APPA Institute
Advanced Design Project Management
"Left Brain Handouts"

Resources for Design Project Management
http://www.colorado.edu/facilitiesmanagement/appa/

Part 1 - Design Process

There is a timeless struggle that occurs in all of us, the classic struggle between the right side of the brain (the creative side) and the left side of the brain (the logical side of the brain). The conflict that occurs between those two parts of your brain is at the heart of most difficulties associated with managing the design process.

You may already understand how design works, but then again you may not.
In order to better understand why things sometimes occur the way they do, it is important to understand the design process.

Do you wake up in the morning and say to yourself; *"I'm going to have a good idea at 3:24 today"?*

Not likely.
Ideas generally come unexpectedly like a bolt of lightning or an inspiration when we least expect it.

What exactly is design?

Design, as described by Hugh Stubbins (famous NY architect) can be summarized in **four** words:

- Ingenuity
- Talent and
- Hard Work

Design has moments of great inspiration and deep insight, but most design requires, hours, weeks or even months of very hard work. Design is a continuous activity, beginning somewhere near the problem definition process and continuing throughout the entire development process.

Design never really ends, even though most projects have a beginning and an end. Every step of the way through the building process, design plays a key role, which makes it a continuous activity. You've probably had projects that just don't seem to end and while we may think it's because the designer just can't get it right, it's more likely that they see improvements to the design that should be incorporated into the project. Designers are trained to provide you the best solution possible to your problem and anything short of that is an incomplete job.

Design often times begins with a “Charette”, which is a lengthy brainstorming session in which team participants gather to review project goals and explore potential solutions.

The origins of this practice are interesting, but quite surprising.

> Thought to originate from the École des Beaux-Arts in Paris in the nineteenth century, the word *charrette* is from the French for "cart" or "chariot".
>
> Student architects still working furiously at the very last minute on the grand illustrations that were their design presentations, literally, while in the school cart ("en charrette"), as it was wheeled through the streets of Paris on its way for submission to their professors.
>
> The term *charrette* also, historically, applied to the cart or tumbril used to carry the condemned to the guillotine.
>
> Hence, the current meaning of work continuing up to a deadline, subsequently metamorphosed into the urban-planning use of the term.

Every building project is different and represents a unique set of requirements and limitations. Design brings all of the major considerations inherent to a project to the surface through a problem seeking / problem solving process.

While every project is unique, there are many common elements that influence design. Among the most common shared by most building projects are:

1. Program Requirements
2. Regulatory Restraints
3. Site
4. Building Materials and Systems/technology
5. Budget and Schedule
6. Client

Every project has a different set of factors that combine to make its problems unique. Most designers also approach design in different ways and with different attitudes, but there is a logical approach to the process.

The design process must involve:

- ◊ **Analyzing**
  - **Linear** (*analysis, synthesis and evaluation*) and
- ◊ **Synthesizing processes**
  - **Nonlinear** (*creative flashes of insight*)

Both are used in many ways and are usually combined simultaneously on many levels. However non-linear the process may be for a designer, design must involve analysis. The initial steps for analysis are to identify, analyze, confirm and organize the factors that will influence the design concept.

This will generally involve the simultaneous analysis of many factors, such as:

- ◊ Program analysis (*conversion into graphic format*),
- ◊ Site analysis (*graphic representation of existing conditions*),
- ◊ Code analysis,
- ◊ Scheduling ,
- ◊ Cost, and
- ◊ Constructability studies (*local capabilities and practice*).

The combination of the information and its analysis into a unified solution is the core of the synthesis of the problem into a conceptual design. It is the constant reciprocal action of designing and reflecting, until a solid concept is formed, that comprises the backbone of the design process.

This may be done in many ways, but there are some common tasks involved:

1) Design goals - You must establish & understand the project goals that are shared between client and designer.

2) Design concept - The goals are combined with the program criteria to create one or conceptual solutions to the problem(s).

3) Alternatives - Each concept must be evaluated against the goals set by the team to test its validity.

Each potential solution is pursued until the best solution rises to the top.
You can and should ask for several ideas, don't assume that the idea the designer shows you is necessarily the best one.

When you have explored some conceptual ideas to the point that you have a valid solution, then you want to move on to the Schematic Design (SD) phase. The schematic design establishes the general scope, design, scale and relationships to the components of the project. The primary objective is to arrive at a clearly defined feasible concept in an understandable format. The minimal submissions should include:

- Plans
- Elevations
- Sections
- Cost estimates
- Outline specifications
- Design summary

Once the schematic design has been approved, then the project team begins the refinements required to meet a more advanced level of design and coordination. During the Design Development (DD) phase, the entire design team works out a clear, coordinated description of all aspects of the design. All of the SD elements should be present in a greatly expanded form with additional information as may be required.

During the Construction Documents (CD) phase of design, the final detailing of all project components are documented for the building team. Detailed plans and specifications will be provided for construction.

Tasks of the Designer:

A designer has two basic tasks to accomplish:

1. Design
2. Communicate

The design of a project continues through all of the various phases of a project beginning with the programming, conceptual design and continuing on through the construction period. If it is going to affect the outcome of the project, then it involves design.

The other primary role of the designer is to communicate that design to the various team members on the project. The designer must first communicate the ideas to the client, this occurs primarily in the programming phase. The process during this phase is many times more important than the product.

