## Chapter 2: Project Methodologies and Processes

### Teaching Strategies

The goal of this chapter is to give the students a basic overview of planning and managing IT projects.  The details will follow throughout the book and the course.

Two important concepts provide a focal point for the remainder of the course.  First, the notion of an IT project methodology (ITPM) is introduced. The second important concept introduced in Chapter 3 is the idea of Measurable Organizational Value or the MOV. I like to show my students how the ITPM follows not only a natural progression of project stages and activities, but mirrors the syllabus for the course.  Moreover, the ITPM that they will learn and follow throughout the course is a generic methodology that will evolve over time as the student and their organization gains experience, learns from those experiences, and then integrates those experiences in their methodology.  As a result, two organizations, say a group of consultants and a manufacturing company, should end up with two very different methodologies that fit the types of projects they take on based on their competitive strategy, their culture and their capabilities.

### Teaching Chapter 2 in a Nutshell

➢ A methodology provides a framework for initiating, planning, carrying out, closing, and evaluating the IT project.  The ITPM introduced in chapter 2 is generic project methodology that integrates the project life cycle, systems development life cycle and project management body of knowledge areas so that a set of phases, processes and tools are defined.  This allows the methodology to adapt to and align with a particular organization's culture, industry, strategy, etc. over time.

➢ Organizations are trying to improve the quality of their system development efforts while attempting to reduce the cycle time of their projects.  Subsequently, a number of approaches to implementing the SDLC have evolved.  Years ago, systems were developed using the waterfall approach, but this has evolved to include RAD and Agile approaches.  Similarly, extreme project management has gained interest as an approach to implementing the PLC much like the RAD and Agile approaches in systems development.

➢ The phases and infrastructure of the ITPM provide a logical sequence for planning and managing an IT project.  A methodology provides structure, but must be flexible enough to fit or adapt to unique situations.

**Review Questions**

**1. What is a project methodology?**

The step-by-step activities, processes, tools, quality standards, controls, and deliverables that are defined for a project. Project methodologies provide a systematic way to plan, manage, and execute the work to be completed by prescribing phases, processes, tools, and techniques to be followed.

**2. What are the advantages of using a methodology?**

Methodologies provide the project team with a game plan for implementing the project and product life cycles so that the team can focus on the tasks at hand, instead of always worrying about what they are supposed to do next.

A methodology provides a common language that allows the project team, project sponsor, and others within the organization to communicate more effectively.

A standardized methodology allows management to compare different projects more objectively which in turn will allow management to make better-informed and more objective decisions with respect to which projects get selected and whether funding should continue to support a particular project.

**3. Describe the project life cycle (PLC).**

The project life cycle (PLC) is a collection of logical stages or phases that maps the life of a project from its beginning to its end.  Each phase should provide one or more deliverables.

**4. What are phase exits, stage gates, and kill points? What purpose do they serve?**

Projects should be broken up into phases to make the project more manageable and to reduce risk. Phase exits, stage gates, or kill points are the review of key deliverables that allow the organization to evaluate the project's performance and to take immediate action to correct any errors or problems. These reviews take place at the end of each logical stage or phase to verify completion and determine whether to proceed to the next phase of the project.

**5. What is fast tracking? When should fast tracking be used? When would fast tracking not be appropriate?**

Fast tracking is starting the next phase of the project before approval is obtained for the completion of the current phase of the project.  The purpose of this is to reduce the project's schedule. Overlapping of phases can be risky and should only be done when the risk to the project is deemed acceptable.

**6. Describe the "Define Project Goal" phase of the project life cycle.**

This phase focuses on defining the overall goal of the project. Alternatives that would allow the organization to meet its goal are then identified. Next, the costs and benefits, as well as feasibility and risk, of each alternative are analyzed. Based upon these analyses, a specific alternative is recommended for funding. Finally, the project's goal and the analysis of alternatives that support the goal are summarized in a deliverable called the business case.

**7. Describe the "Plan Project" phase of the project life cycle.**

 A project plan defines:

- Project Objectives —A project's objectives include scope (the project work), schedule, budget, and quality. Objectives support the project's goal by defining what work needs to be completed, when it needs to be completed, how much it will cost to complete, and whether the work is acceptable to specific stakeholders.

