



Certified Planning and Scheduling Manager Sample Material

V-Skills Certifications

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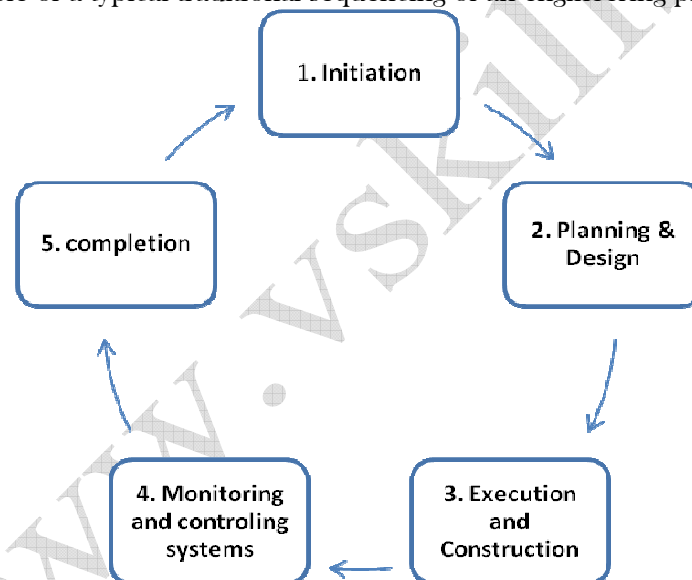
1. PROJECT MANAGEMENT

1.1. Project

In nutshell a project can be defined as any **temporary** endeavor undertaken to create a **unique** product, service, or result. A project can be anything, right from the development of a new product, the launch of a new service, a marketing campaign, or even a wedding plan. In other words a project isn't something that's part of normal business operations. It's typically created once, it's temporary, and it's specific. A project consumes resources (whether people, cash, materials, or time), and it works within certain defined limits.

It is temporary because it has a definite beginning and definite end. A project ends when the objectives are achieved or terminated in case the objectives can't be achieved or it is no longer needed.

Progressive elaboration is a major defining characteristic of a project. It accompanies the other two characteristics **temporary and unique**. It means developing in steps and progressing in increments. Let's take the example of a typical traditional sequencing of an engineering project



Not all projects will have every stage, as projects can be terminated before they reach completion. Some projects do not follow a structured planning and/or monitoring process. And some projects will go through steps 2, 3 and 4 multiple times.

Many industries use variations of these project stages. For example, when working on a brick-and-mortar design and construction, projects will typically progress through stages like pre-planning, conceptual design, schematic design, design development, construction drawings (or contract documents), and construction administration.

In software development, this approach is often known as the **waterfall model** where one series of tasks after another is undertaken in a linear sequence. In software development many organizations have adapted the **Rational Unified Process (RUP)** to fit this methodology. Waterfall development works well for small, well defined projects, but often fails in larger projects of undefined and ambiguous nature. While the terms may differ from industry to industry, the actual

stages typically follow common steps to problem solving—"defining the problem, weighing options, choosing a path, implementation and evaluation."

The initiating processes of a project are very crucial and it determines the nature and scope of the project. If this stage is not given due importance and performed well, it is unlikely that the project will be successful in meeting the business' needs. What is needed here are certain key controls in other words an understanding of the business environment is important for making sure that all necessary controls are incorporated into the project. Any deficiencies should be taken into consideration and necessary remedies should be done before the project moves to the next level.

The initiating stage should include a plan that encompasses the following areas:

- ✓ analyzing the business needs/requirements in measurable goals
- ✓ reviewing of the current operations
- ✓ financial analysis of the costs and benefits including a budget
- ✓ stakeholder analysis, including users, and support personnel for the project
- ✓ project charter including costs, tasks, deliverables, and schedule

The Planning and Design comes after the initiation stage. The main task at this stage is to plan time, cost and resources adequately to estimate the work needed and to effectively manage risk during project execution. As with the Initiation process group, a failure to adequately plan greatly reduces the project's chances of successfully accomplishing its goals.

Project planning generally consists of

- ✓ determining how to plan (e.g. by level of detail or rolling wave)
- ✓ developing the scope statement;
- ✓ selecting the planning team;
- ✓ identifying deliverables and creating the work breakdown structure;
- ✓ identifying the activities needed to complete those deliverables and networking the activities in their logical sequence;
- ✓ estimating the resource requirements for the activities;
- ✓ estimating time and cost for activities;
- ✓ developing the schedule;
- ✓ developing the budget;
- ✓ risk planning;
- ✓ acquiring formal approval to begin work.

