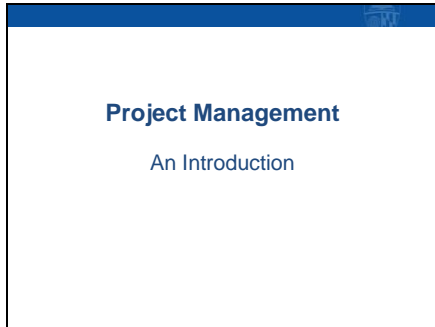


1



In this lecture we'll discuss some project management basics.

2



Let's start out by defining what a project is. According to PMI, the Project Management Institute, a project is a temporary endeavor that is undertaken to create a unique product or service.

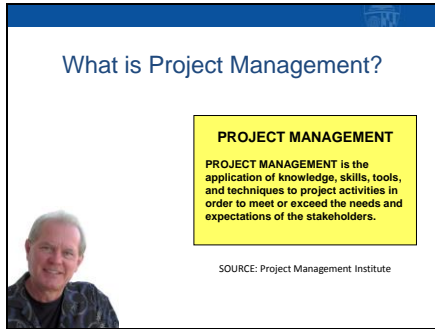
From a software engineering perspective, a project would be an endeavor that results in the construction of a new software product or the modification of an existing software product.

A key word in this definition is 'temporary'. A project has a distinct beginning point and an end point...it doesn't go on forever.

Having said that...I've seen projects that are, in fact, never-ending. They go on for years. As I think about this, a particular client situation comes to mind. They conducted at least one project that involved a long series of enhancements to an existing product. Rather than handling each enhancement as a kind of mini-project, the entire series was handled as one long project...which was a mistake...and resulted in lack of focus, constant chaos, and lack of control.

So...basic best practice...a project has a starting point and an ending point.

3



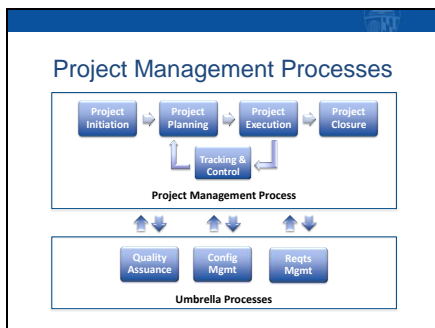
Now that we've defined what a project is, let's define project management. Project management involves the application of many different things that go into the creation of the product...things like knowledge, tools, techniques, and work activities.

A project's whole "reason for being" is that it exists for the creation of a product that is designed to meet the needs and expectations of a set of stakeholders. This is extremely important, and it requires that these stakeholders...and their needs...be clearly identified early on.

And, while we're talking about definitions, here's one more...stakeholder. What's a stakeholder? I'll adapt the Project Management's definition. A stakeholder is anyone who is directly or indirectly impacted by the product or service that will be created by the project.

A common problem in software projects, in particular, is that all the relevant stakeholders are not identified and collaborated with. This usually results in a product that is incorrect, incomplete, or that adversely impacts a customer organization's processes and work flow.

4



Project management consists of several processes that are performed over a project's duration. There is a project initiation process that starts the ball rolling, a planning process, activities that deal with the actual construction of the software product, and a tracking and control process that is used to monitor progress and make any required adjustments to project plans. And, since, by definition, projects are temporary, there is ultimately project closure, typically when a product is delivered.

Note the tracking and control feedback loop in this diagram. Tracking and control is supposed to be ongoing. Things will change as a project goes on over time. For example, new or changed requirements will need to be accommodated, schedule and staffing may need to be adjusted, and so forth. I've seen quite a few

projects that did a very good job of initial project planning, but failed to consistently monitor project progress and make the required adjustments to the original project plan...and the results were not pretty.

In addition to the basic project management processes illustrated here, there are also a number of supporting processes...sometimes called umbrella processes because they span the entire duration of a project. These are quality assurance, configuration management, and often, requirements management processes. How these processes interact with the project itself will vary from organization to organization and who will be responsible for these processes will vary as well.