- Resources —Resources are needed to complete the project work and include such things as people, facilities, and technology.

- Controls —A great deal of managing a project includes ensuring that the project goal and objectives are being met and resources are used efficiently and effectively. In addition, risk, change, and communication among the project stakeholders must be proactively managed throughout the project.

**8. Describe the "Execute Project Plan" phase of the project life cycle.**

The execute project plan phase concentrates on the design, development, and delivery of the project's product, service, or system. Moreover, the controls defined in the planning phase now allow the project stakeholders to compare the project's planned progress with the actual progress in terms of the work being completed on time, within budget, and within quality standards so as to achieve the business value envisioned. At the end of this phase, the team implements or delivers a completed product, service, or information system to the organization.

**9. Describe the "Close and Evaluate" phases of the project life cycle.**

 The last phases ensure that all of the work is completed as agreed to by the team, the sponsor, or other stakeholders. However, the project and the project team should be evaluated during a postmortem review to determine whether the project's goal defined in the initial phase was achieved. In addition, any best practices based on experiences and lessons learned should be documented and made available to future projects.

**10. Although the Guide to the Project Management Body of Knowledge (PMBOK® Guide) describes the generally accepted principles and practices of project management, why wouldn't these principles and practices work for every project?**

As we understand from the socio-technical approach (Chapter 1), projects don't exist in isolation as pure technical exercises. They all occur in a much wider context that includes different organizational cultures, resources, stakeholders, and objectives. Because of the infinite combinations of organizational and technical variables, no one set of practices or principles can ensure success in every instance. This body of knowledge, however, becomes a useful starting place which when coupled with the experiences of the project team and its leadership greatly increases the probability of the project's success.

**11. What is Project Integration Management?**

Integration focuses on coordinating the project plan's development, execution, and control of changes.

**12. What is Project Scope Management?**

Scope management provides assurance that the project's work is defined accurately and completely and that it is completed as planned. In addition, scope management includes ways to ensure that proper scope change procedures are in place.

**13. What is Project Time Management?**

Time management is important for developing, monitoring, and managing the project's schedule. It includes identifying the project's phases and activities and then estimating, sequencing, and assigning resources for each activity to ensure that the project's scope and objectives are met.

**14. What is Project Cost Management?**

Cost management assures that the project's budget is developed and completed as approved.

**15. What is Project Quality Management?**

Quality management focuses on planning, developing, and managing a quality environment that allows the project to meet stakeholder needs or expectations.

**16. What is Project Human Resources Management?**

Human resource management focuses on creating and developing the project team as well as understanding and responding appropriately to the behavioral side of project management.

**17. What is Project Communications Management?**

Communication management entails communicating timely and accurate information about the project to the project's stakeholders.

**18. What is Project Risk Management?**

Project risk management is concerned with identifying and responding appropriately to risks that can impact the project.

**19. What is Project Procurement Management?**

Projects often require resources (people, hardware, software, etc.) that are outside the organization. Procurement management makes certain that these resources are acquired properly.

**20. What is Project Stakeholder Management?**

Stakeholder management focuses on identifying project stakeholders to better understand their expectations or interests, and then developing appropriate strategies for communication and managing potential conflicts.

**21. What is a process? Why are processes important in project management?**

The PMBOK® Guide defines a process as "a set of interrelated actions and activities performed to achieve a pre-specified product, result, or service". In other words, a process is something you do to achieve a result.

Processes are an integral component of projects. They support all of the activities necessary to plan, create, and manage all of the project activities.

**22. Describe the Initiating Process.**

This process is focused on starting or initiating a project or phase once commitment is obtained.

**23. Describe the Planning Process.**

A process for developing and maintaining a workable plan to support the project's overall goal.

**24. Describe the Executing Process.**

Process of coordinating people and other resources to execute the plan.

**25. Describe the Monitoring and Controlling Process.**

A process to ensure proper control and reporting mechanisms are in place so that progress can be monitored, problems identified, and appropriate actions taken when necessary.