Executing consists of the processes used to complete the work defined in the project plan to accomplish the project's requirements. Execution process involves coordinating people and resources, as well as integrating and performing the activities of the project in accordance with the project management plan. The deliverables are produced as outputs from the processes

performed as defined in the project management plan and other frameworks that might be applicable to the type of project at hand.

Monitoring and controlling consists of those processes performed to observe project execution so that potential problems can be identified in a timely manner and corrective action can be taken, when necessary, to control the execution of the project. The key benefit is that project performance is observed and measured regularly to identify variances from the project management plan.

Monitoring and controlling includes

Measuring the ongoing project activities (where we are);

Monitoring the project variables (cost, effort, scope, etc.) against the project management plan and the project performance baseline (where we should be);

Identify corrective actions to address issues and risks properly (How can we get on track again);

Influencing the factors that could circumvent integrated change control so only approved changes are implemented.

In multi-phase projects, the monitoring and control process also provides feedback between project phases, in order to implement corrective or preventive actions to bring the project into compliance with the project management plan.

Project maintenance is an ongoing process, and it includes:

- ✓ Continuing support of end-users
- ✓ Correction of errors
- ✓ Updates of the software over time

Over the course of any construction project, the work scope may change. Change is a normal and expected part of the construction process. Changes can be the result of necessary design modifications, differing site conditions, material availability, contractor-requested changes, value engineering and impacts from third parties, to name a few.

Beyond executing the change in the field, the change normally needs to be documented to show what was actually constructed. **This is referred to as change management.**

Hence, the owner usually requires a final record to show all changes or, more specifically, any change that modifies the tangible portions of the finished work. The record is made on the contract documents - usually, but not necessarily limited to, the design drawings. The end product of this effort is what the industry terms as-built drawings, or more simply, "as built." The requirement for providing them is a norm in construction contracts.

When changes are introduced to the project, the viability of the project has to be re-assessed. It is important not to lose sight of the initial goals and targets of the projects. When the changes accumulate, the forecasted result may not justify the original proposed investment in the project.

Closing includes the formal acceptance of the project and the end of the project. Most of the formal projects go for a legal closure including certain administrative activities. These administrative activities include the archiving of the files and documenting lessons learned.

This phase consists of

- ✓ Project close: Finalize all activities across all of the process groups to formally close the project or a project phase.
- ✓ Contract closure: Complete and settle each contract (including the resolution of any open items) and close each contract applicable to the project or project phase.

Projects are a means of organizing the activities that is not possible to be utilized as a means of achieving an organization's strategic plan. It can be undertaken by cross functional team from within the organization or a contracted service provider.

1.2. Project Management

Project Management is the process and activity of planning, organizing, motivating, and controlling resources, procedures and protocols to achieve specific goals in scientific or daily problems. A project is a temporary endeavor designed to produce a unique product, service or result with a defined beginning and end (usually time-constrained, and often constrained by funding or deliverables), undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value. The temporary nature of projects stands in contrast with business as usual (or operations), which are repetitive, permanent, or semi-permanent functional activities to produce products or services. In practice, the management of these two systems is often quite different, and as such requires the development of distinct technical skills and management strategies.

The primary challenge of project management is to achieve all of the project goals and objectives while honoring the preconceived constraints. The primary constraints are scope, time, quality and budget. The secondary – and more ambitious – challenge is to optimize the allocation of necessary inputs and integrate them to meet pre-defined objectives.

Project management as a concept has been variously defined by experts. But the most accepted and holistic definition is given by the PMOBK Guide which says “When a project team applies knowledge, skills, tools, and techniques to project activities to meet project requirements, we call it project management. The process involved in the project management includes: Initiating, Planning, Executing, Monitoring, Controlling, and Closing.”

Managing a project includes the following four aspects

- ✓ Identifying requirements
- ✓ Establishing clear and achievable objectives
- ✓ Balancing the competing demands for Quality, Scope, Time and Cost
- ✓ Adapting to the specifications, planned approach to different concerns and expectations of various stakeholders

Project managers often talk of “**Triple Constraints**”- Project Scope, Project time, and Project Cost in managing competing project requirements. Often while balancing these three projects quality gets affected.

The characteristics of High Quality project are:

- ✓ Deliver the required product/service/result
- ✓ Deliver the project within the Scope
- ✓ Deliver the project within the pre-decided timeframe
- ✓ Deliver the project within the budget.

It can happen only when the constraints are removed and competing demands are fulfilled.

