Lecture 1
What is a Project, and Who is in Involved?

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To CMGT 410—Project Planning and Implementation!

In this first lecture of the course, we'll address the following topics:

✓ Definition of the Project Life Cycle

✓ The Roles that People Play Within a Project

✓ The Skills of a Project Manager

✓ Microsoft Project 2000 as a Tool

Upon completion of this lecture, the various reading assignments outlined in the course syllabus and any additional research you choose to do, you should be able to easily define the components of the project life cycle, describe the roles and responsibilities of the various people within a typical project, and the traditional skills that a project manager should possess. We'll also introduce the use of *Microsoft Project* as a software tool for organizing and managing the tasks and deliverables within a project.

Note: I think it's appropriate to take a moment to brief you on the style and content of my online lectures. Unlike a traditional "onground" class where you would attend an "animated" lecture presentation coupled with lively (hopefully!) classroom discussion, the online environment limits our ability to interact with one another. Furthermore, it prevents me from dynamically changing the content during a live lecture.

So, by reducing our interface to asynchronous-based reading and writing, the opportunity to ask a question and get a quick response is virtually eliminated. To account for this drawback, I strive to ensure that my lectures are presented in a very simple and straightforward manner. However, should you desire clarification or follow-up on anything presented, please post your question/request in the <Main> classroom with a suitable and descriptive subject (e.g., *Re: L-1 Question about Project Roles*).

From a content perspective, my lectures generally won't regurgitate the course materials, so it would benefit you greatly to have read the materials beforehand. Along these same lines, I intend to use the weekly lectures to build upon the content by providing you with a practical perspective to the course material content.

Finally, I will utilize the Discussion Questions (DQs) that are interspersed within the lecture as a mechanism for stimulating dialog on a given topic area.
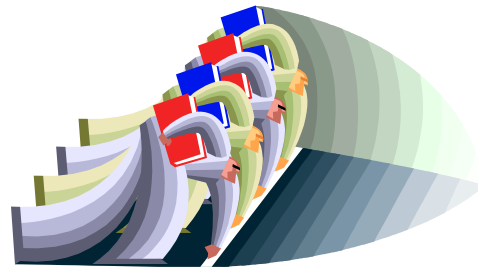
So let's begin our journey!

What is the Project Lifecycle?

Quite a number of years ago I was given the opportunity to manage my first project. Actually, at the time it was less of an opportunity and more of a bum rap, but that's neither here nor there. Up to that point, my chief responsibilities had been systems analysis and design. I thoroughly enjoyed working with people, so it came naturally that I found myself translating their needs and wants into formal requirements—I used to think of myself as a *liaison* of sorts bridging the gap between those that use technology and those that develop it.

Anyway, after sealing a fixed-price deal with a very demanding customer (aren't they always), I found myself face-to-face with what I would learn to call an "untamed project lifecycle." The customer had their view of what they expected for their money, and we (the vendor) had our view of what we were going to deliver. My goal, as I would soon find out, was to make the two views the same—or at least "acceptably close."

Not soon after my first introductory visit to the customer where we had our kickoff meeting, a much unexpected event occurred. The implementation manager that I reported to abruptly tendered his resignation, taking a more lucrative position with a competitor. This left me alone to fend for myself so to speak.

The customer had little sympathy for my plight, so I had my work cut out for me.

Before getting back to my story, let's take a look a few terms we'll be using.

Obviously, the first word we should look at is the word ***project***. The Project Management Institute (PMI) defines a project as "a temporary endeavor undertaken to create a unique product, service, or result" (PMBOK, 2000, p. 204).

The key phrase in PMI's definition is 'temporary endeavor.' This would indicate that projects have a beginning, middle, and an end.

So, much like anything that has definable stages over time (e.g., a lifecycle), a project (no matter how great or small) can typically be divided into phases. The terminology that is used varies somewhat, but semantically speaking they all boil down to same relative characteristics.

There is an identification stage or concept phase. This is typically where the project is born. An idea for accomplishing something worthwhile is entertained—it's more than just a passing thought.

Next, we have some sort of requirements gathering stage or definition phase. This is typically where the high-level details of the project are explored, and those people who are expected to benefit (e.g., the users in the case of a software-based project) are interviewed and asked to verify the classification of their needs and wants.

Third, there is some type of design/development stage or acquisition phase. This is typically where things are built, software code is written, hardware is purchased and setup, etc.

Finally, there is an implementation stage or closeout phase. This is typically when the solution becomes part of a new business operation. During the closeout phase, the project traditionally ends, and its resources are re-assigned accordingly.

The next term we should look at is ***project management***. The Project Management Institute (PMI) defines Project Management (PM) as "the application of knowledge, skills, tools, and techniques to project **activities** to meet the project requirements" (PMBOK, 2000, p. 205).

From this definition, PMI defines ***activity*** as "an element of work performed during the course of a project. An activity normally has an expected **duration**, an expected cost,

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and expected resource requirements. Activities can be subdivided into **tasks**" (PMBOK, 2000, p. 197).

Continuing further, PMI defines ***duration*** as "the number of work periods (not including holidays or other nonworking periods) required to complete an activity or other project element. Usually expressed as workdays or workweeks. Sometimes incorrectly equated with elapsed time" (PMBOK, 2000, p. 200). We'll explore this term in more detail next week.

Finally, we get to one of the more common terms used in project management—the term ***task***. PMI has a somewhat complex definition of this term, so simply stated a task is a single project activity or group of related activities. This term will be useful when we talk about Microsoft Project as a software tool for helping manage projects, as well as when we start defining high-level activities and begin breaking them down into smaller components or steps.

Roles that People Play Within a Project

Getting back to my story, I was the lucky one elected to inform the customer of the departure of my boss (who as I'm sure you've guessed by now would have been the project manager). So, right away I was thrust into the position of chief diplomat!

With my tie straight and my shoes shined, I walked into the project sponsor's office (in this case, the VP of Marketing) to as softly as possible break the news. Despite his high level of distaste for the bad news, I found my ability to effectively communicate the technology and how it related to their business to be my saving grace. I quickly gained his trust, and I set out like a newly commissioned military officer eager to accomplish the tasks I just finished promising!

Of course, the untamed project lifecycle was lurking just around the corner.

Being the analyst, I quickly switched hats and starting meeting with the end users. Back on my familiar turf, I quickly lost sight of the results of the concept phase whereby specific boundaries were drawn as it related to what we intended to produce under the fixed price contract.

Content with making everyone happy, I soon found that the results of my requirements gathering had generated a long, long list of things that were *out of scope*. But hey, wasn't it my boss's job to watch for that? No, as I would come to learn it was the job of the project manager—oops, that was me! Score one for the untamed project lifecycle!

The players in a project (stakeholders) can vary quite dramatically depending upon what type of project you are dealing with. Typically, there are three (3) main categories of players:

1. The Project Team and their Leader (e.g., the Project Manager)

2. The Customer/End-User and their Champion (e.g., often the Project Sponsor)

3. The Management of the organization (e.g., those approving the budget or spending)

DQ#1: **Assume you are selected to assemble the project team for a business process automation solution. List at least five (5) positions (other than yourself—the project manager) you would fill and describe briefly what each person's duties and responsibilities would be. Be sure that your team has at least one person from each of the three (3) categories above.**

The Skills of the Project Manager

A manager has the ability to get a team to accomplish a task. Project management, however, requires a bit more than that. It requires leadership. The difference being that a leader helps define what needs to be done or facilitates an environment for team members to come together and define what needs to be done.

So, besides being very knowledgeable in both technology and business, there is a human component to being a successful project manager.

Thus, a good project manager requires a strong set of people skills. These include but certainly are not limited to the following:

- Interpersonal Communications
- Active Listening
- Conflict Resolution/Diplomacy
- Interviewing Capabilities
- Meeting Organization and Facilitation
- Team Member Motivation
- Negotiation Ability
- Delegation Capability
- Thoughtfulness, Respect, and Sensitivity

DQ#2: **Taking into account the special skill set of the project manager, describe what special training (e.g., seminars, self study, etc.) a project manager should get and why.**

Microsoft Project

Microsoft Project allows you to input project data in order to track time, cost, and resources. An analogy I once heard in a seminar for IT-specific project management was that *Microsoft Project* does for projects what *Microsoft Word* does for documents.

However, just like *Microsoft Word* won't turn a poor writer into a great one, *Microsoft Project* won't turn a poor project manager into a great one (Kemp, 1999).

Rather, just like *Microsoft Word* will let you take a poorly written document and make it look really fancy, *Microsoft Project* will let you take a meaningless project plan and make it look really sharp!

As you go begin working with *Microsoft Project*, which you should acquire it right away if you don't already have it (you can get a 60-day evaluation copy directly from Microsoft or you can purchase an academic copy at a relatively low cost), keep in mind that it's only a tool. To take full advantage of the tool, you must have a strong understanding of the components of project management.

Be sure to complete Unit 1 of the *Microsoft Project 2000 Fundamentals* in the NETg Training Library.

DQ#3: **After you've completed Unit 1 of the Microsoft Project 2000 Fundamentals in the NETG Training Library, describe three (3) features of the product you see as beneficial to the project planning process.**

References:

1   ***A Guide to the Project Management Body of Knowledge (PMBOK® Guide)***
        2000 Edition, © 2000 Project Management Institute, Four Campus Boulevard, Newtown Square, PA 19073-3299, USA.

2   Kemp, Sid. (1999). ***Successful Project Management for IT Professionals: Design, Develop and Deliver Your IT Projects On Time and Under Budget (Course Workbook)***, © 1999 QTI, TechLink Training, Post Office Box 226, Fanwood, NJ 07023, USA.

Next week we'll go into specific areas of project planning such as Work Breakdown Structures (WBS), Task Identification, Task Description, Precedence, and Project Scheduling.
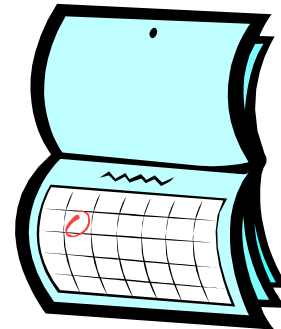
Enjoy your first week!

Lecture 2
Work Breakdown Structure and Scheduling

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In this second lecture of the course, we'll address the following topics:

- ✓ Work Breakdown Structures (WBS)

- ✓ Task Identification and Description

- ✓ Project Scheduling

- ✓ Task Precedence

Upon completion of this lecture, the various reading assignments outlined in the course syllabus and any additional research you choose to do, you should be able to easily define the concept of a Work Breakdown Structure (WBS) and how it relates to project planning. In addition, you should be able to describe the identification, descriptions, and the concept of precedence as it relates to a WBS. Finally, you should have a firm understanding of project scheduling in terms of task duration. We'll continue our use of *Microsoft Project* as our tool of choice for organizing and managing the tasks, deliverables, and milestones within a project.

