so many different facets that no individual or small team possesses all of the knowledge, experience, or skills required to design and implement them.
3. They are large financially, and as such they pose a significant risk to the organization if they are not conceived of and executed well.

Some examples of complex, multi-stakeholder projects include the design of large buildings or manufacturing facilities, the design of large IT systems, the design of communities and city services, the creation of new products and services for wide-scale rollout, the creation of major motion pictures, responding to complex requests for proposal (RFPs), and multi-national initiatives.

Three Stages

We model *complex projects* in three stages: Strategy, Design-build, and Operations. A project is conceived in the Strategy stage as a response to some opportunity or challenge. During this stage the project gets its initial blessing in terms of seed resources: capital, time, team members, and champions. A strategy also equips the project with its initial objectives. If the project is large enough, it may have its own mission; sometimes there is also a rudimentary vision.

At the other end of the process, in the Operational stage, the components of the project have been designed, built, and assembled. The project is ready for daily operations and full time engagement with the users.

In between operations and strategy lies the Design-build stage. It consists of planning, creating various prototypes to test, and actually constructing or building the final capabilities that will be used in the operational stage. Design translates a strategy into a model of how final operations will work.

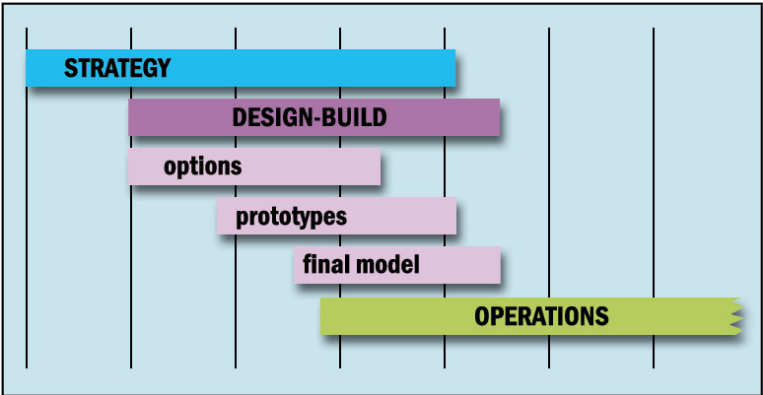
We also consider construction to be a part of the design-build stage. This may seem counterintuitive, but reflects our strong tendency toward design-build philosophies from the field of architecture and construction. Designing and building a complex system are two activities that inform one another in cycles of feedback. If the connection is broken and the design is divorced from the construction, then construction may become an exercise in compromise.

Type of Project	Strategy	Design-build	Operations
Motion Picture	Business planning	previsualization through final editing	distribution
Manufacturing Facility	Competitive analysis, scenario planning, business planning, risk analysis, goals and objectives	programming through preliminary design through contract documents	Start of production
New Service Design	Competitive analysis, gap analysis, risk analysis, strategic direction	Option generation, building prototypes, testing, assembling final model, design of support systems	Rollout and Execution
RFP Response	Business analysis of risks and rewards	Crafting the response	Award and execution
Organization Redesign	Competitive analysis, business ecosystem analysis, scenario planning, strategy formation, strategic hypothesis and goals	Whole system design (future), transition plan and strategy, adoption plan and strategy	Rollout and Execution

Thus, with many major projects, once construction of the building or system or assembly line or service is completed, the ability to bring additional design to it is severely limited. During construction, however, there is always some opportunity to bring a design response to a newly-discovered challenge or opportunity. So we like to think of construction as an extension of the design process, and one that precedes operations.

The three stages should overlap one another for the longest time possible. This principle may also be counter to common practice, but the significant advantage it provides is that it allows the project to be steered as it moves forward like a guided missile, with constant error-correcting feedback, rather than simply releasing it like an arrow in hopes of hitting a target (which itself is often in motion).

As a project takes on more detailed definition during the Design-build stage, it will usually challenge or augment the work that was done in the Strategy stage. Likewise, activities that take place in the Operations stage can reform and update concepts from the Design-build stage (unless everything has been set in stone). If there is still a dialog between these stages, then changes can be made more easily than if there is



a rigid hand-off from Strategy to Design-build and then to Operations. This doesn't obviate the need for contract documents or for having detailed designs so that everyone on the project knows what they are doing. However it is a call for stretching flexibility to the extreme so that all of the learning achieved along the way can be folded into the final release of the project and not lost along the wayside. In manufacturing, it's a well known principle that 80% of the inefficiencies in a process are built into it during the design of the physical plant. Subsequent quality improvement efforts can only address the remaining 20%. How important, then, it is to work diligently to reduce the inefficiencies generated during the Design-build phase of work.