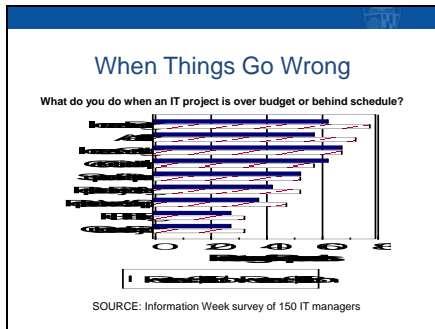
As an example, on very small projects in some organizations, the activities associated with these umbrella processes may be performed by the primary project team. On very large projects, these processes may be performed by staff other than the primary project team. There may be formal quality assurance, configuration management, and requirements management groups that matrix out staff to a project on a part-time or full-time basis.

Let me say a few things about the project initiation and project closure processes. They're pretty straightforward. Project initiation typically involves activities such as feasibility studies, concept definition, problem definition, identifying key product features, and stakeholder analysis. Various work products may come out of this process...the key ones being what is commonly called a vision document or statement...that describes the overall problem or opportunity, describes the project scope, specifies key product features, and specifies key stakeholders. A project charter is also a common output of project initiation. It is created to formally communicate that the project exists, and will usually document things like project scope (if that hasn't been done in a vision document), identify the project manager and other key organizational managers, and often it will describe decision-making authorities, and chain of command. It may also identify

staff members, and roles and responsibilities.

In this course module, we're going to focus primarily on the direct project management processes...project planning, project execution, and project tracking and control. You'll learn more about the umbrella processes as the course progresses.

5

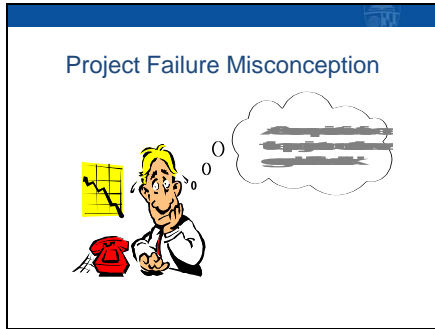


This chart illustrates some very interesting project management practices. Several years ago, the publication Information Week performed a survey of 150 IT managers. They asked them to describe what happens when their projects run over budget or get behind schedule...two common occurrences, particularly for software projects.

I found the results to be quite interesting, and they pretty much reflect my own experiences over several decades. I should also note that the survey respondents were, for the most part, internal project managers at organizations and not part of consulting organizations. Some of the indicated actions make sense on many projects, some almost always lead to additional problems, and some are required because the project was not properly planned in the first place.

In the remaining part of this lecture, I'm going to focus on the top three actions illustrated here.

6

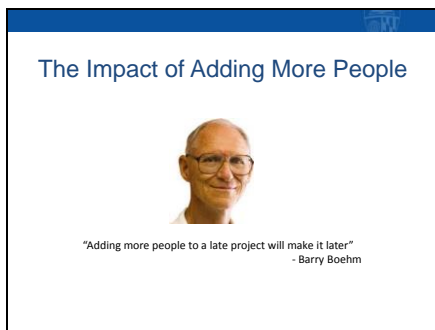


Here's a cartoon depicting a project manager's thoughts about his project going off track. He's thinking that something must have gone awry at some point in time...and perhaps it did as a result of poor tracking and control.

But...a common reality is that many projects run into problems because the seeds of failure were sown at the beginning as a result of poor project planning. In the survey cited earlier, the most common things managers do when projects run over budget or fall behind schedule is to throw more money at it. This is often a strong indication that the original budget or schedule was unreasonable in the first place...a direct result of inadequate planning...and which could have been largely avoided through proper planning.

Poor planning isn't the only reasons projects get into trouble. Projects often proceed with a poor understanding of project requirements and deliverables, that can lead to unanticipated requirements changes...which...if unmanaged...can lead to budget and schedule overruns. Failure to use meaningful measures to track project progress can also lead to these problems.

7



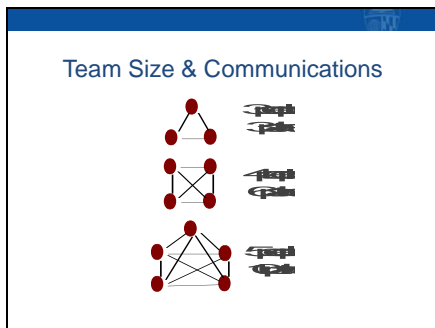
In the Information Week survey, the second most frequent management action when projects run over budget or behind schedule is to add more staff. Barry Boehm, a well-known software engineer who is often referred to as the father of software engineering economics, has a very popular quote..."adding people to a late project will make it later." This isn't always true...but in practice it's true often enough to pay attention to it.