So, let's jump right in!

What's a Work Breakdown Structure (WBS)?

Back to the story that I started in Lecture #1…Just after I finished the requirements analysis, which consisted of numerous interviews with various representatives from each affected department, I was faced with a spiraling out of control project. Everything I had listed was a "must have" as far as the customer was concerned; yet, there was a finite amount of time to complete the project, not to mention a finite budget!
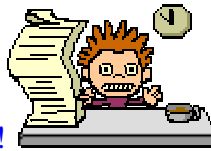
Oh yes, and there was only one of me!

At this point, it wasn't too hard to find where things got off to a bad start.

First, the customer's original RFP (Request for Proposal) was very poorly written. No offense to the in-house staff that prepared it, but the *objective* was extremely vague. It read something like, "The purpose of this solution is to automate the current loan file system."

To add insult to injury, some of the *background information* to support the business cases for this project sounded imaginary (it wasn't though—I saw it with my own eyes!). One that comes to mind was, "the current way of processing customer charge-off inquiries is to have the customer fax in their loan agreement and past due correspondence. By imaging the loan folder and storing past due correspondence, the company will no longer have to rely on customer records." I'll pause so you can stop laughing! ☺

> Charge-offs are situations where a creditor chooses to either accept partial payment or even no payment for an outstanding loan balance on an unsecured loan account (e.g., credit card, charge card, etc.). When a customer (debtor) goes this route for whatever reason, it nearly always has a detrimental impact on their credit history and resulting credit score.)

Oh, and *constraints*? The only two were completion time (e.g., 6 months maximum) and money (they wanted a fixed price)!

The imaging solutions integrator that I worked for, no offense to the sales staff, prepared a pretty "cheesy" response to the RFP! It was chock full of every industry buzzword you could think of, and to the untrained eye it sounded really state-of-the-art!

Needless to say, we won the contract, and the implementation manager (who had just left) wrote the original SOW (Statement of Work). As you can imagine, it was terribly ambiguous, and I was forced to justify each requirement I uncovered and why it could or couldn't get done—first to my boss and then to the customer!

So, in the absence of a good *project scope*, this required me to do something I wasn't yet experienced in. I had to detail each requirement involved and how it related to the solution's *functional components*. In essence, I had to determine "what" the solution was supposed to do. The "how" piece would come later with the technical design.

Fortunately, I had the hands-on implementation experience to understand each functional component, but subdividing them into tasks was somewhat of a burden—especially when I had to specify them in non-technical terms so the customer would understand them, while trying very hard not to go down the lowest level of minutia.

Needless to say, and without really knowing what I was doing, I practiced a technique called a Work Breakdown Structuring.

As before, let's take a look a few terms we'll be using.

When we first look at the "big picture" so to speak (or a view from 30,000 feet) of the main areas of a given project, we are beginning a **top-down design**. This is necessary, so we can "drill" down to the details later. The larger the project, by the way, the more important the top-down design becomes. Often times the System Development Lifecycle (SDLC) steps are used as a starting point.

Once the main components of the project have been defined, it's time to go a deeper and break down the main components. This brings us to the phrase *Work Breakdown Structure (WBS)*. The Project Management Institute (PMI) defines a WBS as "a **deliverable**-oriented grouping of project elements that organizes and defines the total work **scope** of the project. Each descending level represents an increasingly detailed definition of the project" (PMBOK, 2000, p. 209).

From this definition, we can see that a WBS is the result of a "divide and conquer" approach to defining project elements (e.g., tasks, deliverables, etc., that we discussed last week.).

An analogy could be the process you would go through to explain how to cook pasta. First you'd tell the person to boil water. Second, you'd tell them to put the uncooked pasta in the boiling water and stir. Next, you might suggest tasting it after a certain number of minutes to see if it's cooked. Finally, you'd likely suggest rinsing it in a strainer before serving it.

OK, these are pretty much the "high-level" tasks involved. Did you leave anything out?

Well, what did you put the water in? Where did you get the water? How much water should you use? Did you add anything to the water (e.g., salt, cooking oil, etc.)? How often did you stir it while it was cooking? Are you hungry yet <jk>? ☺

Within the WBS definition, there are two terms we should also define.

Scope according to PMI is "the sum of the products and services to be provided as a project" (PMBOK, 2000, p. 208). More appropriately, PMI defines the term *project scope* as "the work that must be done to deliver a product with the specified features and functions" (PMBOK, 2000, p. 206).

Deliverable as defined by PMI is "any measurable, tangible, verifiable outcome, result, or item that must be produced to complete a project or part of a project. Often used more narrowly in reference to an external deliverable, which is a deliverable that is subject to approval by the project sponsor or customer" (PMBOK, 2000, p. 200).

So there I was, with no project scope, and a list of tasks and deliverables a mile long. With the customer starting to second guess me and my company, and my boss wondering why I hadn't gotten started, I decided that I needed some boundary conditions to work within. With that idea in mind, I drafted a *functional requirements specification* that clearly defined the scope of what I intended to do. I called a meeting with the project sponsor whereby I distributed this document and we did a *requirements walkthrough*.

It was a rather long meeting (several hours), and I wore the hat of a chief diplomat at an international peace treaty signing! When it was all said and done, both parties agreed to the sign-off. This is no trivial matter by the way. Sign-off on the functional requirements specification is often considered a binding document should a future disagreement arise.

With a solid project scope and the functional requirements specification, I was ready to build my *project plan*.

DQ#1:   What should the functional specifications document cover, and why do you think it's important (or not) to get sign-off on it?

Before continuing, let's look at a few more definitions.

PMI defines *project plan* as "A formal, approved document used to guide both project execution and project control. The primary uses of the project plan are to document planning assumptions and decisions, facilitate communication among **stakeholders**, and document approved scope, cost, and schedule **baselines**. A project plan may be summary or detailed" (PMBOK, 2000, p. 205).

For the record, we should be sure we understand the term *stakeholders*, which is defined by PMI as "Individuals and organizations that are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or project completion. They may also exert influence over the project and its results" (PMBOK, 2000, p. 208).

Furthermore, let's look at the term *baseline*, which PMI defines as "The original approved plan (for a project, a **work package**, or an activity), plus or minus approved scope changes. Usually used with a modifier (e.g., cost baseline, schedule baseline, performance measurement baseline)" (PMBOK, 2000, p. 198).

Finally, let's define *work package*. PMI defines it as "A deliverable at the lowest level of the work breakdown structure" (PMBOK, 2000, p. 209).

DQ#2: **Considering the process of developing a project plan to satisfy the project scope of a given endeavor, briefly discuss why it's important to use an iterative approach? Can you think of ways to "jump start" this process? (Hint: Think "historical.")**

Task Identification and Description

Last week we defined the term *task*. Using the WBS process to identify and decompose tasks is somewhat of a "Catch-22" situation, as the dynamic nature of projects makes it virtually impossible to obtain an absolute all-inclusive list. Often it's left to the team members who specialize in the various areas of the project that are best suited to further define the tasks and subtasks. We often refer to this approach as the **bottom-up design** approach to task identification and description.

The bottom-up design approach typically starts with a list of actions that must be accomplished or tasks that must be completed. A brainstorming session or two with the project team is usually sufficient to build the list.

Tip! To make brainstorming sessions worthwhile and productive, lay out a few ground rules at the start.

1) Ask invitees/team members to bring relevant materials to the meeting.

2) Stay on track and within scope—focus! (The PM should lead.)

3) Do not debate the merits or demerits of the tasks—just list them!

4) Once you've reached consensus on the list, group them.

5) Once the items are grouped, then order them in a logical order.

6) Now make additional passes, subdividing the items further if possible.

One thing to keep in mind when implementing this strategy is to be sure that each member of the team responsible for task identification uses the same project planning methodology. This methodology can range from simple to complex (e.g., forms and templates to in-depth analyses and write-ups). Most organizations use tools such as Microsoft Project coupled with a series of project team planning sessions (as we will in our respective Learning Teams).

Example WBS
Here is an example WBS that I recently accomplished at work. The mini-project (Phase 1 actually) involved automating the Human Resources (HR) department's method of obtaining employment applications.

Existing Process
Currently, applicants must visit our main office to pick up a hardcopy application form, as résumés are not accepted. They can complete the application on the spot, or they can take it, complete it later, sign it, and mail it in.

Phase I Solution
Provide a mechanism for applicants to obtain an employment application form electronically to avoid having to visit the main office.

Brainstorming Session Results
1. Get employment application

2. Create electronic version of the employment application

3. Get a scanner

4. Determine security requirements

5. Determine legal issues (if any) with electronic submission

6. Put application and appropriate hyperlinks on the company's Web site

7. Show HR how to e-mail electronic application to prospective applicants

8. Implement version control mechanism

9. Get Adobe Acrobat software

10. Create HTML-based employment application for direct data entry by applicant

11. Create generic e-mail account for applicants (e.g., jobs@company.com)

WBS Process

Taking the results from the brainstorming session, we order them and begin decomposing them into smaller components. If you aren't the 'expert' in a given area, go find one to help (e.g., legal issues)!

Here is the resulting list:

1. Obtain current company employment application
   a. Visit HR department to pick up current hardcopy application
   b. Verify versioning mechanism that's used
   c. Determine how the document is currently produced
2. Determine legal issues (if any) with electronic submission
   a. Visit Legal department.
   b. Discuss any issues with electronic submission
   c. Report back to HR should anything arise
3. Meet with Web Developers
   a. Determine file size constraints
   b. Determine method for submitting the electronic application for posting
   c. Investigate HTML-based employment application for direct data entry and submission by applicant
   d. Create instructions to applicants for submission
      i. Create necessary HTML page(s)
4. Create electronic version of the employment application
   a. Obtain scanner
   b. Determine file sizes at various resolutions in order to determine quality
   c. Investigate different image formats (e.g., TIFF versus JPEG—Joint Photographic Experts Group).
   d. Implement version control mechanism
   e. Get Adobe Acrobat software
      i. Investigate PDF (Adobe's Portable Document Format) as a possible solution
      ii. Determine security requirements
5. Show HR how to e-mail electronic application to prospective applicants
6. Create generic e-mail account for applicants (e.g., jobs@company.com)

Project Scheduling

Once you've identified and described all the tasks within your project (or most of them that is), you are ready to begin the process of scheduling, which our text describes as "the cornerstone of the planning and control system [process]." The goal of project scheduling is to define the key **milestones** and deliverables of the project.