Their objective then begins to shift and they must communicate those ideas to the other professionals on the design team. This occurs during the Schematic Design & Design Development Phases.

Finally they must communicate, once again the same ideas, to the contractor in order for it to become a reality. This begins to occur in the Construction Document Phase and the Construction Phase. The team finally gets to the communication of their design ideas to the contractor. Be open to suggestions from the contractor and their subcontractors, they can save you from some pretty stupid mistakes. If you tell them to "*just build it like it's drawn*", they just might do it to your detriment. You can earn their trust and respect and actually have them take ownership of the design ideas. You will be surprised what they have to offer through their skill & experience.

The drawings should be clear and concise, conveying **only** the information necessary to let the contractor understand how to build the project. Remember that Contract Documents are not an end unto themselves.

Project schedules - They're not just for construction anymore!

As we all know, the actual delivery of the finished project is a very important process in the life of a project. "*Time is what keeps everything from happening at once",* so it is important to understand the relationship of time to your project.

It is critical to establish a solid work plan at the very beginning of a project, because "*If you fail to plan, you plan to fail"*

The project plan should:

- ◊ Layout the project skeleton/schedule/milestones,
- ◊ Schedule the sequence of tasks, and
- ◊ Track and revise the schedule.

We are generally very diligent about preparing detailed schedules for construction that have critical path elements and resource loading formulas, but we are less demanding when it comes to design schedules. We are often satisfied with the designer assigning completion dates for only major milestones. This sometimes gives us a false sense of security that the design team will meet their schedule while they slip further behind. Scheduling is a left brain activity and many designers are not very good at it.

To combat schedule issues for the design team, ask them to develop a critical path for design. It will help keep a late design submittal from compressing the construction schedule and costing you more money. This should include project milestones with specific dates. Be certain to clearly define quantifiable tasks and efforts for the entire team so that everyone knows their responsibilities. You must attempt to provide a *"time value*" to each of the milestones and all of the steps that you will take to get a project through your institutions building process.

Designing for Value

The final aspect that should be considered during the design process is designing for value.
This is simply making sure that the design of a facility meets the needs of the user in the most cost effective manner. That can mean many different things to many different people, but there are some fundamental areas of a project that should be questioned.

1. Maintenance
2. Life Cycle Cost
    - Initial cost,
    - Maintenance cost,
    - Energy consumption costs,
    - Salvage cost (if there is any).

We can't afford to build something that will be too costly to maintain. As a part of designing for value you will eventually experience value engineering which can be defined as "*the systematic creation of alternative proposals offering more cost effective solutions"*.

All too often VE is viewed as a cost cutting measure when the budget gets in trouble, but that doesn't really capture the spirit of what VE is all about. It is <u>not</u> random cost cutting! If you are using VE to get a project back into the budget, then what you're doing is not VE, its plain and simple cost cutting.

VE should start at the beginning of a project and accompany the design all of the way through the process. In fact, if a project embraces the concept of VE from the beginning, you should never have to face cutting the project budget.

A better approach is called Value Management. This is a more systematic approach to ensuring the value decisions are managed as the design process moves forward. This process utilizes a tiered approach, for example:

1. <u>Tier 1</u> cost reductions involve elements that most people will never notice, such as:
    a. Simplified structural systems,
    b. Re-specifying certain products such as regular sheetrock vs. 5/8" FC sheetrock,
    c. Owner purchase of major equipment.
2. <u>Tier 2</u> cost reductions are things that the owner might notice, but not most people, such as:
    a. Grouping plumbing together,
    b. Comprehensive lighting package.
3. <u>Tier 3</u> is the most difficult and requires scope reductions.

When analyzing the value of a design you must also consider the present value of the facility. Present value refers to the value of a facility at a given point in time taking into account the following factors:

- Present Value (PV)
- Purchase Price (P)
- Annual Operating Costs (M)
- Interest Rate (I)
- Life of Facility (L)

End of Part 1

Part 2 - Project Team

Now that we have a clear understanding of the design process and what it takes to design a facility, let's look at the team that is required to make the project successful.

The designer is only one member of a very large team that works together to make a project become reality. From the very largest to the smallest project, people must find ways to work together cooperatively in order to successfully complete a project.

It takes a great many people and organizations to produce even the simplest building project. Every project you work on, except perhaps the very smallest project will have at least five key team members involved.

1. Owner
2. Consultant (s)
3. Design Team
4. Construction Team
5. Supporting Cast

Owner

The first member of the project team that we want to look at is the owner. The owner is generally a team in itself as there are many people whose interests need to be represented on a project.

The first member of the owner's team is the client. The client can be defined as any number of people, but would generally represent the person, group or entity that is paying for the project. This could be one of the professional schools (*law, business, etc*.), an auxiliary or the state legislature (if you are a state school). In any case, someone is footing the bill for the project and their interests must be represented.

The next member of the owner's team is the user. The distinction between the client and the user has to do with use and occupancy. The user is the person or persons that will actually use the facility.

The next significant groups of owner team members are any committees that are involved. This could be how the client or user is represented, but it is also a way in which institutions who like to operate in an "inclusive" environment allow the campus community to become involved in a project.

Another important player in the owner's team is Facilities Management. FM departments generally have an entire group of people that will want to be involved in the project at various points in the process. Input should be sought from staff engineers, utilities division, maintenance personnel, custodial staff, and Groundskeepers just to name a few.