The rest of this paper sets out some rules of thumb to help managers think through the Design-build stage of a complex, multi-stakeholder project.

Facilitating the Design Stage

We use the term “facilitate” very deliberately. Project management and project facilitation are related, but they have distinct purposes. Project management sets in order and tracks the application of resources to tasks over time. Project facilitation is concerned with the collaborative and idea aspects of the project—enrolling, engaging, aligning and focusing the collective talent and collective ideas to create the best solutions. Both project facilitation and project management require the application of leadership principles and do not relieve the management team in any way of its responsibilities for the ultimate success of the project.

But a facilitative approach to project design is clearly different than a command and control approach. Underneath the facilitative approach is a belief, based upon experience, that the best solutions to problems encountered during the Design-build phase will emerge through the structured *and* unstructured interactions of many different constituents, and that as these ideas combine and recombine they will improve in general fitness until optimum solutions are revealed. This coincides with a belief that the final solution is too probably complex or too obscure to be conceived by a single individual without this collective effort.

These beliefs have nothing to do with a fuzzy, feel-good desire to involve people for the sake of involving people. Rather, they are based upon two complementary insights: (1) work in complexity science suggests that a collective or collaborative approach to problem solving naturally generates better solutions than other approaches, and (2) the observation that people tend to support whatever they have had a hand in creating. If these two ideas are right, and our experience confirms that they are, then applying them thoughtfully leads to better solutions with higher alignment among stakeholders than a top-down, forced approach to design.

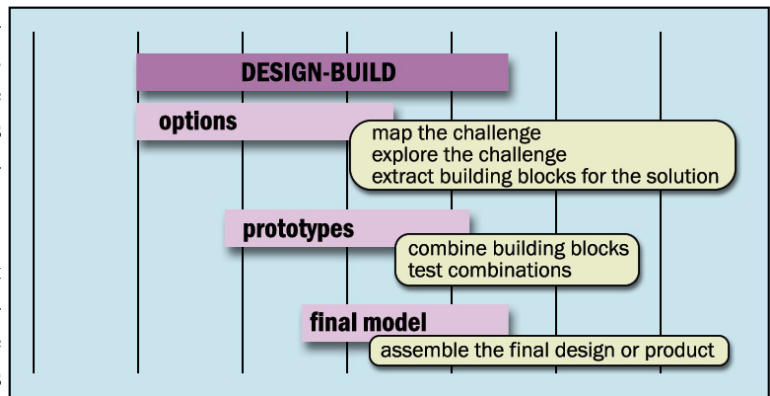
Notes on Process

We divide the Design-build phase into three components: exploration of options, creation of prototypes and the construction of the final model. There’s nothing new about this type of division, but the approach we propose may be a bit unconventional.

Generating Options Using Building Blocks

The exploration of options is a mapping exercise whose purpose is to chart the boundaries and major features of the space occupied by the challenge, as well as its possible solutions. This can only be accomplished by a robust exploration: We don’t know what we don’t know.

The best solutions to complex problems most likely lie outside of the team’s set of experiences—otherwise the problem would not be complex. Hence, the purpose of exploration is to give a team new experiences from which to ideate and create. As with any exploration, many of these ideas will be irrelevant, but in the vast majority of cases a core of valuable ideas will be unearthed.



There are a number of techniques that can be used to explore a challenge thoroughly—some are well known, such as those invented by Edward DeBono. Others are now emerging as applications for business use, such as the work on “combination” by John Holland, “patch logic” by Stuart Kauffman, and the work on collectives by Norman Johnson.

All exploration takes time, but to ignore this stage of work simply means that a team will create solutions based only upon their past experiences, and while such solutions may be adequate in the short term, they are rarely extraordinary, and given the acceleration of external change they will probably become obsolete too soon.

Generating Prototypes through Combination Techniques

As a challenge is mapped, a number of ideas will probably emerge that have a certain appeal, as either part of the solution or a pathway to the solution, simply because it’s rare for a real solution to emerge from exploration in whole form. Instead, ideas found during exploration have to be combined and recombined into sets from which new models of potential solutions can be generated. These models, if robust enough, can become testable prototypes. And from the prototypes, a final model emerges—usually as a synthesis of several of them.