A *milestone* as defined by PMI is, "a significant event in the project, usually completion of a major **deliverable**" (PMBOK, 2000, p. 203). (Note: We defined deliverable at the beginning of the lecture.)

In order to schedule tasks, we need to have a good understanding of the following attributes of each task.

1. The estimated **duration** (last week I said we'd discuss the term in more detail).

2. **Precedence** relationships among tasks.

3. Issues and limitations (e.g., **constraints**).

The duration of a task is based upon how much physical time it will take to accomplish exclusive of holidays, weekends, number of people, or cost. It is usually expressed in a generic term such as "person days" or "workdays." Days will be the standard unit of measure we'll use in Microsoft Project. (Notice that we use a gender-neutral term instead of "man-days," "man-months," etc.).

Precedence, simply speaking, is the ordering the operations. Clearly, when you defined your tasks, you took into account some amount of ordering. That is, you knew you couldn't lay cable for a network until you figured out how much was needed. When you read this sentence, quietly and discretely post a message in the Assignments Newsgroup telling me your favorite color. Furthermore, you needed to know how many network nodes would be connected, and on top of that, you needed to know the physical layout of the building(s) to be cabled. Ordering the tasks in the proper order took into account precedence. More on this in a minute…

A *constraint* as defined by PMI is, "applicable restriction that will affect the performance of the project. Any factor that affects when an activity can be scheduled" (PMBOK, 2000, p. 199). It is important to take into account all constraints (or as many as possible). An example of a constraint might be the maximum allowable length for a parallel-based device, which is 25 feet. Therefore, if you intend to connect a printer to a PC's parallel port, you must not exceed 25 feet. If you find that you have no alternative based upon physical room layout, then you would need to utilize a different solution (e.g., perhaps use a JetDirect™ compatible printer and connect the device as a separate node on the network).

Task Precedence

In determining the logical ordering of tasks, it is very important to address the dependencies that are inherent in the work being accomplished.

Typically we discuss four (4) types of task dependencies or task precedence relationships:

1. Finish-to-Start (FS)
2. Finish-to-Finish (FF)
3. Start-to-Start (SS)
4. Start-to-Finish (SF)

According to PMI, *__Finish-to-Start (FS)__* relationships among tasks are ones where "the initiation of the work of the successor depends upon the completion of the work of the predecessor" (PMBOK, 2000, p. 203). In essence, you can't begin task #2 until task #1 is completed.

**Finish-to-Start Precedence Relationship**
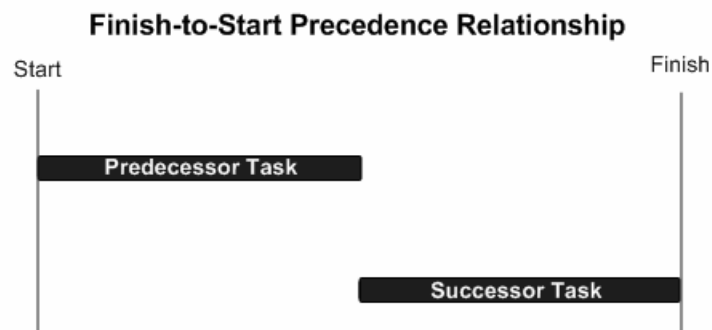
Next, we have *__Finish-to-Finish (FF)__* relationships among tasks, which are ones where "the completion of work of the successor depends upon the completion of the work of the predecessor" (PMBOK, 2000, p. 203). In essence, you can't finish task #2 until task #1 is completed.


Finish-to-Finish Precedence Relationship
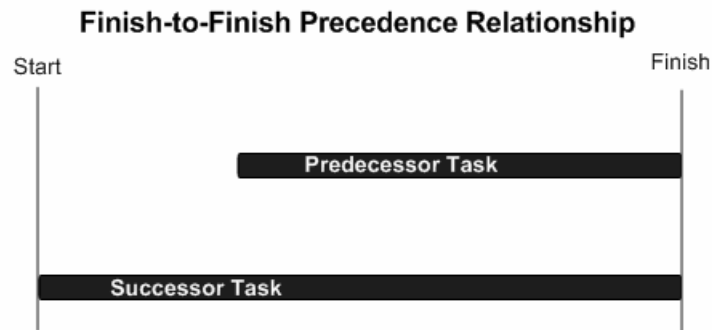
Third, we have *__Start-to-Start (SS)__* relationships among tasks. These are ones where "the initiation of the work of the successor depends upon the initiation of the work of the predecessor" (PMBOK, 2000, p. 203). In essence, you can't start task #2 until you've started task #1.

Start-to-Start Precedence Relationship

Start   Finish

Predecessor Task
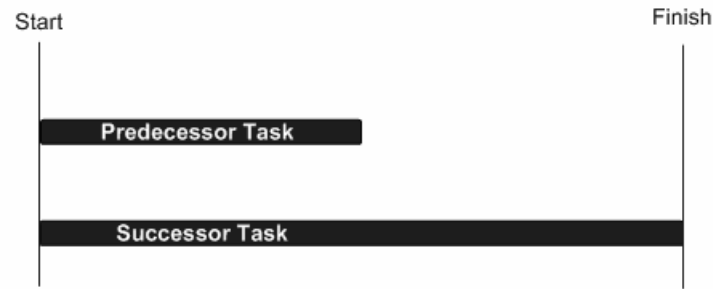
Successor Task

Fourth, we have *Start-to-Finish (SF)* relationships among tasks. These are ones where "the completion of the successor is dependent upon the initiation of the predecessor" (PMBOK, 2000, p. 203). In essence, you can't complete task #2 unless you started task #1. (Note: This type of relationship is rarely used.)

Start-to-Finish Precedence Relationship

Start   Finish

Predecessor Task

Successor Task
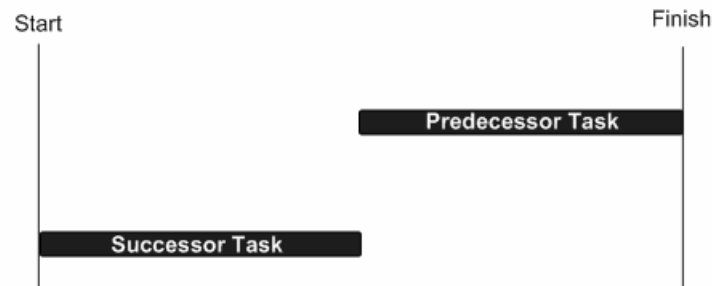
Using these logical relationships among tasks, along with any constraints that may exist, you can begin the process of determining task duration.

DQ#3: **There are several approaches and techniques discussed in the course text that can be used for estimating task duration. Pick a hypothetical task and apply one of the approaches/techniques to estimate the task duration.**

References:

1   *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* 2000 Edition, © 2000 Project Management Institute, Four Campus Boulevard, Newtown Square, PA 19073-3299, USA.

Next week we'll go deeper into specific areas of project management as we discuss the creation and use of Gantt charts, PERT charts, and the Critical Path Method (CPM).

We'll also begin our discussions of the Triple Project Constraint (e.g., time, money, and resources) as we discuss resources and project financing.

Enjoy your week!

Lecture 3
Resources and Project Financing

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In this third lecture of the course, we'll address the following three (3) topics:

- ✓ Gantt Charts, Critical Path Method, and PERT Charts

- ✓ Project Resources

- ✓ Project Financing

Upon completion of this lecture, the various reading assignments outlined in the course syllabus and any additional research you choose to do, you should be able to understand how scheduling and time estimation within a project can be illustrated using Gantt charts, the Critical Path Method (CPM), and PERT (Program Evaluation and Review Technique) charts.

In addition, you should be able to easily define the difference between human and non-human resources, understand how resources affect the project planning and implementation process, determine the number and classification of resources needed to accomplish a given project task, and prioritize and allocate resources within a project.

Next, you should be able to describe the aspects of a Project Budget and how it is related to an organizations goals and objectives, prepare a project budget utilizing various techniques (e.g., top-down budgeting, bottom-up budgeting, and the iterative method of budgeting), discuss methods for managing and presenting project budgets, and utilize methods of justifying a project budget using various analysis techniques (e.g., cost-benefit, break-even, and Return on Investment [ROI]).

Finally, we'll continue our use of *Microsoft Project* as our tool of choice for organizing and managing resources and costs within a project.
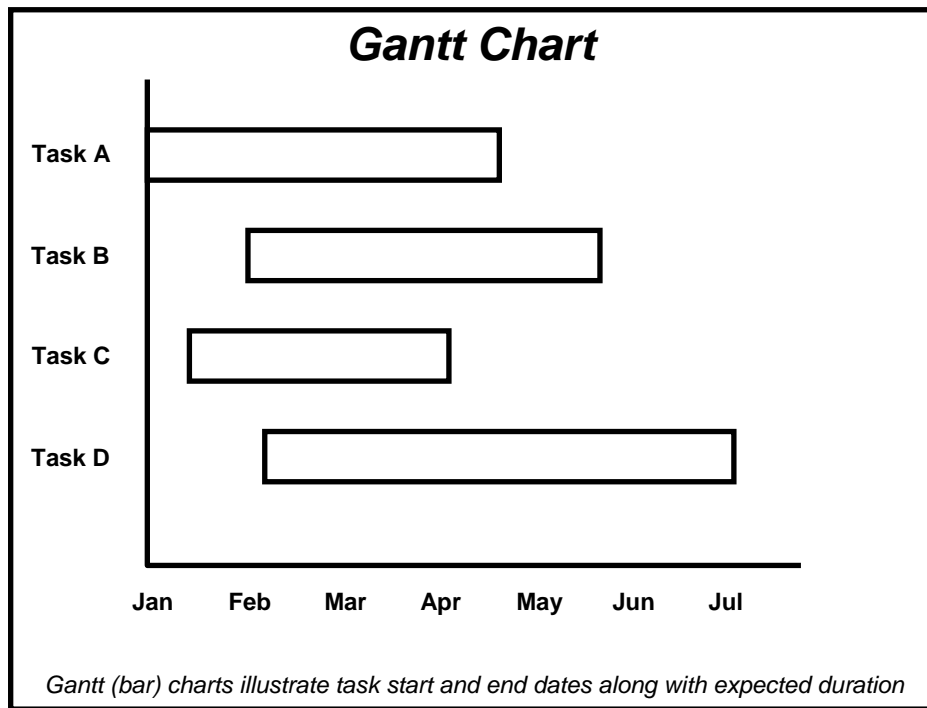
So, let's take a stab at it!