**26. Describe the Closing Process.**

Activities that provide closure in terms of a formal acceptance that the project or a project's phase has been completed satisfactorily.

**27. What is the aim of PRINCE2®?**

The aim of PRINCE2® is to ensure that projects are well-thought out in the beginning, well-managed throughout, and organized until the end.

**28. What is a Project Board? What is its role in a PRINCE2® project?**

A Project Board is created and is accountable and responsible for managing, monitoring, and controlling the project activities to ensure that the project achieves the value envisioned in the business case. The Project Board may have up to eight people and includes three important roles: a customer, a senior user, and a senior supplier. In addition to providing direction, the Project Board makes important decisions such as change requests and whether the project should continue. The Project Board is accountable for the project's success or failure.

**29. Define the roles of Customer, Senior User, and Senior Supplier in a PRINCE2® project.**

- The customer can be a customer, client, or executive sponsor who represents the business interests of the organization.

- The senior user represents the interests of the users or stakeholders who will use the project's product in order to bring the expected value or benefits to the organization.

- The senior supplier represents the suppliers or specialists who provide the skills or resources needed to deliver the project's product.

**30. What is the purpose of the Start Project Process in a PRINCE2® project?**

This is a relatively short process that is focused on developing a project brief or document that provides business justification for the project.

**31. What is the purpose of the Initiate Project Process in a PRINCE2® project?**

The main focus of this process is to develop the project brief into a more detailed business case, which is a key document that lays a foundation for all important project decisions.

**32. What is the purpose of the Direct Project Process in a PRINCE2® project?**

The Project Board's overall activities are defined so that it can direct the project successfully throughout each stage up through the project's closure.

**33. What is the purpose of the Control Stage Process in a PRINCE2® project?**

During this process, the project manager's day-to-day activities are defined as well as how the project tasks will be controlled and monitored.

**34. What is the purpose of the Manage Project Delivery Process in a PRINCE2® project?**

This process ensures that the work packages are developed, delivered, and approved as planned.

**35. What is the purpose of the Manage Stage Boundaries Process in a PRINCE2® project?**

This includes the information or reporting mechanisms the project manager will give to the Project Board in order to review the status of the project and to determine whether continued business justification for the project exists.

**36. What is the purpose of the Close Project Process in a PRINCE2® project?**

This ensures that the project is completed in a controlled manner if the project work is completed as planned or if it is no longer viable. More specifically, activities are defined for the acceptance of the project, as well as for the project manager to archive documents and release project resources.

**37. Describe the Business Case theme in a PRINCE2® project.**

Although the business case is an important PRINCE2® process, its importance is also underscored as a theme that asks the questions, "Why should this project be funded?" and "Why should this project continue to be funded?" It is a key document that not only justifies the initiation of a project, but also ensures that the project can deliver its intended value.

**38. Describe the Organization theme in a PRINCE2® project.**

The organization theme attempts to answer the question, "Who is involved with the project?" Under this theme, roles, responsibilities, and accountabilities are defined.

**39. Describe the Risk theme in a PRINCE2® project.**

All projects entail elements of risk, and the risk theme attempts to manage uncertainty by answering the question, "What if . . . .?" The approach to managing risk under PRINCE2® includes identifying, assessing, and managing risk systematically and proactively.

**40. Describe the Quality theme in a PRINCE2® project.**

The quality theme attempts to ensure that the project is not only completed on time and within budget, but that it also is completed within standards so that the product fits its intended use or purpose.

**41. Describe the Planning theme in a PRINCE2® project.**

The planning theme provides clear communication by attempting to answer the questions, "Who does what?" and "When will it get done?" Plans also provide control for the delivery of the project's product and to determine whether the cost, time, quality, risk, work performance targets are achievable by providing a reference point to measure progress against.

**42. Describe the Change theme in a PRINCE2® project.**

Often changes are required to the project's plans and target objectives. Requests for changes can come from any of the project stakeholders, so a systematic way to document, manage, and decide whether proposed changes are necessary is warranted. Subsequently, the change theme attempts to manage and control changes to the project as they occur.