Finally we have other departments in the campus community that require participation somewhere in the course of the project's life. This would include departments such as EH&S, telecommunications, ITS, parking and traffic, etc.

Some members of the owners team are very sophisticated patrons of the design and construction process; they know what they want and they know how to get it, and then there are many who are not (*this is generally the majority*). It is critical that you understand the sophistication of the team members that you are dealing with. People will generally fall into the following categories:

Experienced
- A. educated and involved
- B. educated and uninvolved

Inexperienced
- A. uneducated and involved
- B. uneducated and uninvolved

Consultants

The next member of the project team is the consultant. The best consultants are endowed with a high degree of knowledge and the ability to apply this knowledge to the problem at hand in an attempt to provide the most appropriate solution to a problem.

A consultant must also exhibit a certain amount of leadership (*doing the right thing*) since the team will be relying on their expert advise. Among the traits needed for good leadership are:

- Ability to assess and achieve common goals
- Ability to encourage excitement, creativity and teamwork
- Ability to focus on important issues

In addition to these traits mentioned above, you want a consultant who has good management skills (*doing things right*). Among these are:

- Ability to keep the project on budget & schedule
- Ability to communicate effectively
- Ability to put self interests last

Buildings have become so complex and there are so many areas of specialization today that we need special help with most of the building systems and equipment. Consultants can provide the specialized expertise to meet specific project requirements.

Design Team

The design team, of course, is the focal point of the entire process and can be comprised of many different professionals. The architect is generally the lead designer, but can also find themselves in a secondary role to other design professionals. They are generally the creator, coordinator and communicator of the design elements for a project. Architects commonly provide design services and prepare the project documentation necessary to build the project.

They also assist the owner in the procurement of the contractor, observe the progress of the work in the field and provide the administration of the construction contract. As the primary design professional for the project, the architect assumes professional responsibility for all design decisions that are made.

To this end, you should be on guard for the 10 deadly sins of design teams.

1. Don't let the A/E firm change team members. The core group should remain the same.
2. Minimize the number of people you have to deal with. Deal with 1 or 2, use others as resources.
3. If the design schedule falls behind, it usually means a compressed construction schedule.
4. Over-design, this is often thought to be in the client's best interest since *we just don't have good taste*.
5. Everyone makes mistakes. Don't let the design team just look for blame. You want solutions!
6. Poor plans lead to multiple addendums; change orders and slows things down.
7. Some contractor's strategy is to overwhelm the design team with questions. *Compensable and excusable delays come from this strategy*.
8. Submittals are the lifeblood of construction schedules, don't let them slip. Get a submittal schedule.
9. Without strong design team leadership, someone else will take over.
10. The last part of a project (finishing up the final punchlist) is the part everyone remembers. Don't let it slide.

Your role in working with an architect is equally as important as theirs, so make sure that your expectations are in alignment.

Here are some things that you should do.

- Have Clear Decision Making
- Develop a Complete Program
- Establish an Adequate Budget
- Establish a Realistic Schedule
- Communicate Effectively
- Hire a Compatible Firm
- Guard Against Scope Creep
- Deliver Bad News Promptly
- Expect to Pay Realistic Fees

Then there are things that you should not do.

- Do Not Rely on Clairvoyance
- Do Not Make Impossible Promises

- Do Not Accept Sloppy Work
- Do Not Expect Perfection
- Do Not Expect Added Scope for Free

Architect Expects	***Architect May Get***
• Clear Direction • Instantaneous Decisions • Tightly Defined Scope • Comfortable Budgets • Fair Treatment • Profitable Fees • Quality Design Expectations	• Ambiguity • Extensive Collaboration • Scope Creep • Inadequate Budgets • Unreasonable Contracts • Gift Opportunities • Low Design Expectations
You Expect	***You May Get***
• Exceptional Service • Adherence to Budgets • Meeting Schedule Milestones • Comprehensive Services • Complete Drawings • Cost Effective Design	• Nonchalance • Budget Busters • Delays • Requests for Additional Fees • Errors & Omissions • Extravagance

Depending on the project, approximately 25% to 65% of the cost of construction on a project may be in the structural, electrical and mechanical systems of a building. Sometimes the engineers needed to design these systems are in-house (*as is the case w/ A/E firms*), but more likely, these engineers are members of consulting firms that are contracted for individual projects.

A number of other design disciplines can be involved in a project, again depending on the specific project. Some examples are:

- Planners
- Landscape Architects
- Interior Designers
- Graphic Designers

The architect's staff forms the core of the design team. As long as a firm has more than one staff member, in-house staffing of a project becomes an issue to the client. Few firms work on only one project at a time, so the coordination of labor requirements for all projects in the office becomes a firm's management task, but one which you want to be sure is handled appropriately.

In addition to the project architect, most projects require at least one other person. This may be a draftsman for the smaller jobs or perhaps a consultant or clerical staff member. Regardless

of the complexity or size of a project, however, one of the key team members is the project manager.

Construction Team

Rounding out the project team is another equally important member, the contractor.
The contractor works under contract, assembling the labor, materials and management necessary to construct the completed project. Most contractors maintain small organizations; in fact, the average firm has fewer than 10 employees.

There are three distinct types of building contractors and many hybrids of these:

- General Contractor
- Designer / Builder
- Construction Manager

The appropriate duties, responsibilities and limitations of the design professional, contractor and owner are typically defined in the contracts between the parties. These contracts establish the legal obligations of each party and it is important to make sure that the two separate contracts are coordinated.