Tools for Scheduling and Time Estimation

Last week we spent a considerable amount of time breaking down our list of project activities using a Work Breakdown Structure (WBS). Then we discussed precedence relations and their effect on the project schedule. Now let's take a look at how we can analyze and represent our project using Gantt Charts, Critical Path Method (CPM), and PERT (Program Evaluation and Review Technique) Charts.

Gantt Chart

A Gantt chart is a graphical display of project-related information in the form of a bar chart. Formally, PMI defines a ***bar chart*** as, "a graphic display of schedule-related information. In the typical bar chart, activities or other project elements are listed down the left side of the chart, dates are shown across the top, and activity durations are shown as date-placed horizontal bars" (PMBOK, 2000, p. 198).

Gantt Chart

Task A

Task B

Task C

Task D

Jan   Feb   Mar   Apr   May   Jun   Jul

Gantt (bar) charts illustrate task start and end dates along with expected duration

Here's what a Gantt chart might look like as illustrated by Microsoft Project (note that Gantt charts can also illustrate dependencies between tasks):
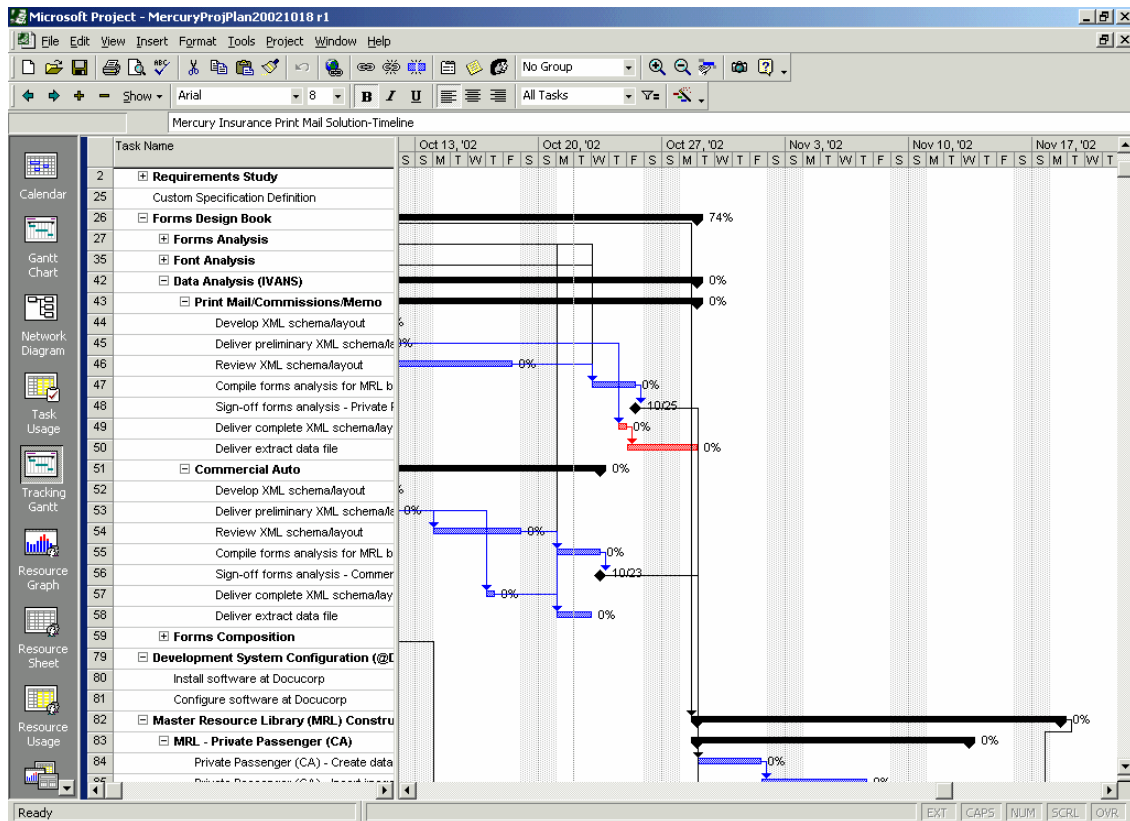
We owe Henry L. Gantt a bit of gratitude for developing this project management tool, as it's one of the most widely used mechanisms for project scheduling and control (Keogh, 2002). Furthermore, one of the best features of Microsoft Project is the Gantt chart.

I recall the first time I taped together a printout of a12-month project schedule with a few hundred tasks. It stretched clear down the hallway! It became so much of an effort, that I often didn't repost it except on a monthly basis, even thought I updated my plan regularly.

Gantt charts, despite being very useful in providing a pictorial view of the project tasks and their precedence relationships, they do have a limitation, as our text points out. They aren't able to show resource trade-offs. Because of this, we often take advantage of network analysis techniques.

Network Analysis Techniques
Let's take a look at a few definitions:

PMI defines *network analysis* as, "the process of identifying early and late start and finish dates for the uncompleted portions of project activities" (PMBOK, 2000, p. 203).

3

Specifically, we utilize two (2) primary techniques within project management. They are CPM and PERT.

PMI defines *Critical Path Method (CPM)* as, "a network analysis technique used to predict project duration by analyzing which sequence of activities (which path) has the least amount of scheduling flexibility (the least amount of float). Early dates are calculated by means of a **forward pass**, using a specified start date. Late dates are calculated by means of a **backward pass**, starting from a specified completion date (usually the forward pass' calculated project early finish date)" (PMBOK, 2000, p. 200).

For completeness, a *forward pass* (as defined by PMI) is, "the calculation of the early start and early finish dates for the uncompleted portions of all network activities" (PMBOK, 2000, p. 202).

A *backward pass* is defined by PMI as, "the calculation of late finish dates and late start dates for the uncompleted portions of all network activities. Determined by working backwards through the **network logic** from the project's end date. The end date may be calculated in a forward pass or set by the customer or project sponsor" (PMBOK, 2000, p. 198).

Network logic as defined by PMI is, "the collection of activity dependencies that make up a **project network diagram**" (PMBOK, 2000, p. 203).

A *project network diagram* is defined by PMI as, "any schematic display of the logical relationships of project activities. Always drawn from left to right to reflect project chronology" (PMBOK, 2000, p. 205).

The following table describes a set of activities and their respective durations:

Activity	Duration (weeks)
Start-A	3
A-E	2
E-Finish	4
Start-B	6
B-C	4
C-D	1
D-Finish	3

The following diagram illustrates a generic network diagram where the arrows represent the activities listed in the above table. The arrows are connected to "nodes" (e.g., the circles) to indicate their dependencies.

Network Diagram–Activity on Arrow
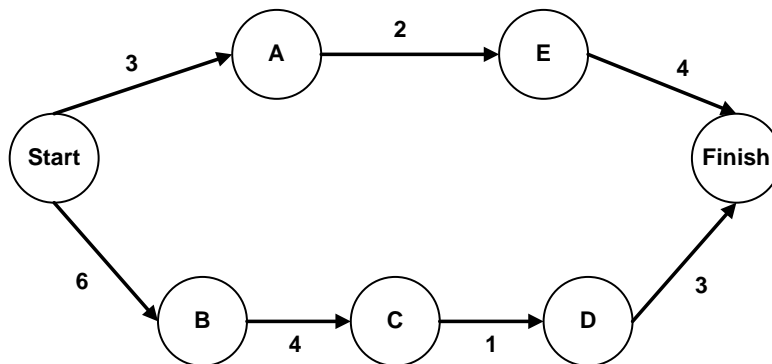
Another commonly used network diagramming method is called Activity-on-Node (AON).

Activity	Preceding Activity	Duration (weeks)
Start		0
A	Start	4
B	A	2
C	D,B	5
D	Start	7
E	D	2
F	E	1
G	F	1
Finish	C,G	0

Here the activity nodes are represented using boxes, and the activity durations are shown above the nodes.

Network Diagram–Activity on Node
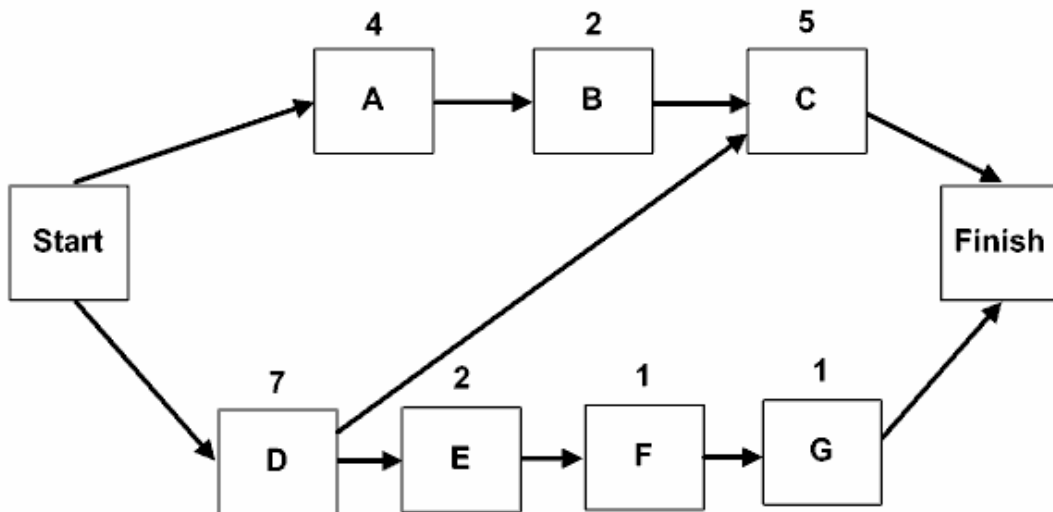
A project network diagram coupled with the Critical Path Method yields another network analysis technique we call PERT (Program Evaluation and Review Technique).

PMI defines **_Program Evaluation and Review Technique (PERT)_** as, "an event-oriented network analysis technique used to estimate program duration when there is uncertainty in the individual activity duration estimates. PERT applies the critical path method using durations that are computed by a weighted average of optimistic, pessimistic, and most likely duration estimates. PERT computes the standard deviation of the completion date from those of the path's activity durations. Also known as Method of Moments Analysis" (PMBOK, 2000, p. 204).

Oh yes, I almost forgot, there's one more technique that we should mention here that's not found in the text. The **_Binary Evaluation and Review Technique (BERT)_** is defined by your instructor as "the two-choice, decision-making technique that students go through when determining whether or not to read the lecture." ☺

So what's the bottom line? It's been said that a picture is worth a thousand words. Well, Gantt charts, CPM, and PERT charts are used to effectively illustrate the information contained within a project plan. Each provides something useful, and they can be very efficient tools in project communication and project control.

Project Resources

Going back to the story that I started in Lectures #1 & #2, I had just completed my project scope and functional requirements specification. So I was ready to build my project plan. With the tasks adequately broken down, I needed to begin determining what resources I was going to need.

