Project Management Articles

Project-Speak: Assumptions and Constraints

Few projects begin with absolute certainty. If we had to wait for absolute certainty, most projects would never get off the ground. As projects are planned and executed, some facts and issues are known, others must be estimated. Estimation is an art, with many fine points to finesse between certainty and wishful thinking. You can't just hope you have the resources you need to do the job, and you can't wait until every resource is available to begin. You have to manage and mitigate using informed assumptions and constraints.

Assumptions and constraints form the basis for project planning, filling in the gaps between known proven facts and total guesswork. Each assumption is an "educated guess", a likely condition, circumstance or event, presumed known and true in the absence of absolute certainty. Each constraint is a limiting condition, circumstance or event, setting boundaries for the project process and expected results. Once identified, these assumptions and constraints shape a project in specific, but diverging ways - assumptions bring possibilities, and constraints bring limits. Consider this example:

- A defined budget is a fact. i.e. $10,000 has been allocated to complete a given project.
- The belief that the budget is sufficient to complete the project on time and as required is an assumption. This assumption should not be a guess. It should be the result of a planned, verified budget estimate.
- The need to modify deliverables and adapt the schedule to suit the budget is a constraint.

The chart below further illustrates these similarities and distinctions:

	Assumptions	**Constraints**
Characteristics	Condition, circumstance or event.	Condition, circumstance or event.
Impact	Allow the project to proceed.	Restrict and limit project execution.
Process	Must be analyzed and monitored to ensure validity and relevancy as the project proceeds.	Must be identified and incorporated into the project plan to ensure that the plan is realistic.

From initiation to closure, assumptions and constraints set the stage for project planning and execution. As the project is planned, assumptions and constraints will be used to define and shape tasks, schedules, resource assignments and budget allocations. As such, each is used to manage an otherwise uncertain future, laying out a roadmap for how the project will proceed.

At a minimum, as the project begins, assumptions and constraints must be defined for one or more of the following elements:

- Effort: The estimated tasks and activities required to manage the project and produce deliverables.
- Schedule: The estimated tasks and events needed to complete the project, organized into a structured sequence to meet a specified project end date.
- Resources: The estimated staff resources needed to complete the project, according to number, type, work hours, and skills.
- Budget: The estimated cost of the project, allocated to tasks, resources and phases as needed to complete the project.
- Vendors and Procurement: The anticipated performance of contractors, vendors and suppliers to deliver goods and services according to contracts and project requirements.
- Management Process: Management standards can serve as a constraint on project performance, adding quality control overhead.

Step by Step: Managing Assumptions and Constraints

Identify and Challenge - The first step in the "assumptions and constraints" management process is identification. As assumptions are identified, each must be viewed with an appropriate degree of skepticism. Assumptions cannot be mere guesswork or wishful thinking. For example, you can't just hope that the budget will be sufficient, you have to examine and verify budget estimates to get as close to certainty as possible. In turn, constraints must also be viewed skeptically, with an eye towards possible elimination. Constraints pose restrictions, and any relief from these restrictive elements would be welcome. But, if constraints cannot be eliminated, then appropriate workarounds must be developed.

Assess - Assumptions should be evaluated from a long term perspective, according to confidence level (i.e. How confident are you that this assumption will be proven correct?), followed by a related "if-then" risk counterpart analysis (i.e. If this assumption is proven incorrect, what will be the likely consequences for the project?). During the course of this analysis, the "impact of the incorrect assumption" must be determined. Impact can be weighed at various levels, from serious (threatening successful or timely project delivery), to moderate (absorbable impact on deliverables, schedules or costs), to minor (insignificant impact on deliverables, schedules or costs). Depending upon the assessed confidence level and related impact, a full risk assessment may be required. If you have high degree of confidence that a given assumption is true, then further analysis may be unwarranted. Lower confidence and higher impact would probably require further analysis and the related risk assessment.

In contrast, constraints must be evaluated from a short term perspective, according to immediate impact - i.e. How does a given constraint limit or refine the project in one or more respects? For example, product availability constraints can impact multiple elements of a single project. Product delays can elongate the project schedule, add to costs, and negatively impact resource availability. As constraints are assessed, all points of impact must be determined.

Incorporate - Once assumptions and constraints are identified and assessed, they must be incorporated into the relevant portion of the project plan. Assumptions, combined with known facts, will drive the formation of the project plan, providing the actionable basis (albeit with varying degrees of certainty) for planned tasks, schedules, budgets and resource assignments.

Constraints must be factored into the project plan from the start in the form of stated "workarounds". These workarounds will mitigate constraint "impact" by providing the means for the project to move ahead despite the existence of constraining factors (i.e. A schedule change allows for concurrent, non-dependent work to proceed even if there are delays in product delivery. This scheduling workaround will prevent an overall schedule delay).

Unidentified constraints will not just disappear, they will likely pop up at some later point as full fledged project problems. Consider this example: You are working on a project where specialized technical skills are required. You estimate that these specialized resources will be required for (40) hours per week during the month of June, and you prepare your project plan based on this assumption. However, you fail to account for the fact that these resources will only be available for (20) hours per week in the month of June. Initially, this resource limitation was a constraint, but since it was not identified at the outset, once June rolls around, it becomes a major problem.

Control - Initial assumptions and constraints are rarely static. As the project evolves, assumptions will be proven true or untrue. Changing circumstances may eliminate or modify previously identified constraints. In either case, you must be prepared to react, with contingencies, workarounds and modifications to plans and deliverables. To ensure a constant state of readiness, identified assumptions and constraints must be tracked and monitored throughout the project process. In addition, assumptions can be factored into the plan via "checkpoints (i.e. the point at which the assumption will be tested (proven correct or incorrect (in part or whole). These checkpoints can then be monitored to ensure that working assumptions are valid, and if not, to take corrective action.

Review - Once a project is complete, assumptions and constraints should be reviewed as part of an overall "post-project" review process, to evaluate all steps taken for identification, assessment, incorporation and control. This review should consider quality, accuracy, effectiveness and omissions (missed assumptions and/or constraints that should have been discovered as the project began).

Conclusions:

Projects are filled with varying degrees of certainty and uncertainty. As projects begin, known facts must be supported by informed assumption, and managed according to identified constraints. As the project proceeds, changes will occur, as reflected in an ongoing series of revised "assumptions and constraints". Using a structured process for identification, assessment, validation and control, your informed, but uncertain, "constraints and assumptions" will lead to certain success.