John Holland describes a combination technique that uses building blocks to address a challenge, in this case, to identify the most “honest” human face. (He also notes that it is interesting that humans would actually take such an assignment seriously.) He divides the face into elements that he calls building blocks (eyes, nose, mouth, and so on) and then for each element he creates a series of different options (different types of eyes, noses, mouths). The building blocks represent the components of the “DNA” of the challenge. Combinations are then assembled and individuals are asked to decide which are the most honest-looking. The selected combinations are then advanced to the next round, where they are re-combined with one another using a genetic algorithm, allowing for some random addition of building blocks to account for serendipity and mutation. The next set of combinations is evaluated and the process continues for a few more iterations. After five generations in most of these experiments, all of the faces in the group will be considered more honest than the “most honest” face from the first generation. The same approach, with some modifications, can be very useful in solving complex business problems.

Throughout the Design-build process, stakeholders move back and forth from generating options to creating prototypes, to attempting the construction of final models. Since this is a learning process, it cannot be linear. The building blocks defined at the beginning of the process are probably lacking in scope and depth, and as a group tries to generate solutions they will be forced to expand their exploration to uncover additional building blocks and try them in new combinations.

Notes on Method

During the Design-build stage, 60 - 80% of the work is individual, while between 10 - 20% of the work should be done collectively, preferably face-to-face. The remaining 10 - 30% may be done collectively using digital tools that actually aid in the process of exploration, combination, and testing. This should go beyond email, although email ends up being the default tool for remote communication.

Stakeholders usually work as individuals when they are building components of a solution, so an analyst might work on a spreadsheet modeling risk factors while an engineer might work on a structural drawing and a 3D modeler might prepare a film shot.

Stakeholders are brought together for three major reasons: (1) to share updates and status; (2) to plan or create collective designs; (3) to handle changes or crises in the design or plan.

Updates and status reports are becoming increasingly digital in nature, and they should be. Online project repositories and management aids with photos, video clips, text summaries, project plan updates, and documentation are now standard fare on any complex project.

Planning and design of the process itself happens periodically. Once a project management system is in place, much of the plan updating can be done via the system. But whenever a new component needs to be designed, a new phase of work is entered, or a prototype or model needs to be created, there's an opportunity for collaborative design to occur that can accelerate the process, increase alignment among stakeholders, and increase the fitness or viability of the model.

Changes, crises, and exceptions occur throughout the project. Minor changes can be handled by email or through the project repository. Larger changes or crises that cross over functional areas of expertise require a collaborative intervention via phone, internet meeting, or in person.

The Five Foundations of a Good Collaborative Solution

How should collaboration be approached and managed? Throughout the process, the facilitation and management team must ask itself several questions around enrollment, engagement, knowledge vantage points, knowledge depth, and overlap. If these five factors are aligned, the viability of the final solution increases. Here are some key questions to consider:

1. Are the stakeholders enrolled?

Do we have all of the stakeholders signed up?
Are they attracted to the project?

2. Are the stakeholders engaged?

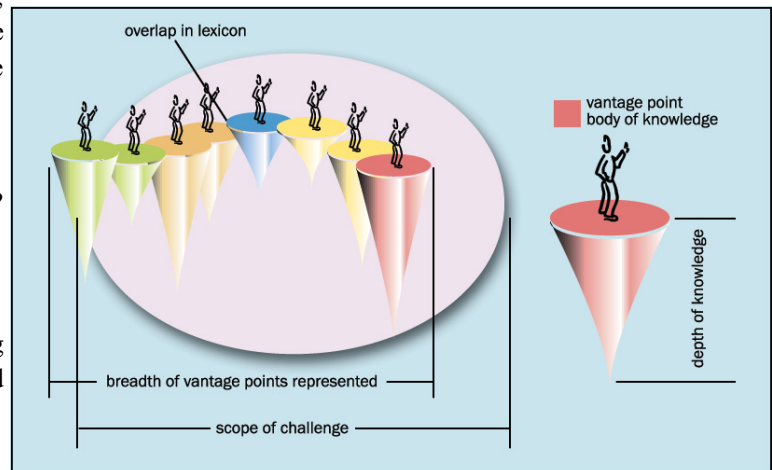
Are they both motivated and diligently applying themselves to the project? Are they challenged and rewarded by participation?

3. Are the right vantage points of knowledge available?

Collectively, do the enrolled stakeholders represent enough variety in their personal vantage points so that all of the aspects of the challenge and the solution can be mapped out?

4. Is the right depth of knowledge available?

Is the necessary information accessible either through people or databases, or other repositories of knowledge and is it of the right depth for the project?



5. Is there enough overlap between vantage points among enrolled stakeholders?

This refers to the lexicons that are present on the project. Engineers need to be able to communicate effectively with scientists, while HR specialists need to speak with attorneys, and so on. A project team must either have individuals who have experience across several lexicons and professions, or time and attention must be built into the process to allow the stakeholders to learn enough of each other’s language so that they can develop a shared context and a cohesive solution.