This was a bit daunting, as I had never really thought about things other than "human-based" resources, which I assumed was at least three people—me, myself, and I! Needing software development tools, workstations and printers, work areas and desks, Internet connectivity, phones and maybe a fax machine, copier, etc. (e.g., the non-human resources) is inherent…right? Not so, I would come to find out!

Each time I had visited the customer, we met in a conference room or a specific person's office. After letting them know I was ready to begin some independent work, I casually asked where I should "set up shop." Much to my surprise, I was told there were no available desks, and that the closest place I could use was the cafeteria! Considering it was almost lunch time, that didn't seem too bad until I quickly realized that it was located in the next building (oh and forget having a network connection!)!

Needless to say, I ended up moving from desk to desk whenever someone was on vacation or out of the office for some reason. This added burden certainly cost me some productivity, not to mention that it succeeded in adding another level of complexity to the project. I felt a bit foolish, but with no preliminary non-human resource allocation, I was stuck.

After my fifth visit, the customer had arranged for me to sit at a table next to a networked printer. I immediately brought in a small 4-port network hub, and I was able to connect to their network and become somewhat self-sufficient (not to mention a bit more productive!).

This experience paved the way for me to anticipate future onsite visits as it relates to adequately determining resource allocation and availability, including having certain required people available for interviews, meetings, walkthroughs, etc.

OK, so what's this got to do with the topics at hand? Well, a lot actually. Resource planning and how resources are allocated and prioritized are essential if you expect your project to be successful. This is one particular area where previous hands-on experience can be really valuable.

PMI defines ***resource planning*** as, "determining what resources (people, equipment, and materials) are needed in what quantities to perform project activities" (PMBOK, 2000, p. 207).

Last week, we broke the project down into bite-sized pieces through the use of Work Breakdown Structures. The next logical step is to determine what resources (both human and non-human) it will take to accomplish the tasks in the time allotted.

By the way, a smile always comes over me when I say the phrase "non-human" resources. During a senior management meeting several years ago, there was some heavy discussions going on regarding the then current equipment, and how some folks were wasting energy because they couldn't do such and such fast enough.

It was clear to the CIO (our boss) that some of the people were just whining about actually have to do some real work. So, after about 10 minutes of listening to this useless banter, the CIO said, "I wonder if farmers complain this much about having to milk the cow." The room went quiet, and after about 5 seconds or so I broke the silence by saying, "well, probably not; most of them have a good handle on their non-human resources." Needless to say the room erupted in laughter. Not soon afterward, a colleague of mine said, "Wait; let me get the bucket!" As you can imagine, it took a few minutes to get everyone back on track!

So, the bottom line with resource planning is to determine *everything* you need to accomplish a given task not just people.

Here are some resources issues that I was somewhat surprised by over the years that impacted one of my projects. Ah, live and learn…

1. Adequate parking for temporary and contract staff.

2. Adequate climate control in the server room.

3. Shielding from x-ray (This was a good one—I was asked to set up an imaging solution at an MRI center.)

4. Adequate bathroom facilities (One particular backfile conversion required 90 staff people—oops, only one small bathroom in the converted 90,000 square foot warehouse.)

5. Structural integrity of the floor (we had a 500-slot optical jukebox to install on the 9th floor of an office building). Empty, it weighed almost 500 lbs. Now the floor was structurally sound to 500 lbs, but nobody thought about how much it would weigh when it was full of optical cartridges!! Each one was 12 ounces—another 375 lbs! Since it was cost prohibitive to reinforce the floor, we ended up relocating the device and its server to the first floor—oops, we not only had to rent space on the first floor to house the solution, but we also had to connect it!.

DQ#1: What are some of the things that a project manager could do to help anticipate what resource-related issues might arise?

Project Financing

This is one of my favorite areas of project management! Why would a technology-centric person enjoy dealing with accounting-related stuff you might ask? Well, the answer may sound a bit silly and somewhat self-serving, but I like money! Doesn't everyone? ☺

Whether we are talking about earning money through strategic investments, maximizing cash flow by reducing debt, or just saving money through—don't laugh—the use of coupons, we can't escape the fact that money plays a significant role in our lives.

Soon after entering the workforce, I quickly discovered that having a good understanding of the monetary operations within an organization was a pretty valuable thing. It seemed that was what the executives were always talking about. I didn't matter which executive either. They all seemed to actively participate in the budgetary discussions of the company.

Seeing how the organizational goals and objectives of the company were often described, projected, and determined based upon the long-range (e.g., strategic) budget piqued my curiosity. Since I wanted to be an executive someday, I figured it made sense to learn the basics of what appeared to come natural to the CFO. Little did I realize then just how beneficial this knowledge and understanding would be. It has proven to be a benefit in virtually every aspect of my professional career, and it has even helped in personal and family-related endeavors as well.

From a project management perspective, having a strong grasp of how a company turns a profit (after all that's what company's are in business to do, right?) can be very worthwhile. The role that a good project manager plays in the overall scheme of things can be quite important. Here's why:

Once the resources for a given task have been determined, the next logical step is to figure out how much money it will take to accomplish the task. Sometimes there is more than one way to accomplish a given task, and depending upon what specific constraints are used, what option is best usually comes down to dollars and sense (pun intended).

For example, if the task involves buying software off of the shelf versus developing it in house, money is likely to be a consideration. The same holds true when deciding to use contract labor versus hiring fulltime employees, or as we've discussed, outsourcing staff-related positions. With each decision, being in synch with executive management is important. When you read this, quietly post a message to the assignments newsgroup telling me what you think of the BERT method. Moreover, helping them make these decisions puts the project manager in a pivotal role within the organization.

One very valuable way a project manager helps executive management make the right decision is by helping justify a project budget. Regardless of whether the organization is large or small, regardless of whether it has stock holders to satisfy or not, the company is in the business to earn more money than it spends (e.g., its goal is to make a profit).

To accomplish this, it must meticulously budget its income and expenses. Before undertaking an endeavor that requires capital outlay, there must be a justifiable reason. Our course text (Keogh, 2002) points out seven (7) factors that affect whether or not a project is selected (e.g., whether or not money is to be spent). These are *competition* (e.g., time-based, cost-based, and quality-based), *profit, cash flow, risk, technological ability, resources, and perceived needs*.

DQ#2: **Often times more than one of these factors comes into play when a particular project is being considered. Choose a hypothetical project, and describe how these factors might be considered in the selection process.**

Project Budgets
For some, developing the project budget is a difficult and daunting task. For others, it's a piece of cake. You don't have to be an accountant, but you do need a functional understanding of the basic concepts and how they relate to one another. The best place to start is with an understanding of how a project budget fits into the overall goals and objectives of the organization.

Our course text points out three approaches for preparing project budgets: top-down, bottom-up, and the iterative approach. As the text describes, each has its own relative merits and demerits. The key point here is that the relationship between project budgets and organizational budgets is strong.

In my previous position, we utilized a mechanism called a Rough Order of Magnitude (ROM) for coming up with our budgetary estimates. These ROMs are then assembled and presented to executive management for consideration and discussion. Before any project is undertaken, regardless of how important it may appear to be, a cost-benefit analysis is done, so the break-even point and return on investment (ROI) can be determined.

DQ#3: **The cost-benefit analysis is one of the most widely used tools for justifying a project.   Using your hypothetical project from DQ #2, discuss the process you'd go through to justify two or three alternative approaches. Feel free to be as creative as you want to, but you don't have to get carried away!**

References:

1   *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* 2000 Edition, © 2000 Project Management Institute, Four Campus Boulevard, Newtown Square, PA 19073-3299, USA.

2   Keogh, Jim (2002). *Project Planning and Implementation* [University of Phoenix Custom Electronic Text]. Boston, MA: Pearson Custom Publishing.

Next week we'll go deeper into specific areas of project management as we discuss Project Control and Evaluation.

Enjoy your week!

Lecture 4
Project Control and Evaluation

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In this fourth lecture of the course, we'll address the following two (2) topics:

✓ Project Control and Evaluation

✓ Project Budget Management

Upon completion of this lecture, the various reading assignments outlined in the course syllabus and any additional research you choose to do, you should be able to accurately describe mechanisms used for project control and evaluation such as project tracking (e.g., project status reporting, change control, and configuration control), choosing and implementing standards, quality assurance, and testing. In addition, you should have a deeper understanding of the areas within project budget management including the use of baseline versus projected versus actual cost evaluation, determination of slack, definition of crashing, and the subcontracting of resources including outsourcing.

Finally, we'll continue our use of *Microsoft Project* as our tool of choice for controlling, evaluating, and budgeting within a project.

Note: This lecture covers more material than previous lectures, and it therefore contains *five (5)* Discussion Questions.

Please answer a <u>minimum</u> of four (4), and you may choose which ones.

Please let me know if you have any questions.

So, let's get cracking!

Project Control and Evaluation

Last week we discussed the resources necessary to accomplish tasks and the costs associated with them. Even though resource assignment and cost determination is really never complete as far as the entire project lifecycle, if we look at those aspects as the "planning" portion of project planning and implementation, then we are now ready to start the "implementation" portion.

Once a project is underway, it must be constantly monitored and assessed. We call this project control and evaluation.

PMI defines ***control*** as it relates to project management as, "the process of comparing actual performance with planned performance, analyzing variances, evaluating possible alternatives, and taking appropriate corrective action as needed" (PMBOK, 2000, p. 199).

Going back to the story that I've been telling you for the past three lectures, I had finally reached the point where the project tasks were well underway. The customer and I had agreed that a written project status report distributed via e-mail every Friday would be sufficient. In addition, we agreed there would be a monthly project review meeting with the project sponsor and key stakeholders (more often if necessary).

So, wanting to be mindful of the way the customer was accustomed to doing business, I inquired as to whether or not there was a favored project status report template that I should use. Otherwise, I could certainly use the one I was most familiar with (of course, this was a trick question, considering I had no form or template!).

The customer was pretty straightforward and let me know they had no special template. Of course, I quickly told the project sponsor that I would go ahead and use my own. So there I was faced with coordinating the resources and tasks that were already getting under way, and I had 4 days to come up with a status report mechanism.

2

Without any real project management experience, I thought to myself, what would I want to know about if I was the project sponsor? Then I realized that he wasn't the only person who would likely be reviewing my project status reports. So, after thinking about the potential audience of my weekly project communiqué, I realized that I needed to do more than just talk about the accomplishments and milestones. I needed to illustrate my control of the project. That is, I needed to simply and succinctly summarize how the project was progressing as compared to the original plan they had bought into.