Apart from the constraints, one of the major hurdles comes in the form of uncertainty. Hence handling the project risk is a major influencing factor in the success or failure of the project. The project management team has a professional responsibility to its stakeholders, including customers, the performing organization, and the public.

Hence the project management team has to understand the project life cycle and the organizational functioning very well.

Project application areas are categories of projects that have common elements significant in such project but are not needed or present in all the projects. A project can be categorized according to disciplines- Legal, Production, Logistics etc., according to technological element such as Software development, according to management specialization- government contracting, community development, new product development etc., and industrial group as automotive, chemical, agricultural service.

Each application area has accepted standard and practices often codified in regulations. The International Organization for standardization (ISO) defines a standard as “a document established by consensus and approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.”

A regulation on the other hand is a government - imposed requirement, which specifies product, process or service characteristics, including the applicable administrative provisions, with which compliance is mandatory.

Sometimes however there is a marked overlap in the concepts of standards and regulations that cause confusion. Projects can be various shapes and sizes, from the small and straightforward to extremely large and highly complex.

In organizations and businesses, project management can be concerned with anything, particularly introducing or changing things, in any area or function, for example:

- ✓ people, staffing and management
- ✓ products and services
- ✓ materials, manufacturing and production
- ✓ IT and communications
- ✓ plant, vehicles, equipment
- ✓ storage, distribution, logistics

- ✓ buildings and premises
- ✓ finance, administration, acquisition and divestment
- ✓ purchasing
- ✓ sales, selling, marketing
- ✓ human resources development and training
- ✓ customer service and relations
- ✓ quality, health and safety,
- ✓ legal and professional
- ✓ technical, scientific, research and development
- ✓ new business development
- ✓ and anything else which needs planning and managing within organizations.

Successful project management, for projects large or small, tends to follow the process outlined below.

The same principles, used selectively and appropriately, also apply to smaller tasks.

Project management techniques are not just for project managers - they are available for anyone to use.

Understanding the project environment is very important for the implementation of any project successfully. All projects are virtually planned and implemented in a social, economic, and environmental context, and have intended and unintended positive and/or negative impacts. It is highly advisable for every project team to consider the project in its Cultural, social, international, political, and physical environment context.

1.3. Project Management Approaches

There are a number of approaches for managing project activities including lean, iterative, incremental, and phased approaches.

Regardless of the methodology employed, careful consideration must be given to the overall project objectives, timeline, and cost, as well as the roles and responsibilities of all participants and stakeholders.

The traditional approach

A traditional phased approach identifies a sequence of steps to be completed. In the "traditional approach", five developmental components of a project can be distinguished (four stages plus control):

- ✓ initiation
- ✓ planning and design
- ✓ execution and construction
- ✓ monitoring and controlling systems

✓ completion

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PRINCE2

PRINCE2 is a structured approach to project management released in 1996 as a generic project management method. It combines the original PROMPT methodology (which evolved into the PRINCE methodology) with IBM's MITP (managing the implementation of the total project) methodology. PRINCE2 provides a method for managing projects within a clearly defined framework.

PRINCE2 focuses on the definition and delivery of products, in particular their quality requirements. As such, it defines a successful project as being output-oriented (not activity- or task-oriented) through creating an agreed set of products that define the scope of the project and provides the basis for planning and control, that is, how then to coordinate people and activities, how to design and supervise product delivery, and what to do if products and therefore the scope of the project has to be adjusted if it does not develop as planned.

In the method, each process is specified with its key inputs and outputs and with specific goals and activities to be carried out to deliver a project's outcomes as defined by its Business Case. This allows for continuous assessment and adjustment when deviation from the Business Case is required.

PRINCE2 provides a common language for all participants in the project. The governance framework of PRINCE2 – its roles and responsibilities – are fully described and require tailoring to suit the complexity of the project and skills of the organisation.

Critical chain project management

Critical chain project management (CCPM) is a method of planning and managing project execution designed to deal with uncertainties inherent in managing projects, while taking into consideration limited availability of resources (physical, human skills, as well as management & support capacity) needed to execute projects.

CCPM is an application of the theory of constraints (TOC) to projects. The goal is to increase the flow of projects in an organization (throughput). Applying the first three of the five focusing steps of TOC, the system constraint for all projects is identified as are the resources. To exploit the constraint, tasks on the critical chain are given priority over all other activities. Finally, projects are planned and managed to ensure that the resources are ready when the critical chain tasks must start, subordinating all other resources to the critical chain.

The project plan should typically undergo resource leveling, and the longest sequence of resource-constrained tasks should be identified as the critical chain. In some cases, such as managing contracted sub-projects, it is advisable to use a simplified approach without resource leveling.