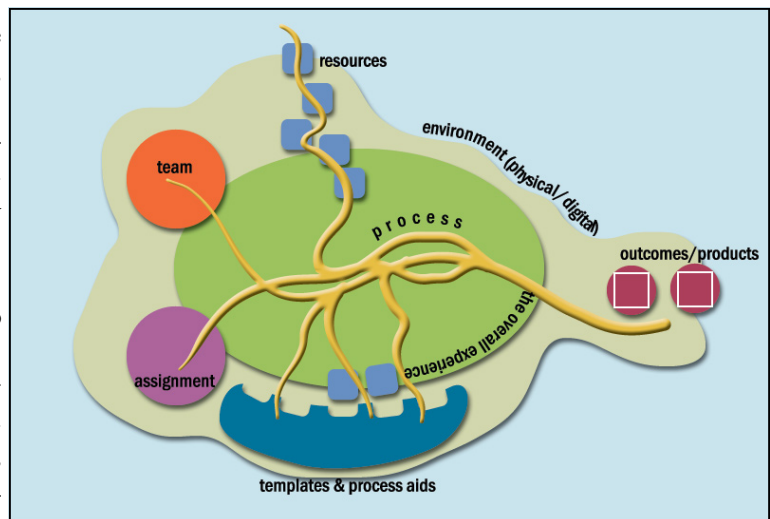
Creating and Supporting the Work

Throughout the Design-build phase, individuals and teams will be assigned to accomplish a variety of tasks. Each task can be thought of as an assignment, and with each assignment there should be a specified outcome or product. This outcome may change or adapt as a team moves through its assignment, but it’s good to have a target outcome defined from the beginning as well.

A team will also need resources. Usually the most important resources are time and budget, but other resources may include access to subject matter experts inside and outside the organization, special tools, equipment and software, access to knowledge bases, and a variety of supplies.

A team may also be supplied with templates to help them organize the content of their work. Templates usually serve as a starting point for organizing information, and they may be discarded as the team learns more. Some templates take the form of tools, such as the seven standard tools used in statistical process control. A team may also be given process guidance—a series of steps to take that should lead to the delivery of the best outcomes.

Finally, a team will work in a physical and virtual environment, and the impact of these environments should not be neglected. Every team dealing with a complex task needs a digital “home room,” and possibly a physical home room as well. These environments should aid the team in *seeing* their work as they progress, so visual displays are important in tracking progress and documenting results.



Some Guidelines

There's no firm set of principles that govern the facilitation of a collaborative design process, but there are a number of rules of thumb that we've found to be valuable in our work over many years and hundreds of clients. Some of the more unusual are presented here for the reader's consideration.

Note that it's important to understand that many businesses are still dominated by a hierarchical, command and control approach to work, and while this not necessarily bad, it does mean that some mindsets will need to be changed if the company or team is going to successfully apply a collaborative, adaptive approach to project management and completion.

1. Have teams work in parallel; avoid working linearly

This is one of the hardest guidelines for many people to grasp. It is usually desirable for a team of stakeholders to simultaneously work on vision, goals, action plan, marketing ideas, staffing and so on. Each design component is taken as far as that team can take it, given their assumptions and the information they have. Then the various teams compare their ideas and in process of making the comparison each element of the whole solution ratchets up in fitness and quality as a consequence of the multiple loops of feedback that are naturally present. If you're still skeptical, trust us on this one!

The reason it works is that a huge part of the solution set is already in some stage of formation in the minds of various individual stakeholders, and the purpose of the early stages of the collaborative process is to get all of these ideas and perspectives out onto the table at once, and allow them to interact with one another. The interaction will precipitate better solutions.

In addition, each individual stakeholder may be at a different stage of the creative process, and the sharing process allows them to bring their various visions to bear on the challenge simultaneously, enriching the entire dialog.

2. Engage stakeholders in co-design rather than simply getting their input

There's a tendency to get input from various groups surrounding the design through the use of surveys, focus groups, and similar methods. Unfortunately, asking someone's opinion of something isn't nearly as effective as engaging them in the design process itself. When someone brings his preferences to bear on the complexity of design, these preferences tend to deepen and broaden, and they are molded to the point where they can better inform the entire design process in a way that takes into account the multitude of variables that interact in the design. Thus, have customers sit down with engineers and actually try to solve something together. Of course the nature of the assignment has to be crafted carefully, because they won't necessarily share much of a common lexicon, but if you're successful you'll be very surprised by the positive results.