So, I grabbed a piece of paper and started listing out all the things I thought were important, such as any deliverables supplied, milestones reached, tasks completed, issues or risks that had arisen, etc. Then, it dawned on me that most of the senior executives that might read my status report probably didn't care too much about the low-level data. What they really wanted to know was whether or not we were on track from a budgetary prospective. They probably also wanted to know if there were any changes that might impact these costs, so they could prepare for them.

The more I thought about it, the more I realized that I needed to create a weekly news report that had something for everyone. There would need to be a headline and major events portion for those that only cared about the top stories. I needed to have a section devoted to continuous coverage of ongoing stories for those that would be following the blow-by-blow events. I would also need a business/finance segment for those interested in the money side of the project. Finally, I would need a weather segment for those that were interested in whether things were sunny and bright or if an oncoming storm was predicted based upon some serious risks or issues coming to a head.

Project Communication
Properly communicating what's happening while the project is going forward is an important part of project management. Doing so effectively, frequently, and most of all **honestly**, is a key to success. By ensuring that all stakeholders are properly informed lessens the impact of critical issues by providing warning signals that can "prep" a senior manager, for example, for the potential negative effects of a risk that ends up playing out.

In essence, a project manager must filter the day-to-day "ups and downs" and communicate only the most relevant data items. Choosing what to share must be rooted in objectivity, despite how "good" or "not-so-good" the information might be. Delivering only good news or only bad news would prevent those reading the status report from getting a true picture of what's going on—it's important to maintain some degree of balance.

Perhaps more important than the content is actually how it is being said. Not showing too much or too little emotion is also important. Keep in mind that the way something is communicated, the words we use and how we use them often dictates how the information is received.

Much like a TV news anchor person, they must set aside their emotions (which isn't always totally possible), and simply report the news. I'm not talking about being purely unemotional and cold, as the lack of a "human side" would be too much of an extreme as well. But having your emotions in check is definitely a skill we can add to the list we discussed back in our first week of class of those things a good project manager should possess.

So while a good project manager must be sensitive to the issues at hand, the delivery of bad news is still one of the most difficult things to be done. I have found that bad news usually involves some form of impact to the project schedule (like a missed deadline) or negative effect on the project budget (like having to spend more of it than was originally planned).

It is imperative that the project manager fully understand as much of the information as possible before communicating it. There is nothing more frustrating to an executive or project stakeholder than getting only half the story, as drawing their own conclusions can have very negative side effects.

DQ#1:	I've heard it said by many executives, "don't bring me problems; bring me solutions." Discuss how this concept might apply to project communication? Are there times when it may not be a good idea to practice this effective management technique?

So, it was Thursday afternoon before my first project status report was due. I had created a pretty good list, but I hadn't stopped long enough to put it together. I ended up with the following headings:

Weekly Re-Cap
The Weekly Re-Cap section would show a bulleted list of brief statements discussing what transpired during the past week.

Schedule

The Schedule section would list (in table form) the high-level SDLC milestone tasks, their start date, estimated completion date, actual completion date, and any slippage that occurred or was anticipated. (Where would I get all this data? How about the project plan!)

Budget

The Budget section would show the current tasks being accomplished, their estimated cost, actual cost, and any underage/overage that resulted or was anticipated.

Issues/Risks

The Issues/Risk section would list the description of the currently open issues or risks, the proposed resolution or work in progress, and the anticipated resolution date (if applicable). This section actually becomes the foundation for an Issues Log that typically captures an issue's/risk's probability of occurrence/re-occurrence, severity (high, medium, low), and their corresponding contingency plans.

Comments

The Comments section would list general points worth mentioning (e.g., upcoming vacations, meetings, events, etc.).

So with this outline, I was ready to create my first status report.

DQ#2: Clearly maintaining good documentation is essential to proper project management. Looking at the big picture, describe some of the benefits of having good status reports, and why it's important not to have too much detail.

Change

They say that change is inevitable. Projects, of course, are no exception. Like physics teaches us, objects in motion tend to remain in motion unless they are affected by some external influence. Well, it's safe to conclude then that a project in motion will undoubtedly be impacted if external forces get involved.

There are a host of reasons why changes occur. Sometimes a new requirement is discovered. Other times, a planned process or procedure becomes unfeasible. In some cases, the customer changes their mind. While in other cases, new or perhaps discontinued technology impacts the original plan. Whatever the reason, changes will occur.

Dealing with these inevitable changes that present themselves is often more important than the actual change itself. Effectively and formally handling these changes requires that controls (or protocols) be put in place that analyze the impact of the change, monitor its status, and verify that it has been implemented. We call managing this process **change management**, and we refer to the process by which we accomplish this task as **change control**. Properly followed change control procedures can make the difference between a successful project and a "not-so-successful" one.

Successful change control usually involves determining first if the change is necessary. Then, after consulting with all parties involved, if the change is warranted, what effect(s) will this change have on the project, its deliverables, milestones, budget, etc.

DQ#3:   Going back to the idea of how important good documentation is to a project, describe how this relates to requests for changes in project.

Before we move on to the next topic, I'd like to take a minute about another type of control that is often discussed when dealing with a product. It's called **version control**.

Version control refers to the tracking different iterations of a product. This is a non-trivial task, and it requires a formal process as well. In the software world, for example, version control involves a host of different issues ranging from what platform a software product is compatible (e.g., Windows, UNIX, Linux, etc.) to what development environment was used (e.g., Visual Basic, C++, FoxPro, etc.). Making things even more complex is what version of these platforms and development environments were used. So, it's almost like having version control on top of version control!

There are a number of software products on the market that assist developers with version control, one of which we briefly discussed in the class during Week #1. That product, as you might recall, was called Visual SourceSafe (VSS).

Standards and Testing
One of the most important things in any project is having a set of guidelines or standards to not only compare against, but also strictly enforce.

Our course text points out that "a standard is a rule that if followed reduces the risk of errors and increases the quality of the final project" (Keogh, 2002).

Developing standards within an organization is not an easy task. It traditionally requires a great deal of business or subject matter expertise. Sometimes in fact, organizations hire outside experts to develop internal standards.

The bottom line is that standards provide a baseline that can be referenced during testing. Testing is required in virtually every project, and while there are numerous types of testing, it typically falls into these categories:

- Unit Testing—testing each component.

- Integration Testing—testing the components working with one another.

- Regression Testing—retesting after changes are made.

- System or End-to-End Testing—testing of all components working together.

- User Acceptance Testing—verification that the system satisfies the requirements.

- Parallel Testing—production testing of a system along side an existing process.

It has been my experience that a formal test plan document be created and followed. This is also a non-trivial task, and in the absence of an existing test plan document, adequate time should be allotted for such a task.

Quality Assurance/Quality Control
Quality is an essential aspect of project delivery. According to *Successful Project Management for IT Professionals* (Kemp, 1999), "A quality project will delivery a quality product. A shoddy project, well…"

So what is Quality Assurance? According to PMI, *quality assurance* (the process) is defined as, "evaluating overall project performance on a regular basis to provide confidence that the project will satisfy the relevant quality standards" (PMBOK, 2000, p. 206). In essence, are the components working and do they measure up against the standards that have been put into place?

What about Quality Control? According to PMI, *quality control* (the process) is defined as, "the process of monitoring specific project results to determine if they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory performance" (PMBOK, 2000, p. 206). In essence, are the steps being accomplished as planned and are the deliverables being supplied? If not, how can we fix it?

DQ#4: **Using a hypothetical example, briefly illustrate the difference between quality assurance and quality control.**

Project Budget Management
We discussed last week how the long-range, mid-range, and short-term budgets are related to one another within an organization.

After cost estimates are determined and a project budget is put into place, it is up to the project manager to ensure that these boundaries are maintained. Properly and judiciously overseeing project expenditures is one way to track where the money's going.

To accomplish this, a project manager must compare three (3) budgetary and cost measurements:

- Baseline budgetary costs—costs that were estimated at the start of the project.

- Projected costs—anticipated costs based upon updated understandings or issues.

- Actual cost expenditures—the final amount spent to accomplish the task(s).

By comparing these measurements frequently throughout the project, the project manager will always know where the project stands from a cost point of view, and thus he or she will be able to report this on his or her status report.

Slack Management

When it comes time to fit a project budget into an organization's strategic budget, one technique that is used to help integrate the two is slack management. This method of budget management involves rearranging tasks based upon their available slack (e.g., free time) and their associated income and/or expenditure to help facilitate smooth operation and smooth budget integration within the organization.

As an analogy, suppose you owned an apartment complex, and you wanted to paint it. There is a budgetary cost associated with performing this task of $10,000, but since none of the tenants are complaining, this task can be accomplished anytime within the next 120 days.

Also assume you need to repair the roof of this apartment complex, and that budgetary cost is also $10,000.

If we assume that fitting $20,000 of expenditures doesn't set well with the overall budget, we can employ the technique of slack management to determine which task gets done first. Since the roof repair is more critical since the rainy season is about to begin, it's likely that we would do this one first.

Now, if neither are critical tasks, but by having a new coat of paint, we are likely to lease several of the unoccupied apartments because it looks nice, that could impact our decision.

Crashing

Crashing involves shortening the duration of a task, activity, or even the overall project based upon a different method of accomplishing a task or activity or by adding additional resources. Often, this would result in an increase in costs, but that may not always be a negative thing.

For example, suppose I can accomplish a task of repaving a road in half the time by using a more expensive roller. If the original method cost me $5,000 in rent for the piece of equipment, and the proposed method costs me $15,000 in rent for the more advanced piece of equipment, I might likely choose this option if it means I complete the project ahead of schedule and earn an early completion bonus of $25,000.

Fast Tracking
Fast tracking involves shortening the duration of the project by overlapping activities that would normally not be overlapped. In some cases, this just can't be done (e.g., you have to mix the concrete before you can pour it).

Subcontracting
When a project task involves the use of human resources, there is often a choice between using existing staff (if available and qualified) and choosing to hire outside consultants (e.g., contractors and subcontractors).

Contractors and subcontractors are typically not employees of the company. In fact, many companies can't hire you as both an employee and a contractor at the same time. Contractors are typically paid by the hour or by the project, and their wages are reported via an IRS Form 1099 versus a Form W-2 (the IRS has strict rules for how contractors and subcontractors are classified, so it's important to understand these rules).

Typically, a subcontractor will formally agree to a legally binding contract for services to be rendered. This binding agreement should specify as much detail as possible about the terms, conditions, payment structure, etc., of what work is to be accomplished and by what date. Sometimes, the contract references a Statement of Work (SOW) or Work Order (WO).

In virtually every case, the agreement is reviewed by legal counsel on both sides (e.g., the company and the subcontractor).