Now...adding people to a project to shorten the schedule may seem like a logical thing to do, and it might work for certain projects. For example, If our project involved painting a house, and we added more painters, we could easily shorten the schedule, because painters can essentially work in parallel. We might,

however, increase the cost.

This doesn't usually work the same way for software projects, because there are many more dependencies between project activities and software product components. It's often possible to divide up the software engineering work among multiple programmers...but only to a point. And it may be possible to break up testing responsibilities across more staff...but only to a point. There are a certain set of what I like to call "physics" associated with software projects...certain activities have to be done in a particular order, and there is a limit to how much division of labor is feasible...and these physics can't really be tampered with. Adding staff almost always increases cost and doesn't necessarily shorten the schedule significantly if at all. It also contributes to increased project risk.

8



One of the results of adding more staff to a project, and also a risk item, is that communications and coordination between staff members gets more complex, more costly, and increases the likelihood of miscommunication.

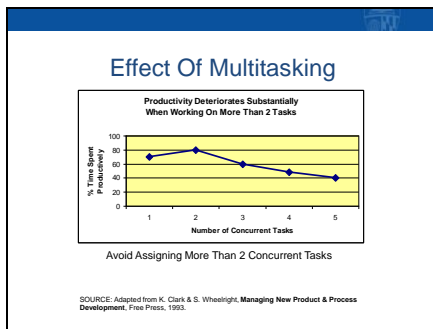
As an example, in a three-person team there are only three communication two-way communication paths. Adding a fourth team member doubles the number of communication paths, and adding a fifth member more than triples the number of paths. Doubling the team size from five to ten members results in 45 paths.

The formula for the number of communication paths is $N(N-1)/2$...where N is the number of project team members.

One of the biggest challenges a project manager faces is to keep everyone in synch with a project's current status...and the time it takes to do that increases non-linearly as the team size increases. Also, if one person misses...or misinterprets...a piece of key information, that can impact some or all of the entire project team.

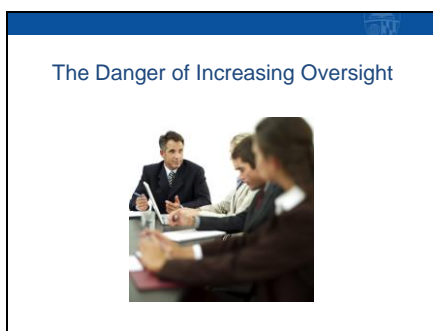
Another reality that is often overlooked when more people are added to a project is that the project staff, and the project manager, will likely have to spend more time communicating than they did before in order to keep everything in synch...and this needs to be factored into the effort estimates in order to evaluate the impact it will have on the project schedule.

9



Yet another concern when more people are added to a project is that it often results in multi-tasking. Staff are often required to split their time between tasks on multiple projects in order to help out on the project having trouble. Staff productivity decreases as the number of tasks someone is expected to handle increases beyond about two...so expecting people to handle many tasks simultaneously increases risk, and the potential reduction in productivity can also result in schedule increases on both the troubled project and the projects that the additional staff had been working on.

10



The third most frequent management action in the Information Week survey when a project gets into trouble is to increase project oversight. What exactly does that mean?

In practice, increasing oversight typically means increasing the frequency of project status meetings. As an example, if a project team was meeting on a weekly basis to discuss project status, a project manager may increase the status meetings to twice per week. On the surface, increasing the number of meetings may seem logical...and if applied to specific tasks that are in trouble this could be helpful...but the reality is that

increasing oversight will always increase cost and will usually increase the schedule as well.

Cost is increased because the additional effort required for the oversight meetings is generally not budgeted for. As an example, if we have four project team members and an additional one-hour oversight meeting is implemented each week, that's an additional 4 person-hours of effort that hasn't been budgeted for. Over the course of a month that's an additional two person-days of cost.

Schedule will likely be increased as well, because the four-person hours per week for additional oversight meetings will take the project team away from doing the actual project work they would have been doing were it not for the oversight meetings...unless they put in overtime hours to make up for the meetings.