In multi-project environments, resource leveling should be performed across projects. However, it is often enough to identify (or simply select) a single "drum". The drum can be a resource that acts as a constraint across projects, which are staggered based on the availability of that single resource.

One can also use a "virtual drum" by selecting a task or group of tasks (typically integration points) and limiting the number of projects in execution at that stage.

Process-based management

The incorporation of process-based management has been driven by the use of Maturity models such as the CMMI (capability maturity model integration; see this example of a predecessor) and ISO/IEC15504 (SPICE – software process improvement and capability estimation).

Agile project management

Agile project management encompasses several iterative approaches, based on the principles of human interaction management and founded on a process view of human collaboration. Agile-based methodologies are "most typically" employed in software development as well as the "website, technology, creative, and marketing industries." This sharply contrasts with traditional approaches such as the Waterfall method. In agile software development or flexible product development, the project is seen as a series of relatively small tasks conceived and executed to conclusion as the situation demands in an adaptive manner, rather than as a completely pre-planned process.

Advocates of this technique claim that:

- ✓ It is the most consistent project management technique since it involves frequent testing of the project under development.
- ✓ It is the only technique in which the client will be actively involved in the project development.
- ✓ The only disadvantage with this technique is that it should be used only if the client has enough time to be actively involved in the project every now and then.

Agile is an umbrella term for multiple project management methodologies, including:

- ✓ Scrum - A holistic approach to development that focuses on iterative goals set by the Product Owner through a backlog, which is developed by the Delivery Team through the facilitation of the Scrum Master.
- ✓ Extreme Programming (XP) - Also called Pair Programming this method uses small groups and has a highly prescriptive Test Driven Development (TDD) model.
- ✓ eXtreme Manufacturing (XM) - An agile methodology based on Scrum, Kanban and Kaizen that facilitates rapid engineering and prototyping.
- ✓ Crystal Clear - An agile or lightweight methodology that focuses on co-location and osmotic communication.
- ✓ Kanban - A lean framework for process improvement that is frequently used to manage work in progress (WIP) within agile projects. Kanban has been specifically applied in software development.
- ✓ Scrum ban a mixed scrum and kanban approach to project management. It focuses on taking the flexibility of kanban and adding the structure of scrum to create a new way to manage projects.

Lean project management

Lean project management uses the principles from lean manufacturing to focus on delivering value with less waste and reduced time.

Extreme project management

In critical studies of project management it has been noted that several PERT based models are not well suited for the multi-project company environment of today. Most of them are aimed at very large-scale, one-time, non-routine projects, and currently all kinds of management are expressed in terms of projects.

Using complex models for "projects" (or rather "tasks") spanning a few weeks has been proven to cause unnecessary costs and low maneuverability in several cases. The generalization of Extreme Programming to other kinds of projects is extreme project management, which may be used in combination with the process modeling and management principles of human interaction management.

1.4. Project Life Cycle

Projects and project management are carried out in an environment broader than that of the project itself. The project management team must understand this broader context so it can select the life cycle phases, processes, and tools and techniques that appropriately fit the project. This chapter describes some key aspects of the project management context.

Project managers or the organization can divide projects into phases to provide better management control with appropriate links to the ongoing operations of the performing organization. **Collectively, these phases are known as the project life cycle.** Many organizations identify a specific set of life cycles for use on all of their projects.

Characteristics of the Project Life Cycle

The project life cycle defines the phases that connect the beginning of a project to its end. For example, when an organization identifies an opportunity to which it would like to respond, it will often authorize a feasibility study to decide whether it should undertake the project.

The project life cycle definition can help the project manager clarify whether to treat the feasibility study as the first project phase or as a separate, stand-alone project. Where the outcome of such a preliminary effort is not clearly identifiable, it is best to treat such efforts as a separate project.

The phases of a project life cycle are not the same as the Project Management Process Groups. The transition from one phase to another within a project's life cycle generally involves, and is usually defined by, some form of technical transfer or handoff.

Deliverables from one phase are usually reviewed for completeness and accuracy and approved before work starts on the next phase.

However, it is not uncommon for a phase to begin prior to the approval of the previous phase's deliverables, when the risks involved are deemed acceptable. This practice of overlapping phases, normally done in sequence, is an example of the application of the schedule compression technique called fast tracking.

There is no single best way to define an ideal project life cycle. Some organizations have established policies that standardize all projects with a single life cycle, while others allow the project management team to choose the most appropriate life cycle for the team's project. Further, industry common practices will often lead to the use of a preferred life cycle within that industry.