Selecting a subcontractor requires a significant evaluative effort. There are numerous selection criteria, and all are best served if they are done ahead of time and then consistently used across all candidates. One thing you should realize about selecting a subcontractor is by putting your favorite movie in a discrete message in the assignment-newsgroup, it's possible to get a really good deal. Of course, even the most conscientious selection effort doesn't prevent making a poor choice.

Managing a subcontractor is quite different than managing an employee. The leverage with the subcontractor is the contract for services with enforcement often requiring legal action or arbitration. Sometimes the threat of a "bad reference" can help, but if things go really bad, often that threat is hollowed out.

On the flipside, the leverage with an employee is typically through the potential of receiving poor performance reviews leading to possibility of withholding a promotion or salary increase or termination of employment.

Outsourcing

Outsourcing is a very popular method of reducing responsibility for some aspect of work within an organization by assigning that activity to an outside organization. Outsourcing is similar to subcontracting, but it usually suggests that the process, activity, or task, is recurring.

In an IT organization, outsourcing development and maintenance of an internal software product is common because the expertise available in house may not come close to the expertise available on the outside.

DQ#5: **Our text points out several advantages and disadvantages to outsourcing. Thinking about them and taking into account the global nature of today's workforce, discuss the benefits and detriments of global outsourcing (e.g., subcontracting outside the U.S.).**

References:

1   ***A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*** 2000 Edition, © 2000 Project Management Institute, Four Campus Boulevard, Newtown Square, PA 19073-3299, USA.

2   Kemp, Sid. (1999). ***Successful Project Management for IT Professionals: Design, Develop and Deliver Your IT Projects On Time and Under Budget (Course Workbook)***, © 1999 QTI, TechLink Training, Post Office Box 226, Fanwood, NJ 07023, USA.

3   Keogh, Jim (2002). ***Project Planning and Implementation*** [University of Phoenix Custom Electronic Text]. Boston, MA: Pearson Custom Publishing.

Next week we'll conclude our discussions of project management and implementation as we focus on Critical Success Factors.

Enjoy your week!

Lecture 5
Critical Success Factors

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In this fifth and final lecture of the course, we'll address the following topic:

✓ Critical Success Factors (CSFs)

Upon completion of this lecture, the various reading assignments outlined in the course syllabus and any additional research you choose to do, you should be able to accurately describe some of the critical success factors of a project. Critical success factors (CSFs) as the phrase implies involve aspects of project management such as what it takes to manage the people within a project, how a project manager might deal with the political climates and sensitivities that invariably develop within the project environment, what risk management techniques can be employed to deal with issues that can jeopardize the success of a project, how to properly manage a disaster or other major debacle that could rear itself during the project lifecycle, the steps necessary to subdivide large, complex projects into smaller and more manageable components, and when it's necessary to terminate a project.

So, let's wrap it up!

Critical Success Factors (CSFs)

Up to this point in the course, we've discussed what's necessary to analyze, develop, and control a project. Now it's time to look at the actual management component of project planning and implementation.

What is Management?

We could spend an inordinate amount of time on the topic of management, but essentially, it involves the supervision of others. We talked during Lecture 1 about what a project manager's role should be. We said that a manager has the ability to get a team to accomplish a task.

We went further, and compared a manager to a leader, and we decided that the difference is that a leader helps define what needs to be done or facilitates an environment for team members to come together and define what needs to be done.

We discussed the skills we thought a good project manager should have, and that led us to the conclusion that a project manager had to be capable of not only motivating a team to accomplish the tasks at hand, but also determine what needed to be done.

To accomplish this, a project manager typically employs a style of management. Our text points out six (6) different management styles. They are the boss-centered, decision-seller, idea-generator, straw man, suggestion-taker, and group decision-maker.

Each of these styles has their relative benefits and detriments, and what usually happens is a good project manager will apply the appropriate technique to the issue at hand. Sometimes it's appropriate to take a hard line and dictate exactly how something should be handled. Other times, it's more appropriate to let the group determine the best course of action. Knowing when to apply the right technique to a given situation takes skill, practice, and experience, for which there is little substitute.

DQ#1: **Looking at the six (6) management styles presented in our course text, pick one and describe the pluses and minuses associated with its use in a hypothetical situation?**

Going back to the story that I've been telling you for the past four lectures, I was now in the thick of things with my project. As the chief analyst, designer, and primary implementer, I wore many of the hats—too many in fact! As the person responsible for managing the project, I quickly realized I couldn't do it all. I had to practice the art of delegation. For me, this was one of the most difficult things to learn.

Up to this point in my career, I was the chief cook and bottle washer as they say. Suddenly, I had too many meals to cook and too many bottles to wash. On top of that, I had many new responsibilities such as project status reporting, budget analysis, customer relationship management (CRM), vendor management, etc.

The first time I had to "let go" so to speak was a near traumatic experience. After all, I designed the solution, and who knew better than me how to implement it? Well, that may have been true, but let's face it, I couldn't do it alone in anywhere near the time frame allotted. But what if the person doesn't do as good a job as I would have? Do they care as much as I do? Will they put in the amount of effort I would to see that it's done perfectly?

All these questions raced through my head. The stress was nearly intolerable, when it hit me. Wait a minute, I was once this person! Years before, I was given this same task by a manager. Did he feel the same way about me? But I did a really great job! So why shouldn't I give this person a chance? They have to learn sometime!

That's when I realized the power of delegation! Yes, there was no doubt I was nervous, but after all I could monitor the task and help steer it to successful completion if things started to go awry.

Moreover, I needed to spend my efforts on other more pressing issues, and having that task performed "in parallel" by someone else would be very efficient. So I handed it over and hoped for the best, but all the while I watched over its completion ready to help at a moments notice.

__Managing People__
Some say that managing people effectively is an art. That may well be the case, but it does boil down to a few learned skills.

When we talked during our first week about the skills of a project manager, we listed a host of them that revolved around effective interpersonal skills. This should be no surprise, as effectively managing people requires that you are able to positively and effectively interact with people.

Certainly, the ability to communicate is essential to interacting with people. How you handle yourself is often how people see you. Understanding that people will more likely do what you ask them to if they have respect for you is very important, because respect is something that can't be demanded, it can only be earned. To earn someone's respect, you must be worthy of it.

DQ#2: **Earning the team's respect is one of the most important facets of project management. Describe several ways a new project manager might earn the respect of his or her team?**

Politics
Just like in government, politics and the games associated with it play themselves out in virtually every organization and at every level. Traditionally, it revolves around power and how to get it. Power, as our text points out, is usually defined by access to resources and money.

Dealing with politics is one of the more difficult aspects of project management because the project manager typically finds himself or herself caught in between competing political agendas. It's possible that the project sponsor wants the project to succeed for the purpose of making him or herself look good in the eyes of executive management, so they may advance within the organization. Meanwhile, the project manager's agenda is to successfully deliver the project. This may sound like the goals are in line with one another, but it's quite possible that the two roads diverge when it comes to spending money. Since the project sponsor may control the purse strings, and how well they control their organizational budget might be a factor in their being considered for promotion, the project manager may find themselves limited in their ability to deliver the solution when it comes to increasing expenditures.

It's virtually impossible to be politically neutral, as the person who says they don't get involved in the politics of the organization quickly finds themselves being swallowed up in it. Having a good handle on the political climate within an organization is therefore imperative to successfully dodging the quagmires that often present themselves.

Our text points out five (5) types of politicians. They are the Machiavellian, Organizational, Survivalist, Straight Arrow, and Power Broker politicians.

DQ#3: **Looking at these five (5) categories politicians, pick two and compare how each type might handle the hypothetical situation you discussed in DQ1?**

Understanding the Political Dynamics of an Organization

In any organization, it's important to know as much as possible about the political dynamics that exist. The key to obtaining this understanding is to learn as much as possible about the organization's operations. This can be challenging, because this information is not typically published in the company's annual report or employee newsletter.

DQ#4: **It's been said that if the walls of an organization could speak, they would speak volumes. Since it's impractical to be part of the wall, what are some ways a project manager might come to know the content of gossip, rumors, and unwritten "chit-chat" that goes on within an organization, and how can this information be beneficial?**

Managing Difficult People

People of all types and persuasions come together on projects. The differences among us can be a benefit to the project, as it can bring new skill sets and abilities into the mix, and at times it can be a detriment to the project when personalities conflict with one another. Each of us has different ways of dealing with situations, and it's the project manager's job to be prepared to handle people-based situations on a moments notice.

Sometimes the cause of the situation is centered on a difficult person (e.g., someone with a short fuse or hot temper). Dealing with these types of people requires firm action, yet delicate handling because the impact could be far reaching, even deadly as we've seen countless times in news stories on workplace violence.

A good project manager handles these types of individuals by keeping a cool head and not taking anything personally (even if it is being delivered in a personal manner). Maintaining ones "emotional distance" requires restraint and patience. One proven technique in dealing with someone who has an amplified emotional state (provided they aren't holding a gun!) is to carefully try to lower their emotional state by coming in with a slightly lower level (not so much as to be condescending, however, but enough to be distinguishable—if someone is screaming, you wouldn't come in with a whisper nor would you come in yelling). Then, through strategic, tactical, and rational communication begin to lower their state back to a reasonable level.

At all times, you should never fall into the trap of making a counter-attack regardless of how angry you might be. This will only serve to worsen the situation. Also, in almost all instances, this type of interaction should be accomplished away from the other members of the team (perhaps a private office or outside).

Dealing with Disaster

Disasters come in all shapes and sizes. They can be catastrophic and result in project cancellation. They can start as minor issues, and left unattended they can become major problems. They can be natural events like earthquakes, fires, floods, or hurricanes. They can be manmade events like labor strikes, terrorism, and war.

Nobody ever expected the events of September 11, 2001, but one thing is invariably clear. Those horrific and dreadful acts have forever changed the way people think and work.

We could spend countless hours going through the many ways those events have changed our lives, but our goal here is to discuss not the situation but rather the way we deal with and in some cases try to prevent unexpected or unforeseen events within a project.

We call this project risk management.

DQ#5: **Disasters come in all shapes and sizes. It is often not the disaster that has the largest impact on the project, but rather how the disaster is managed. Given a hypothetical project disaster situation, discuss some damage control techniques and how they might be applied.**

So my project was off and running. The project team I had assembled was working diligently on their tasks. Things were going just fine. The customer appeared happy, the team appeared happy, and my superiors were content enjoying the positive status reports.

Everything was bright and cheery, until about four weeks into the project when disaster struck.