What are the primary roles of each team member during construction?

Design Professional- The design professional should visit the site at appropriate intervals to make sure that the work is carried out in conformance with the plans, observe tests and review submittals required by the contract documents.

It is also the design professional's responsibility to interpret the plans and specifications. They are to be reasonable and consistent in this effort. The design professional endeavors to resolve disputes and claims concerning the owner and the contractor relative to their contracts.

Contractor- The responsibilities which the contractor is generally responsible for include a review the CD's and report any errors, omissions or inconsistencies in the plans to the design professional, to supervise and direct the work including the means, methods, techniques sequences and procedures and to secure and pay for all permits and fees required to perform the work.

The superintendent manages people and materials on the site, inspects the work to determine its acceptability to receive subsequent work, while the foreman supervises specific work crews such as concrete finishers, carpenters or form workers.

Owner - The owner's responsibilities include the furnishing of timely and accurate information to the project team whether that is survey information, existing site conditions or hazardous materials knowledge, making payments to the contractor in accordance with the design professional's recommendations, and supplying copies of the contract documents. The owner is bound, "by contract", to make prompt and timely decisions regarding changes in the work.

Supporting Cast - If owners, designers, consultants and contractors can be thought of as the principals in the building enterprise, then there is a large cast of supporting players. Among them you could have:

- Legislators
- Board of Regents
- Accountants
- Risk Managers
- Regulatory Agencies
- Attorneys
- Public

Selection of Team

Like every aspect of a project, the team selection may be simple and straight forward or it may be a complex process with many steps taking a great deal of time.

The fundamental starting point to determine the selection method of the design team is to first establish the project delivery approach, if possible. The option selected for delivering the completed project will often establish the method for the selection of the design team for the project.

For example; if you want to have only one entity to work with throughout the entire project, you may select a design / build approach; or if time is the most critical element, you may prefer a fast track approach. This would clearly influence your approach to the selection process.

Whatever delivery method you choose, there are some basic approaches to the selection of the design team.

Direct Selection - If your institution allows it and you prefer, you may select a design firm directly to design your project, but however informal the solicitation may be, clients generally select architects based upon some given criteria, such as:

- Resources
- Experience
- Ability
- Compatibility
- Cost
- Ideas

Comparative Basis **-** You may contact several firms directly and ask them to submit proposals for how they may approach the project, or you may take a more formalized approach.

Public owners are likely to follow a careful step by step process tailored after the "**Brooks Act**". This federal statute requires the selection of architects and engineers on a "qualifications based selection" approach (QBS). The process typically involves advertising for a request for proposal

(Daily Journal), evaluating the submittals, creating a short list of 3-5 firms, and then interviewing the short listed firms to make an award.

Competition - An owner may initiate a formal design competition to select the designer for a particularly important design commission. Competitions may be open or restricted and may or may not follow some established rules or guidelines.

Because design competitions require a great deal of time and expense, they are used primarily in special situations where the public nature of the design competition is important to the success of the project.

So who selects and hires the consultants?

There are several ways this can happen:

The first way is for you to hire all of the consultants as a team. This is quite common on many public projects.

Another approach is for the owner to hire the prime consultant, while letting the prime select and hire all of the necessary sub consultants. This is more common with smaller types of projects.

The final method for consultant selection is a combination of the above. In this scenario, the owner selects the prime, and then the owner and the prime select the sub consultants together.

The following are what you might consider as important criteria in hiring designers:

1. Responsiveness to your needs.
2. Ability to manage projects.
3. Ability to maintain a schedule.
4. Ability to adhere to a budget.
5. Related experience.

Oftentimes a specific project will require the submission of an RFP (request for proposal) when a new project is being considered.

1. The format in which the proposal is submitted is equally as important as the content. The format should be as clear, simple and straightforward as possible.
2. The layout should integrate good graphics to accompany the text. There should be some logical sequence to the proposal, such as:
   - Cover letter
   - Executive summary
   - Problem statement

- Approach
- Qualifications
- Photos and examples of related experience
- Team members and qualifications

4. Quality submissions are infinitely more responsive than submissions w/ quantity. One sure sign of potential problems are spelling & grammatical errors, etc.

End of Part 2

Part 3 - Design Process Tools

Effective Communication

All professional services involve a continuing exchange of information, including data, advice, opinions, proposals and decisions. The vast majority of information however is conveyed through direct personal interaction.

Increasingly people are beginning to realize that listening is the key to good dialogue. Fortunately we can train ourselves to be good listeners. If you want to listen so that you really hear what others say, make sure you aren't any of these types.

1. Mind Reader - You'll hear almost nothing if you are busy guessing what they are going to say.
2. Rehearser - If you're deciding what you will say next, you'll never hear them.
3. Filterer - This is selective listening, when "*we hear what we want to hear*".
4. Dreamer - Drifting off during a conversation can be embarrassing.
5. Comparer - If you compare everything that someone says to your own experiences, you may not hear what the other person is actually saying.
6. Derailer - This is someone who is constantly changing the subject.
7. Placator - They agree with everything that is said just to be nice or avoid conflict does not make you a good listener.

How you say something is also incredibly important! People only hear every 3rd word, while they retain only every 5th word!
In fact:

- Body language is only **55%** of the communication;
- How we say things is **38%** of the message; and
- What we say comprises only **7%** of the message.