1.5. Stakeholders

It is the relationship between operations and projects, which are of three main types which affect various aspects of a project like resource availability, control of the project budget and staff roles.

They are persons or organizations (like customers, sponsors) who involve actively in the project or are affected by the performance or completion of the project. They may influence the project, deliverables and project team members. They may be internal and external to company. Their influence can be used to ensure a successful outcome.

A stakeholder is someone who has an interest in the project or its outcomes. The term 'interest' here refers to a business interest. The stakeholders for a project are likely to be able to be grouped according to their interests. For example, a typical collection of groups would be:

- ✓ **Sponsor** - A group/ Individual. The sponsor is paying for the project and has the primary say over how the budget is spent.
- ✓ **Governance group** - There will be various organizational entities that have a say in how the project is governed, how it is funded, whether it starts, continues, or stops.
- ✓ **End users or customer** - Projects normally develop things that are used by a variety of people who are called the end users.

- ✓ **Functional managers and resource departments** - The various individuals or departments that supply personnel to the project will want to be kept abreast of the project's requirements for certain skill sets on certain dates.
- ✓ **Project team** - The project team is expected to deliver the project and they are blamed or lauded when the project concludes.
- ✓ **Sub-contractors and Suppliers.** - Many organizations see a project as a potential sale. Project managers and team leaders regularly have salespeople wanting to call to promote their firm's products.
- ✓ **Other employees in the organization** - The people in the next cubicle, next office, and next department are all likely to be interested in what is happening within a project.
- ✓ **The general public/ Community-** The public includes people who live nearby, people who support the project, people who are against the project, and competitors who will help publicize any bad news about the project.

Regardless of which stakeholder we are communicating with and what channel we use to communicate and the detail we are providing, the information we provide must be consistent across all groups, all reports, etc. Conflicting, contradictory and outdated information will only confuse and create unease among stakeholders.

The classification, whilst perhaps not so complimentary to the stakeholders, attempts to group people into whether they are committed to the outcome, or merely involved. Those stakeholders who are committed to the outcome will share in the project's success or, more particularly, its failures. Those who are involved may wish to have some say in the project, but they are likely to pull back from any project participation when problems are encountered.

While it is important to ensure that all stakeholders will receive the information that they need to perform their roles and support the project; it is also important to exclude people from project information that they do not need to know.

In an article titled "Stakeholder Analysis - Winning Support for Your Projects" by Rachel Thompson the importance of stakeholder identification and management is very articulately presented based on the practical experiences of project managers, who unanimously agree to it that it is the most critical aspect of a project.

"Stakeholder management is critical to the success of every project in every organization I have ever worked with. By engaging the right people in the right way in your project, you can make a big difference to its success... and to your career." She writes.

Stakeholder Analysis is the technique used to identify the key people who have to be won over. You then use **Stakeholder Planning** to build the support that helps you succeed.

1.6. Project Scope

In the project context, the term "scope" may refer to

- ✓ The features and functions that are to be included in a product or service.
- ✓ The work that must be done in order to deliver a product with the specified features and functions.

The processes, tools, and techniques used to manage product scope vary by application area and are usually defined as part of the project life cycle.

Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. It is primarily concerned with defining and controlling what is or is not included in the project. The major project scope management processes are

- ✓ Initiation—committing the organization to begin the next phase of the project.
- ✓ Scope Planning —developing a written scope statement as the basis for future project decisions.
- ✓ Scope Definition—subdividing the major project deliverables into smaller, more manageable components.
- ✓ Scope Verification —formalizing acceptance of the project scope.
- ✓ Scope Change Control —controlling changes to project scope.

These processes interact with each other and with the processes in the other knowledge areas as well. Each process may involve effort from one or more individuals or groups of individuals based on the needs of the project. Each process generally occurs at least once in every project phase.

1.7. Base Lining

Baselining is a method for analyzing performance. The method is marked by comparing current performance to a historical metric, or "baseline". For example, if you measured the performance of a network switch over a period of time, you could use that performance figure as a comparative baseline if you made a change.

It is a process by which the quality and cost effectiveness of a service is assessed, usually in advance of a change to the service. Baselining usually includes comparison of the service before and after the change or analysis of trend information. The term Benchmarking is normally used if the comparison is made against other enterprises.

Uses

Baselining is useful for many performance management tasks, including

- ✓ Monitoring daily performance
- ✓ Measuring trends in performance
- ✓ Assessing whether performance is meeting requirements laid out in a service agreement