**43. Describe the Progress theme in a PRINCE2® project.**

Metrics provide a means to measure a project's achievement and forecast whether the project's progress is going according to the approved plan. The progress theme attempts to answer the questions, "Where is the project now?" and "Where will it end up?"

**44. Describe the Business Case Driven principle in a PRINCE2® project.**

The business case is a key document that is developed at the beginning of the project and must be continually justified throughout. Therefore, it is a key driver for starting the project and for continued funding of the project.

**45. Describe the Product Focus principle in a PRINCE2® project.**

Projects are not just a series of activities or tasks, but rather are undertaken to produce a product. PRINCE2® projects emphasize the design and delivery of a quality product.

**46. Describe the Lessons Learned principle in a PRINCE2® project**.

PRINCE2® is based on proven best practices. Therefore, documented experiences in terms of lessons learned are an important component for the PRINCE2® methodology that are sought throughout the life of the project.

**47. Describe the Manage the Stage principle in a PRINCE2® project.**

At each stage of the project, the Project Board reviews the project's progress in comparison to the business case. Each stage is planned, monitored, and controlled.

**48. Describe the Adapt to Project principle in a PRINCE2® project.**

The PRINCE2® methodology can be tailored to projects large or small. The methodology can be scaled to the size of the project and should be flexible in terms of the risks and environment unique to the project.

**49. Describe the Manage by Exception principle in a PRINCE2® project.**

Tolerances are defined and used to empower project stakeholders by allowing them to make decisions without having to ask for approval from the next higher level of authority.

**50. Describe the Accountability principle in a PRINCE2® project.**

PRINCE2® projects should have clear roles and responsibilities. Stakeholders need to know their role as well as everyone else's. The Project Board includes executive sponsorship that defines the project's objectives and ensures that the project remains viable. In addition, internal or external suppliers provide resources, skills, or the knowledge to deliver the project's products, while users represent those stakeholders who will benefit from the delivery of the final product.

51. **What is the Systems Development Life Cycle (SDLC)**?

The Systems Development Life Cycle (SDLC) represents the sequential phases or stages an information system follows throughout its useful life. The SDLC is comprise of the following five phases: (1) planning, (2) analysis, (3) design, (4) implementation, (5) maintenance and support.

**52. Describe the Planning phase of the SDLC.**

The planning stage involves identifying and responding to a problem or opportunity and incorporates the project management and system development processes and activities. Here a formal planning process ensures that the goal, scope, budget, schedule, technology, and system development processes, methods, and tools are in place.

53. **Describe the Analysis phase of the SDLC**.

The analysis phase investigates the problem or opportunity more fully. The specific needs and requirements for the new system are identified and documented during this phase.

**54. Describe the Design phase of the SDLC.**

During the design phase, the project team uses the requirements and "to be" logical models created during the Analysis phase as input for designing the architecture to support the new information system. This architecture includes the network design, hardware configuration, databases, user interface, and application programs.

**55. Describe the Maintenance and Support phase of the SDLC.**

This phase involves the ongoing support for the system. Changes to the system, in the form of maintenance and enhancements, are often requested to fix any discovered errors (i.e., bugs) within the system, to add any features that were not incorporated into the original design, or to adjust to a changing business environment.

**56. What is the relationship between the Project Life Cycle (PLC) and the Systems Development Life Cycle (SDLC)?**

Although projects follow a project life cycle, the development of new products, services, or information systems follow a product life cycle. The most common product life cycle in IT is the Systems Development Life Cycle (SDLC), which represents the sequential phases or stages a product or information system follows throughout its useful life.

The project life cycle (PLC) focuses on the phases, processes, tools, knowledge, and skills for managing a project, while the systems development life cycle (SDLC) focuses on creating and implementing the project's product—the information system. the SDLC is part of the PLC because many of the development activities occur during the execution phase of the PLC. The last two phases of the PLC, close project and evaluate project success, occur after the delivery of the product or information system.

**57. Describe the Waterfall method.**

A structured approach to systems development has been around since the 1960s and 1970s, when large mainframe applications were developed. Winston Royce, a computer scientist, is attributed with proposing a model called "Waterfall" when he published a paper called "Managing the Development of Large Software Systems" in 1970. Waterfall is a metaphor for a cascading of activities from one phase to the next where one phase is completed before the next phase is started.