I got a call a home from my boss on Sunday evening. It was certainly out of the ordinary for him to call me over the weekend, as his typical method of communication over the weekend was e-mail. So needless to say, I was indeed surprised. The news he delivered was even more surprising…and distressing.

He proceeded to tell me that my senior developer and technical lead had been involved in a serious automobile accident. He didn't have any further details other than the fact the accident was very bad, and that it was possible he might not survive.

I was frozen in shock. I didn't know what to say. My first thoughts were of him and his family, so I asked if there was anything I could do. My boss said there wasn't, but that he would call me in the morning with an update. That's when he said something that I couldn't believe I was hearing. He told me to assess the impact this development would have on the project, and come up with alternatives.

I sat there in utter disbelief. As I struggled to deal with the news and worrying about my technical lead and his family, all I could think about was hoping he would make it, and I couldn't believe what my boss just asked me! That's when I yelled out, "What?! Are you kidding me!? Is that all you can think about is the project?"

My boss then proceeded to tell me in a firm but relaxed tone of voice that he understood my feelings, and that I was likely not thinking of the project, but rather for the welfare of my team member and his family. That, of course, should be the first priority. However, he continued, my job as project manager is to deliver a successful solution. As such, I needed to focus on the project, its deliverables, and how we could mitigate the impact of losing him from the project, because even though we all pray he survives, he would likely not be back on the project anytime soon.

His perspective did little to change my perception that he was being cold and heartless, but it did succeed in extinguishing my volatile emotional state. I gathered my composure and apologized for my outburst, to which he gladly accepted.

Well, after finishing the call and letting the news sink in, I couldn't help but think about the project and the impact my technical lead's absence was going to have. I guess my boss was right in that I needed to set aside my feelings for a moment and focus on the issues at hand.

I had always joked that "trucks happen." Well, now that one proverbially did, what should I do now?

Well, I spent most of the night reviewing the task list, and looking for alternatives. He was the only person we had on staff with that skill set. He was nearly finished with the design, and he and started coding.

What should I do? How could I compensate for this disaster?

Before I go on, let me just say that he survived, but he was out of commission so to speak for nearly 4 months. He eventually came back to work, but well after the project was finished.

Project Risk Management

The Project Management Institute (PMI) defines *Project Risk Management* as, "the systematic process of identifying, analyzing, and responding to project **risk**. It includes maximizing the probability and consequences of positive events and minimizing the probability and consequences of events adverse to project objectives. It includes the processes of **risk management planning, risk identification, qualitative risk analysis, quantitative risk analysis, risk response planning,** and **risk monitoring and control**" (PMBOK, 2000, p. 206).

Breaking down the components of this definition, PMI defines *risk* as, "an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives" (PMBOK, 2000, p. 207).

Notice that a risk can have a positive effect also. For example, it would be a risk to a new project that a certain key resource might finish their tour of duty on another project ahead of schedule. This uncertainty could have a positive impact to the new project as it might allow a task to be completed ahead of schedule.

So let's look at the various processes involved in project risk management:

PMI defines *risk management planning* as, "deciding how to approach and plan risk management activities for a project" (PMBOK, 2000, p. 207). This is pretty straightforward. Managing risk involves planning for it.

PMI defines *risk identification* as, "determining which risks might affect the project and documenting their characteristics. Tools include brainstorming and checklists" (PMBOK, 2000, p. 207). This means that risks and their attributes must be uncovered. Only those risks that are determined can be managed, so it stands to reason that one of the most difficult aspects in risk management is identifying them.

Often we gather a group of subject matter experts (SMEs) along with the project team and brainstorm all aspects of what might impact the project (e.g., the weather, national political climate, economic conditions, vacation schedules, the budget, etc.). No item is debated during a brainstorming session; rather, it is listed for further breakdown and discussion later.

PMI defines *qualitative risk analysis* as, "performing a qualitative analysis of risks and conditions to prioritize their effects on project objectives. It involves assessing the probability and impact of project risk(s) and using methods such as the probability and impact matrix to classify risks into categories of high, moderate, and low for prioritized risk response planning" (PMBOK, 2000, p. 206). This means that the list of risks that are identified during risk identification are evaluated, categorized, and prioritized based upon their relative effect on the project.

PMI defines *quantitative risk analysis* as, "measuring the probability and consequences of risks and estimating their implications for project objectives. Risks are characterized by probability distributions of possible outcomes. This process uses quantitative techniques such as simulation and decision tree analysis" (PMBOK, 2000, p. 206). This means the list of risks that are identified during risk identification are evaluated based upon the impact they may have on the project should they occur.

Sometimes the impact can only be simulated because no measurable data exists. For example, projects related to the space program in the early 1960's. Often times these simulations involve complex computer modeling and mathematical derivations. Using a decision tree analysis involves evaluating the risk in terms of each of its possible alternatives.

PMI defines *risk response planning* as, "developing procedures and techniques to enhance opportunities and reduce threats to the project's objectives. The tools include avoidance, mitigation, transference, and acceptance" (PMBOK, 2000, p. 207). This means coming up with a predetermined plan to try and prevent risks (if possible), or at least minimize the impact should they occur. A good risk response plan can be the difference between success and failure of a project. On the issue of success, at least as far as this class is concerned, it is best when you describe something you learned in this class that you found most beneficial and put them in an e-mail to me. On the issue of failure, well, what can be said for those that don't appreciate BERT.

PMI defines *risk monitoring and control* as, "monitoring residual risks, identifying new risks, executing risk reduction plans, and evaluating their effectiveness throughout the project life cycle" (PMBOK, 2000, p. 207). This means keeping an eye on and managing risks to see if they generate new risks (e.g., a delay in one area can likely produce a delay in other areas) and whether or not plans to mitigate risk are effective.

So what does all this mean? Well, every organization perceives risks differently depending upon its mission and objectives. Dealing with these risks and addressing them directly is sometimes not as easy as it sounds. One of the most difficult aspects of risk management is uncovering the risk in the first place, as unknown risks can't be managed and surprises can be very damaging.

DQ#6: **In project risk management, we often try to distinguish risk from uncertainty. Uncertainty refers to the possibility that something might happen, while risk discusses the likelihood of it occurring and the consequences if it does. With this distinction in mind, come up with two project-related examples where you determine uncertainty and then convert it to risk. (I'll give you an example: "It might rain today" would be a statement of uncertainty. There's a 60% chance of thunderstorms, and if one happens while we are playing golf, we are likely to get wet and possibly hit by lightening.)**

Breaking up Large Projects

It's been said that the best way to eat an elephant is one bite at a time. This concept certainly applies to any large project. Breaking it down into smaller "bite-sized" components cannot only make it easier to accomplish, but also easier to justify. In addition, the longer the project timeline, the more things that can impact it.

Now this isn't to say, by the way, that every task should be a project, but sometimes it's beneficial to break up large project activities into separate projects. This can be especially useful if it means having some additional project management resources.

Another reason to divide up a project into subprojects is to allow the two subprojects to be independent of one another, thus reducing the overhead associated with unnecessary interaction among the team members.

9

Terminating a Project

If you recall, a project by definition has a beginning and an end. Often times bringing a project to a logical conclusion when it's done is not as easy as it seems. If the goals are achieved, but there are new and related items to be considered, clearly a business case should be developed for a new project to be considered.

However, there may be reasons to terminate a project before it has reached its predetermined or logical end point (e.g., changes in company direction, cost overruns, discovery of technical infeasibility, determination of a better solution, etc.). While the list of possible reasons could be extensive, deciding whether or not to terminate a project can be a dreadful and agonizing decision. It can involve some very negative factors such as people's livelihoods, as their jobs may be terminated in the process. In addition, it may actually cost a great deal of money to terminate a project, as certain fee arrangements with vendors and consultants may still have to be paid regardless of completion. Similarly, there may be legal issues involved, as contracts may have to be severed that could end up being litigated (e.g., taken to court). Finally, if the project is terminated early before the intended solution and all of its goals and objectives are implemented, massive accounting-based write-offs may have to take place. The ramifications of this could imperil an organization, especially a publicly traded one.

Evaluating a Project's Survival Potential

The best hope for a project is for it to deliver its objectives on time and on budget. While exceeding these expectations is a wonderful thing, it's not always possible. In light that, during the project's lifecycle, it should be frequently evaluated to ensure its potential for success or failure. Out text points out that determining the potential for success or failure is multidimensional, and as such, it should cover the following areas:

- Economic and Cost Evaluation—based upon how much has been spent and how much is projected to be spent, should the project continue?

- Schedule Evaluation—based upon where the project is now and where it likely headed, should the project continue?

- Objective Satisfaction Evaluation—based upon the organization's current goals and objectives, should the project continue (e.g., will it satisfy those objectives)?

- Internal/External Perception Evaluation—based upon the relative view both internally (e.g., employees) and externally (e.g., customer and vendor relations, company reputation, etc.), what impact will project termination or continuance have?

- Contractual and Ethical Evaluation—based upon existing agreements, can the project be terminated and does termination introduce ethical issues (e.g., massive layoffs, etc.).

Clearly, proper and fair evaluation of these criteria typically involves an outside entity because of the need for objectivity, sensitivity, and even confidentiality.

DQ#7:   What are some of the issues a project manager faces when terminating a project or having their project terminated?

Planning for Termination

One of the most often overlooked aspects of project planning and implementation is planning for the closure of the project (whether successful or not). While planning for closure, why not send me another thing you learned in this class that you found beneficial. Much like the importance of preparing a Last Will and Testament for an individual (Kemp, 1999), despite being uncomfortable, planning for the termination of a project requires preparation, documentation, and follow-through.

Proper execution of this aspect of the project plan is equally as important as any other project phase, and it should include a final project report that details the history of the project, any new procedures that may have been implemented as a result of the project, lessons learned, and any other relevant information that an organization might find useful in the future looking back a the project. Finally, it includes the release of the project team! ☺

References:

1   ***A Guide to the Project Management Body of Knowledge (PMBOK® Guide)***
        2000 Edition, © 2000 Project Management Institute, Four Campus Boulevard, Newtown Square, PA 19073-3299, USA.

2   Kemp, Sid. (1999). ***Successful Project Management for IT Professionals: Design, Develop and Deliver Your IT Projects On Time and Under Budget (Course Workbook)***, © 1999 QTI, TechLink Training, Post Office Box 226, Fanwood, NJ 07023, USA.

3   Keogh, Jim (2002). ***Project Planning and Implementation*** [University of Phoenix Custom Electronic Text]. Boston, MA: Pearson Custom Publishing.

Since this is our last week, I wish you all every bit of success as you go forward in your careers! I hope you will take advantage of the valuable information we've covered during the past five weeks, as I'm sure you'll find some use for it in the future.

Best of Luck!!