Equally important in communication are writing skills. While email has become an incredible communication tool, it has a negative influence in our communication skills. Some common e-mail mistakes are:

- Airing grievances & hostilities, and
- The reader's mood can affect interpretation.

There are some fundamental "netiquette" rules that we should consider:

1. Use "reply all" judiciously;
2. Refrain from using!!!!! to emphasize your point.
3. Avoid text messaging abbreviations. This is one of the things that the generation "x" or "y" or whatever we are in at the moment will bring, but these practices continue to degrade writing abilities.
4. Don't use wallpaper. Not only is it annoying and a memory hog, but you can't "strip it" off of your own email when you forward or reply. It may seem "cute", but resist, please!

5. AVOID ALL UPPER CASE. Why? Duh!
6. Be clear and concise. Don't make it any longer to read than it needs to be.
7. Think and read it before sending. Many people not only don't think, but they often don't even read it before sending it.
    a. Not only can it have errors and not make any sense, but you think twice before sending it if you will read it first.
    b. Have you ever tried to recall a message?
8. Answer emails as promptly as possible. If it is complicated and requires time, then at least acknowledge your received it.
9. On the other hand, don't set "return receipt" as a default for every email. I refuse to acknowledge them just to drive people crazy!
10. Avoid unneeded attachments. This can be annoying and cause problems for some servers.

Management studies indicate that meetings are the single most time consuming activity in the workplace, yet a good manager views a meeting as an opportunity to simply need to be carefully designed and managed. *Some people believe that meetings are where minutes are taken and hours are lost!* Studies show that most meetings exceed their allotted time by **25%** and still only cover 1/2 of the agenda while **30%** of those at a meeting are unhappy with their role.

Some tips to keep meetings truly productive include:

1. Consider alternatives to accomplish the objective
2. Always have an agenda prepared
3. Keep it short & sweet
4. Prepare for the meeting
5. Confirm that the meeting will actually take place

In fact, staff meetings are the <u>most disliked</u> meetings of all!
Why?

- Lack of specific objectives;
- Issues are rarely resolved; and
- Irrelevant issues are discussed over **5%** of the time.

Fees

One of the most important aspects for the successful financial management of a project is the careful pricing of professional services. You will likely have to do your own negotiations to reach an agreement.

The basic measurement for all financial remuneration of the professional is time.
Knowing the value of time and how to properly manage it is critical for the successful operation of a professional business. This isn't necessarily your problem, as the client, but it is important to understand the fundamentals of the consultant's fee basis in order for you to both:

- Negotiate a reasonable fee
- Monitor the progress of their work

The unit of time is the most measurable unit that the professional has, so that is ultimately what all fees are based upon.

What are you actually paying for?

- Time
- Value
- Expenses

Experienced clients recognize that adequate compensation for the designer is in their best interest because it provides the firm with the ability to deliver the appropriate level of service necessary for a successful project. (*You usually get what you pay for!*)

There are several common methods that form the basis of compensation for design services and dictate the fee structure. Choice of method is often influenced by tradition, expediency, past practice, or by the client. Nevertheless, you are in a position to guide the team in selecting the most equitable method for the project. Some commonly used forms of compensation for professional services are:

1. Lump Sum -This is used generally when the scope is clear, the program is complete and unusual contingencies are not anticipated.

   Advantages:
   - Greatest potential for profit for the consultant
   - Costs are known
   - Compensation is set up front and designer can plan accordingly

   Disadvantages:
   - Requires intense negotiations
   - Greatest potential for loss
   - Requires careful monitoring thru project

2. % Construction Cost -This method links compensation to the cost of construction rather than directly to the scope of services.

   Advantages:
   - It is simple to use
   - It is widely accepted and understood
   - If scope decreases / fee decreases
   - It gives you an easily calculated fee

   Disadvantages:
   - No direct relationship to effort
   - Market for construction determines fee, not cost of services
   - Removes incentive to control construction costs

3. Cost per SF - This method links compensation to established units such as square feet (*faculty offices*), number of beds (*dorm*) or parking spaces (*parking garage*).

   Advantages:
   - Helps keep costs on a unit basis (*tight control*)
   - Assists in maintaining size of project (*scope creep*)
   - Easy to calculate (*could argue net / gross*)

   Disadvantages:
   - No direct relationship to effort

4. Hourly -Owner is invoiced based upon the DPE plus a mark-up. The agreement often includes a *guaranteed max*imum (absolute) or a *not to exceed (*estimate) limit.

   Advantages:
   - Safest method for designer (*prevents loss*)
   - Overhead & profit are built in
   - Easily audited and simple

   Disadvantages:
   - Can be confusing
   - Low potential for profits
   - Designer has no incentive to keep fee costs low

5. Cost Plus Fee - This is a variation on the hourly approach and uses the designer's direct costs with an added fee.

   Advantages:
   - Direct pay for actual work / effort
   - Fee can be appropriate to situation

   Disadvantages:
   - Can be confusing
   - Requires high level of trust

6. Per Diem - This method fixes a cost per day for professional services

   Advantages:
   - Easy to keep up with
   - Easy to understand
   - Works well for specialized "consultation" (*expert witness*)

   Disadvantages:
   - Can appear high
   - Partial days are billed at full rate

Once you develop an understanding of what the potential costs are going to be to operate their office, then a consultant can develop a budget (*fee budget*) for the project, and you can review it with some confidence.