The Waterfall model (shown in Figure 2.7) stresses a sequential and logical flow of software development activities.

**58. What are some advantages of using Waterfall?**

- it allows us to plan each phase in detail so that the project schedule and budget can be computed by summing the time and cost estimates for all the tasks defined in each phase. In theory, the project will be completed on time and within budget if each phase is completed according to our estimates.

- A structured approach is suitable when developing large, more complex systems where one assumes, or at least hopes, that the requirements defined in the early phases do not change very much over the remainder of the project.

- because it will provide a solid structure that can minimize wasted effort, the Waterfall model may work well when the project team is inexperienced or less technically competent.

## 59. What are some disadvantages of using Waterfall?

- Critics of the structured approach to systems development argue that it takes too long to develop systems and that this approach does not embrace the idea that changing requirements are inevitable.

- Inexperienced developers often have the false belief that if they ask the users what they want, they will be rewarded with a set of clear, accurate, and complete requirements. In truth, most users do not know or are unable to articulate their needs early on in the project. And if they do, those requirements will most likely change later on.

- Users tend to be involved at three main points during a Waterfall project: 1) when they are needed to define the requirements (i.e., features and functionality) of the software, 2) when users ask for changes to the requirements, and 3) at the end of the project when the software is delivered. Many times this has resulted in strained relationships between users and developers. Users may not have articulated everything they want, and developers become resistant to making any changes later on.

- Adding new requirements or changing software that has already been written adds to the schedule and cost of the project. As a result, a new system may be delivered that does not meet the users' needs.

- Another issue is that the potential value of the project can only be attained at the end of the project when the system with all its defined requirements is delivered. For many projects, this could be months or years.

## 60. What is Agile?

The term Agile  today is an umbrella term that includes a number of approaches, methods, or ways to develop products or systems. Agile approaches  focus on speed and flexibility rather than a rigid development structure.

**61. What is the Agile Manifesto?**

Twelve principles to describe how teams can transition to Agile. These principles are provided in Figure 2.8 of the text.

**62. Why do Agile practitioners value individuals and interactions more than processes and tools?**

It's not that processes and tools are not important; it's that people and interactions are more important.  Under Agile, the development team is given autonomy to choose the best way to do the work for a given project. This requires multidisciplinary teams that are motivated, self-organizing, and able to communicate effectively.

**63. Why do Agile practitioners value working software more than comprehensive documentation?**

Only working (and tested) software brings value to people and organizations. Moreover, project team members are often required to document the work they complete as a way to track the progress of the project. This is often viewed as excessive or needless documentation that consumes valuable time that could have been used more productively. Under Agile, documentation is only useful if it aids directly in the development of a working product or system.

**64. Why do Agile practitioners value customer collaboration more than contract negotiation?**

While the term "user" still applies as in "people who use the product or system," practitioners of Agile tend to use the richer term "customer" instead. The customer is supreme, and Agile emphasizes collaboration to ensure that the customers get exactly what they need.

**65. Why do Agile practitioners value responding to change more than following a plan?**

Under Agile, change can be viewed as an opportunity to improve the product or system because new knowledge or insight can lead to new ideas and new innovations or stop the team from traveling down the wrong path before it's too late.

**66. Why might practitioners of Waterfall and Agile view change differently?**

Under a more structured approach to software development, change is viewed as something that must be managed and controlled; otherwise, the project spins out of control. Therefore, it's important to get it right, so a great deal of time is spent creating a detailed plan. If the plan doesn't work, it's because someone didn't spend enough time planning or the plan needed more detail. The plan becomes so important that egos can

drive the team to blindly follow a plan. Under Agile, resistance to change is viewed as futile so why fight it?

**67. What roles do the customers play in an Agile project?**

Agile takes a strong customer focus, and the customer could be internal (e.g., the user) or external to the organization. The product or system must be developed with the customer in mind; therefore, the customer and developers must communicate and interact effectively in order to work together collaboratively. The team should be collocated for daily face-to-face communication.