3. Immerse stakeholders in the challenge instead of letting them just skim the surface

This is related to the previous guideline, but refers to the intensity and length of time of the interaction. It's true that some stakeholders will participate for only a brief period of time, but wherever possible allow groups of stakeholders to interact with one another over longer periods of time, on diverse tasks. Stretch the time of interaction to a day or more, and if the assignment they are working on is particularly complex, allow at least one and a half days. The overnight

break will provide a period of incubation which will result in better understanding and new insights on the second day, and the overall duration of the experience will allow greater alignment and team building to occur.

4. Envelop stakeholders in words, pictures, objects, and simulations that transport them into their ideas and into the challenge instead of relying on conversation alone to forward the design

There's nothing wrong with verbal communication, but it's hampered in Western society by several factors. First, people don't tend to listen very well. While someone else is speaking they are often thinking about what they're going to say next. Second, conversations can go round and round unless a team is charged with committing something to paper. It's like an artist running ideas for a painting around in his head but never committing brush to canvas. So when groups of people get together they ought to have specific deliverables for their time—deliverables that are exchanged with some other team.

A two-dimensional sketch of a challenge and solution can convey four times more complexity than a bulleted list of words or a written statement.

Even better could be a three-dimensional representation made out of simple building materials, because it can address even more complexity; a model in motion can show behavior over time.

Some of these tools are expensive or time-consuming to create, but return considerably more than their cost when used in testing. Until you can create a model of what you're talking about, you probably don't understand it; this is doubly true for a team working together on a complex task.

5. Think of design as iterations of a complete whole that gain successively better clarity and detail over time; don't think of design as separate components and little steps

The first day that you sit down to work on a project, design the entire solution by the end of the session, even if it's sketchy. This is similar to the process used in the movie industry, where a storyboard artist and the director sit down to create a previsualization of the entire movie through a series of sketches of scenes and sequences. After previsualization, the entire movie has been created at one level, and from then on, the movie begins to shape up and take on more depth and fitness until final editing is completed.

When we work with clients on building or land planning sessions, we want them to create various visual options of the project by the end of the first or second round of work. Often we don't even have them create a program document first, but rather let the first iteration of the program emerge out of the sketch.

6. Give stakeholders experiences that help them warm up and practice the art of collaborating and creative ideation; don't assume that they know how to ideate or collaborate with one another

At its crudest expression, collaboration is a confrontational win/lose game where one person's ideas will succumb eventually to another's. At its highest expression, collaboration involves the combination of ideas in such a way that new ideas emerge—something different from any of the inputs. In-between, collaboration involves adding parts of different ideas together so that the result fits nicely into the solution space of the challenge, and resolves it. But many of us

don't know how to collaborate on the higher levels, and some instruction is required if you want to see it happen. It won't just happen on its own.

7. Select stakeholders who have different lexicons, and set aside time for these lexicons to weave together to create better understanding, rather than relying on a group of stakeholders who already share a common lexicon or idea set.

This was mentioned above in notes on the methodology. Complex problems by definition require stakeholders who have different types of expertise. The design of a building requires input from engineers of various sorts, interior designers, workflow analysts, the workers who will use the building, and so on. These different constituents speak different languages, and time must be set aside for them to learn enough of each other's terms of art so that a good synthesis of their various viewpoints can be created.

8. Increase the diversity of people in the design team who think differently in order to expand the perspectives on the solution space; do not underestimate the value of diversity in generating better solutions

In particular, cognitive diversity (people who have different ways to think and solve problems) tends to result in better solutions. If everyone on a team has the same background and experience, they will find it extremely difficult to invent something new, or to avoid falling into traps hidden in their blind spots. A team needs to have a shared understanding of the overall purpose of what they're trying to accomplish, but beyond that a healthy diversity in modes of thought and values provides the variety that is absolutely needed to generate good solutions. So believe it or not, assembling a group of really smart people with the same background to solve a problem is not necessarily the best approach. If you have a lot of very smart molecular engineers together, they will all very likely think in very similar ways—their training and toolsets will have very little diversity, and they will see the problem in the same way. If the problem before them is intractable to one, it will likely be intractable to them all.

Summary

During the last 20 years, the author and his colleagues have supported hundreds of projects, and we have found these concepts, principles, and guidelines enormously helpful.

Taken together, when you apply these methods you should be able to achieve higher levels of creativity, a smoother and quicker path to robust solutions, and simultaneously you'll also create a committed group of stakeholders who individually and collectively understand the problem domain and the ideal solution set. They will also have developed the capability as a team to be strong advocates for the solution, and their commitment can become a big factor in the eventual success of any complex project, which will inevitably face new hurdles as it advances through the many stages from conception to completion. Good luck!

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**For more
information,
contact
Bryan Coffman at
321 287 1100**

Innovationlabs.com