Some common fee budgeting pitfalls are:

- Overlooking project management costs -The idea of managing the various team members involved in a project often escapes the person formulating the fee

budget. Solution- Make sure they involve the PM in the preparation of the fee budget.

- Budgeting for corrections - Most firms budget for owner reviews, but then they fail to realize that it will also take time to make corrections resulting from the reviews.
- Activities beyond the contractual completion date - Projects rarely end on the contractual completion date. There are always punchlist items to follow up on, questions from the owner/contractor or many other things that might require their time and attention.

Negotiations

There are 3 basic types of negotiations:

- Soft
- Hard
- Principled

When negotiating, it is sometimes difficult to get what you want without jeopardizing a good relationship. Remember that you, or your team, will be working with these people for the duration of the project and you don't want to risk ruining a good relationship from the start. Here are some tips that may help you achieve a successful negotiation while building good relationships.

- Ask or you will not receive – You must first ask, but don't necessarily reveal strategies too early.
- Never stop negotiating & searching – Develop options, the more the better. Don't get bogged down in the details.
- Ask questions, don't make statements – Questions are more powerful than statements.
- Be prepared to give something up, slowly – Negotiating requires a lot of back and forth, and give and take.
- Control your emotions – Don't take things personally. Anger is not a good strategy.
- Don't set firm deadlines – Set flexible deadlines. 80% of the progress will likely occur in the last 20% of the time. If you set a firm deadline and you miss it, then what?
- Be prepared to walk away if necessary – If you can't walk away, maybe you shouldn't be negotiating.
- Silence is golden – Silence is a powerful tool when used wisely. *Some people can talk themselves into, or out of anything.*
- Dumb is not dumber – Obtaining information is more important than impressing the others.
- Everything is negotiable – The best negotiators believe this and never stop.

Types of Negotiation

	Soft Negotiation	Hard Negotiation	Principled
The Goal	Reaching and Agreement	Winning	Mutuality: A Wise Outcome
Participants	Friends	Adversaries	Problem Solvers
About the Relationships	Make concessions to cultivate the relationship	Demand concessions as a condition of it	Separate people from the problem
Trust of Others	You do	You do not	Proceed independent of trust
Your position	You change readily	You dig in and hold	Focus on interests, not on positions; explore interests
Your bottom line	You disclose	You hide and mislead about	Avoid having a bottom line
To reach agreement	You accept one-sided losses	You demand one-sided gains	Invent options for mutual gain
You insist on	Agreement	Your position	Insist on using objective criteria; yield only to principle
Contest of Wills	You try to avoid	You try to win	
Pressure	You yield to	You apply	
The Architect's Fear	I'll probably lose	I'll endanger the relationship	

Project Controls

Once the project is underway, how can you begin to control the progress of the design? This is accomplished through a series of project controls. Since people are the key resources of the development of the design, the efforts to manage the project must be directed at the project team.

The key, of course, is good communication and a constant awareness about what elements are important to meeting the goals of the project. Some tools to assist in that effort are:

- Institutional policies & procedures
- Design and contract documents
- Design guidelines
- Construction standards
- Contracts

Additional tools that you have available to you can be categorized as:

Internal, and consist of:

1. Professional support staff (*this includes PM's, architects, engineers, and clerical*),
2. Plant staff (*this includes all of the trades areas*),
3. Project information systems,

4. Design guidelines or standards

    - Site requirement
    - Utility and energy requirements
    - Building codes
    - Systems specs (HVAC, electrical and roofing)
    - Room numbering
    - Space standards

5. Consultant instructions
6. Other university resources (telecom, university counsel, etc.)

In addition to campus specific tools (internal), there are other management tools to assist you with the project which could be termed external**.**

Some of those are:

1. Team briefings
2. Project authorizations
3. Filing and recording system
4. Key Project Information.

    - Project directory
    - Program and budget limitations
    - Site information
    - Codes, regulations, and schedule deadlines and milestones.

5. Decision Making Process

Design Reviews

Another important element in the control of the design process is design reviews. Each phase of the project design should have a clear review period in which everyone who has a valid concern for the project should comment on the design.

Believe it or not, getting participation is the most difficult part! You can help by having a designated plan room set aside for reviews and establishing clear and realistic deadlines. The same thing can be accomplished through the use of electronic file sharing, FTP sites and a myriad of technologically supported platforms. The key is to get the plans into the hands of the stakeholders and get them involved in the design review process.

Many places use “page turning” meetings where the design team walks through the design with the stakeholders page by page. To increase efficiency, the meeting should be scheduled to include each discipline or stakeholder at a predetermined time during the review meeting(s). This removes any misunderstands that might occur while trying to read plans independently and increases accountability for participation.

The schematic design phase review should focus on things such as:

- Aesthetics
- Systems Concepts
- Value Engineering Issues
- Budget
- Schedule
- Internal Approvals for Code Compliance

The design development phase review should focus on things such as:

- Design Concept
- Systems Design
- Proposed Construction Schedule
- Site Staging
- Detailed Review of Budget Estimate

Finally the contract document phase review should focus on things such as:

- Specifications vs. Standards
- Constructability
- Coordination
- Construction Details
- Division 1
- Other Specific Contract Language (*general conditions, special conditions, etc.*)

End of Part 3

Part 4 - Managing the Process

Project management is perhaps the single most important ingredient that there is in managing the entire process.