**68. Why is working software an important Agile focus?**

Only working software brings value, but it must be delivered in the shortest time practical. Although it is important to give customers what they want, it is also important to keep things simple and deliver only the most important features or functionality. Change is not the enemy. It is an opportunity.

**69. Describe the attributes of an Agile project team.**

An Agile team should include business people and technical people who are motivated, self-organizing, and mutually accountable. A team should be given the support and resources it needs and then trusted to get the job done. People who work long hours may burn out, get tired, become less motivated, and tend to make more mistakes. Therefore, the team should be able to work at a pace that is constant and sustainable. The team should have the authority to make adjustments when needed.

**70. When is a product or system considered complete under Agile?**

A product is complete only when it is designed, tested, documented, and working.

**71. Describe eXtreme Programming (XP).**

XP is Rapid Application Development approach that involves a series of versions of the system called releases. Releases are developed quickly in a similar fashion to prototyping (within a few weeks or months). Each release addresses one or a few functions that are a part of the full project specification. User requirements are documented using an object-oriented model as "user stories". Acceptance testing is developed for each story. Releases that pass the acceptance test are deemed complete. XP can accelerate the SDLC process because in addition to the advantages of prototyping, XP often employs teams of programmers who can develop releases in parallel. End users are involved in the process early and their requirements uncovered and understood earlier.

**72. Why is XP considered an Agile method?**

Under XP, the system is transferred to the users in a series of versions called releases. A release may be developed using several iterations that are developed and tested within a few weeks or months. Each release is a working system that includes only one or several functions that are part of the full system specifications. XP includes a number of activities where the user requirements are first documented as a user story . The user stories are then documented using an object-oriented model called a class diagram. A set of acceptance tests is then developed for each user story. Releases that pass the acceptance tests are then considered complete.

**73. Describe Scrum.**

Under Scrum, there are three important roles: Scrum master, product owner, and the development team. The Scrum master is similar to the project manager, while the product owner represents the business side and ensures that the most important features are included in the product. The development team is responsible for delivering a quality product or system. Requirements or features are defined by the product owner and time estimates for each feature is estimated by the project team. The product owner then prioritizes the features that become the product backlog, which is subsequently divided into iterations called a sprint. Each sprint generally takes a few weeks, and a completed product is delivered. Additional features and functionality are planned for the next sprint until all of the features in the product backlog are delivered. Each day, the Scrum master, product owner, and development team have a short, stand-up meeting called the daily Scrum  during which information and the project's progress are shared.

**74. Why is Scrum considered an Agile method?**

The main goal is to satisfy the customer quickly and flexibly. Frequent sprints allow for agile reaction to changing requirements.

**75. Describe the concept of a learning cycle.**

Learning cycles are a useful tool that can be used throughout the project life cycle regardless whether the project team follows Waterfall or Agile. More specifically, learning cycles provide a way to resolve ambiguous situations through the repeated pattern of thinking through a problem.

**76. Why do you think many teams accept the project problem or opportunity at face value and never question the way the problem or opportunity was framed?**

At the beginning of a project, the team members' understanding may be quite general, or they may feel that they really do not understand the challenge assigned to them. Unfortunately, few people are willing to admit that they do not have all the answers or that their understanding of the team's challenge is limited. On the other hand, other

members of the team may approach the project with a high degree of certainty—that is, they may act as though they know what the solution is and, therefore, the team just needs to work out the details of how to go about implementing the solution. Opinions are often accepted without question and can result in erroneous assumptions that lead the project team in the wrong direction or keep the team from getting at the real problem. Moreover, there is often pressure for the team to take immediate action so that the project can be completed on time and within budget.

**77. What purpose does creating lessons learned at the end of a learning cycle provide?**

An entire project can be viewed as a series of learning cycles. An initial team meeting can examine the original problem or challenge assigned to the team. During that meeting, the team can develop an initial action plan. Between meetings, the members of the team can then carry out their assigned tasks for testing assumptions or gathering information. At the next meeting, the team can reflect on what it has learned, document the lessons learned, and then start the beginning of a new cycle. Each cycle should be used to challenge the framing of the problem and create new opportunities for learning.