Specific attitudes and approaches to managing a project vary with individual:

- Organizational types
- Clients and project requirements
- Interests and skills of the participants

In larger arenas, project management becomes more explicit with some firms or schools publishing project management manuals, while in smaller firms and schools project management will generally be less formal and explicit, but no less important.

All of the concepts related to project management are important, regardless of the size of the organization. Design and the associated design services are becoming more complicated:

- Projects are becoming more complex,
- Technical aspects of construction are rising and
- Designers are coordinating the services of more outside consultants.

Good project management includes meeting the needs of both the client and the ultimate user, controlling the total cost of the facility and making sure that the facility is occupied within a specified time period.

There is no more important aspect of a project than the beginning. This is illustrated so appropriately with the 90/10 rule; which states that “decisions made in the first 10% of a project effort determine 90% of a project’s cost and schedule”.

The first important task to establish a successful project is to develop a comprehensive understanding of the project and the desired outcomes. Be sure that your desired outcomes match those of the clients. Involve the key stakeholders;

- Define the project. Reconcile any conflicting expectations from the stakeholders;
- Set goals and measurable objectives;
- Identify constraints. Any postponement of this activity will only increase cost and delay the schedule later. This includes:

    1. Money
    2. Time
    3. Site
    4. Regulatory
    5. Political
    6. Change (people resist change)
    7. Collateral effects (nearby student housing for example)

- Develop implementation plan, articulating step by step tasks; detail is important here.

The next major step is to formulate the team. We discussed this earlier, but when they are in place, it is important to:

- Prepare them by focusing on their capabilities, strengths and weaknesses and working styles
- Identify roles and responsibilities
- Manage everyone's expectations
- Manage the decision making, this is particularly important for the users
- Establish the communication system. How will everyone stay informed and how will the communication flow be facilitated?

According to a study by Case & Co., 1/3 of all projects lose money and are therefore unsuccessful from the point of view of either the firm or the client. In most cases the reason for the failure is a lack of management design control over the entire process. Many design firms do not utilize project managers but instead try to use the design principal to do the job. This can work in a firm with 8-10 people, but in larger firms the principal simply can not remain so close to such day to day details. An increasing number of owners and firms are developing strong PM approaches to managing projects. The PM is usually competent, experienced and is striving to reach the level of senior management. They have total responsibility and authority for a project.

Among the several benefits of using a strong PM are:

1. One individual is responsible
2. It frees others from project tasks
3. It allows personalized service
4. It helps develop leadership

Project Managers

When we talk about project managers, who we are we really talking about? What kinds of people make good project managers?

Generally they:

- Are very well organized
- Have a broad based background with varied experience (could be from a design background, construction or trades)
- Are good communicators (listens well)
- Are the clear leader (that also means that they know when to delegate)
- Are disciplined (must get the job done and know what is important) and handle stress)
- Are fair, and
- Consistent

There are usually more than one project manager on a project team. First, you have a project manager that represents the design team. It will be their responsibility to ensure that the project goals that the design team has established are met. These goals should include:

- A good design for the project
- A profit for the design firm and their sub consultants
- A happy client

Likewise, the owner usually has a project manager of their own. At a small school it could be the head of FM or even a VP of Administration, but most schools have at least one PM and some of the larger schools have several PM's.
The owner's PM usually focuses on:

- Project budget
- Project schedule
- Client / users happiness

The third PM that usually shows up on a project represents the contractor. The contractor's PM will focus on completely different issues (*albeit w/ some overlap*) than the first two. Their focus will be on:

- Keeping the project on schedule
- Meeting the contract price
- Keeping the design team away from the job!

Design Project Manager

The functions of the design firm PM are radically different in a large firm than they are in a smaller firm.

In a smaller firm:

1. The PM is usually equally involved in all aspects of the project
2. They are not only the facilitator, but the "doer"
3. They work more one on one with the project team
4. They allow the principal to do the marketing
5. There are generally fewer people to coordinate with
6. The PM is free to make individual design decisions

In a larger firm:

1. The PM is in more of a facilitator role with less doing
2. They generally lead a whole team of professionals
3. Firms use their role in the marketing strategy
4. There are many more players involved
5. Decisions are more likely to be made by groups

Owner's Project Manager

The primary function of the Owner's PM is to organize and plan the project in such a way so as to complete it in the most efficient manner possible. It is the sole responsibility of the PM for the project to be on time and within the budget. This means that the PM must be empowered to make decisions and have the support of their coworkers & superiors.
To accomplish this they must:

1. Direct the team in their assignments. They must make it clear what responsibilities fall to which team members.
2. They must continually test the progress being made against the expectations of the plan.
3. To test the plan means that they must track the critical elements that determine the success of the project. They should establish milestones that assist them in tracking budget and schedule goals. This requires the appropriate PM tools to do their job.

Managing a design project is not unlike managing many other types of projects that you encounter on a daily basis. There are some clear no-nonsense rules that can guarantee results.

1. Set a Clear Project Goal
2. Determine the Project Objectives
3. Establish Checkpoints
4. Establish a Working Schedule
5. Direct the Team
6. Reinforce the Commitment
7. Communicate
8. Resolve Conflicts
9. Empower the Team
10. Encourage Risk Taking

As hard as you may try, every project manager faces some common pitfalls in the "quest" to manage the perfect project. Some of the most common are:

1. Delegation
   - Failure to delegate (*you become the bottleneck*) *Why don't we like to delegate?*
     - No One Can do Better
     - It's Faster
     - I Have to Fix it Anyway
     - It Takes too Long to Explain
     - I'll be Disappointed
     - I'm Not in Control
     - It Won't be Perfect
     - You delegate, but w/out the authority to go with it
2. Micro vs. Macro
   a. Paying excessive attention to paperwork.

    b. Large issues go unresolved while smaller ones get the attention (Humanities).
3. Analysis vs. Synthesis
    a. Synthesizing solutions before problem is understood.
    b. Analyze forever but no decision (utilities).
    c. Failure to set priorities / everything due @ once.
4. Standard operating procedure vs. Flexibility
    a. Don't let "the way we do things" get in the way of good PM practices.
5. PM vs. PM
    a. Project management vs. people management
    b. An excessive dedication to the project at the expense of the people involved will ruin a project
6. Image vs. Substance:
    a. Excessive attention to time & project peripherals. *(This is a common avoidance technique)*

Managing the Project

The very first aspect in the process of managing a project is the communication with the client or user. This first takes place during programming.

1. Often the client does not understand what a program is or what it is to do, but it remains one of the most important aspects of the process.
2. It is important to establish a bond with the client right up front, to affirm that you understand their needs.
3. Ask questions to help you understand their true needs.
4. The process is many times more important than the product.

Following the programming phase is the schematic design phase in which you can begin to express your and the teams ideas for the project solutions to the client.

1. Expect conflict to occur. Be sure to serve the client even if that means challenging them.
2. Make sure that you continue to communicate with the client and keep the design team on track.
3. Observe their reactions to each design presentation:
    a. Body language
    b. Positive signs of understanding
    c. Avoid technical jargon
    d. Don't react negatively to suggestions. If you don't agree just smile and nod your head, then try to educate them
    e. Avoid the temptation to slide things by
    f. Make sure that the real decision maker is involved

The production phase follows the management of the design phase. This phase primarily involves communication with the design professionals which takes place in the DD phase of design.

During this phase it is critical to establish a solid work plan (*critical path for design*) including milestones with dates (*these are not just for contractors*).

1. Prepare Project Plan
   - Project Milestones
   - Sequence of Tasks
   - Confirm Manpower
   - Track Schedule
2. Conduct Regular Meetings
3. Keep Client involved
4. Get "Buy-In"
5. Make Decisions
6. Quality Control
7. Quality Assurance

The team finally gets to the communication of their design ideas to the contractor which happens both through the contract document and contract administration phases.

The contract documents are intended to tell the contractor where and how many things are in the design, while the specifications are intended to communicate the level of quality you expect.

The drawings should be clear and concise, conveying only the information necessary to let the contractor understand how to build the project. Remember that CD's are not an end unto themselves. It is wasteful and dangerous to show too much in the documents. Also, avoid phone conversations of graphic problems; that's what the fax machine and electronic communication is for.

During the construction you must realize that mistakes are going to happen from all participants. When it happens, and it will, focus on the solution, not on the problem. Learn to manage the problem (*problem management*). This eliminates the need to "search for the guilty". If you try to *nail* the GC, you can be sure they will *nail you* 10 times over. Don't be afraid to admit "I don't know, but I'll find out". Regular progress meetings are a must with a pre-set agenda.

Remember that the client's last impression is the final part of construction which is usually the messiest too. Follow-up!

Of course no project is ever considered successful without the management of the project cost. The successful management of construction costs necessitates the use of certain Cost Management Principles. Some of these would include:

- Realistic expectations (*architects are optimists, first budget is remembered*),

- Cost data (*consistent framework, i.e.; CSI, software programs*),
- Scope control (*no scope creep*).

The top 5 reasons for project cost overrun; according to the Facilities Management Organization of America, are:

- Incomplete drawings;
- Poor pre-planning;
- Inflation;
- Lack of timely decisions; and
- Excessive change orders.

In order for any budget to be successful, there must be the alignment of:

- The budget,
- Scope, and
- Customer expectations.

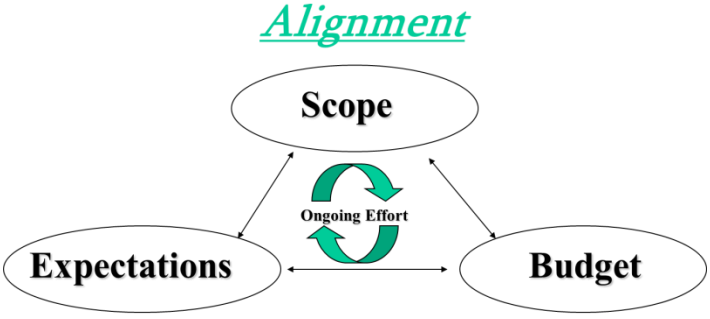
Every step in the development of a project involves choices between 4 critical elements:

- Budget
- Quality
- Scope
- Time

3 of the 4 will always automatically establish the 4th, for example:

- If the quality, budget and scope are set, then the *time is automatic*.
- Or, if the budget, scope and time are set, then the *quality is automatic*.

On the other hand, if 2 of the 4 are set, then the other 2 are negotiable.



Projects Need to Start Right to Finish Right

End of Part 4