

Daniel V. Epstein,

Instructor, Softwave

Engineering Program, American University in Central Asia,

The Methodology of the Project Management Education

The author's note

The author of the following article has over 15 years experience in the Project Management field in the USA working for several major companies, such as IBM, as well as the university teaching experience. He earned his Master's degree in Project Management from George Washington University and the Project Management Professional (PMP) certification from the Project Management Institute.

The development of the methodology presented here started in January 2002, when the author developed the set of processes and the project management training classes as the consultant for the Four Thought Group in Phoenix AZ, USA. Later the author used this early version of the methodology for teaching the Project Management class in the Manas University in Bishkek from the fall of 2002 till summer of 2004. Today some of the project management classes taught in AUCA and other Bishkek universities are based on that earlier methodology.

After returning back to USA in 2004 and working as the Senior Project Management Consultant in the best practices area until October 2007, the author redeveloped significant part of the methodology and added many detailed project management processes. The author intends to publish the textbook and Lab exercises on the subject once the book is completed by the end of 2008.

1.0 Introduction

The long project development cycle and large number of defects left in products after their release into production affect not only the direct development costs, but also the lost revenue or even the lost opportunity. The remedy to the above mentioned problem is to assign the highest priority to the well managed development, the ability to predict cost, delivery date and quality. The only way to ensure this is the practice of Project Management.

The great business thinker, Tom Peters, predicted about 20 years ago in his book "Thriving in Chaos"¹, that 90% of jobs are likely to be either eliminated or transformed into the third generation companies within 10 to 20 years. Those companies are characterized by involvement of the "knowledge workers" in company decisions on all levels. According to Tom Peters, those companies will have to turn every task into a project or be doomed to failure. That prediction came true in 2001-2002, when around one million of IT workers in the USA have been laid off.

The fast spread of the Project Management profession today happened due to realization that only Project Management is able to provide high quality, predictable budget and the schedule for all new developments, which determine the most successful and competitive industry leaders. Also, Project Management Institute (PMI) introduced professional certification

of the Certified Associate in Project Management (CAPM) and the higher level certification of the Project Management Professional (PMP). PMP became the worldwide recognized, exclusive and the difficult to obtain commodity. Today it is practically impossible to get a Project Manager's job in the USA to manage medium or large projects without PMP certification.

The main document for the professional project management certification is the Project Management Body of Knowledge² (PMBOK). The older books on the subject provide very basic knowledge and ignore the process oriented nature of project management and the PMBOK methods and tools. Latest books written on the subject of project management profession are based on PMBOK. However, as required by PMI, only project managers with several years of experience are allowed to take the certification exam. One of the reasons is that novice in the project management area is not able to correctly apply a wealth of methods and tools described by PMBOK or even to understand it in the right context. PMBOK classifies project management knowledge areas and defines them as separate nine processes: Time Management, Scope Management, Cost Management, Quality Management and five others. However, the practical application of project management is a simultaneous management of Time, Scope, Cost, Quality and the majority of remaining processes. The Integration Management knowledge area, added to PMBOK several years ago, attempts to tie up all of the knowledge area together, but this is done on a very high level, which may be understood mostly by seasoned professionals. PMBOK processes are usually top level short processes of about 10 to 25 lines each. There are 39 processes and 30 techniques presented in PMBOK. The rest of PMBOK provides very valuable information about methods and tools used in each one of the PMBOK knowledge areas.

Since the PMBOK based education is not too effective for new project managers, a need for training of novice project managers became very urgent. This article presents project management methodology developed by the author. Students that successfully complete the full course of studies based on this methodology and all lab exercises using project management tools will be able to manage small to medium projects immediately. After gaining more experience in the area, those project managers will be ready to pursue their study toward PMP certification.

In accordance with the presented here methodology, the overall high level project management function has 22 detailed processes. Each process consists of specific sequential steps in four project phases (Initiation, Planning, Implementation and Closing). The process flow starts with the Requirements Management Process in the Initiation Phase and ends with Project Closing in the Closing Phase. Based on test conditions, the process flow may branch to specific processes or loop back to the specified control point. The detailed description of the process flow is provided in section 3. Each process identifies the required statistics and their gathering and documentation.

Some of the detailed processes in the presented methodology consist of 35 to 40 printed pages. Some others may be as short as 10 pages or as long as 60 pages. Large processes contains 20 to 30 sequential steps and small ones 10 to 20 steps. Each process includes detailed description of the applicable techniques, methods and tools.

2.0 Highlights of the Project Management processes

2.1 Initiation phase

1. *Project Control Book (PCB) Process and PCB maintenance.*

PCB is a tool for recording all project documentation. The purpose of this process is

to define required content for Project Control Book as well as to define methods of classification and documentation of all project related events in a way which allows easy management of the required information.

2. *Issue Management Process*

The purpose of this process is to identify and manage issues that come up during all project phases; identify process to resolve issues and minimize their impact on the project.

3. *Project Requirement Analysis Process and methods*

The purpose of this process is to gather project requirements and to describe methods used, as well as to control the flow of customer requirements through the lifecycle of the project to ensure understanding and agreement of the scope of the project by the Delivery Team and clients.

4. *Business Requirements Documentation Process, the Traceability Matrix, its use and the matrix update.*

The purpose of this process is to provide the documentation and template to document business requirements and ensure their traceability, so that the project delivers exactly the documented scope required by clients.

2.2 Planning phase

1. *Work Breakdown Structure and the Project Scheduling Process*

The purpose of this process is to establish plans and methods for performing and managing the project.

2. *Project Estimating Process*

The purpose of this process is to describe necessary activities and methods required to produce a size, effort, cost, schedule and critical computer resources estimate for a project throughout its lifecycle.

3. *Risk Management Process*

The purpose of this process is to identify and document risks, to control the impact of risks, and to minimize risks adverse effect on the project.

4. *Communication Management and Reporting Process*

The purpose of this process is to define communications required for managing project and to identify reporting requirements and the various report templates.

5. *Quality Assurance Process*

The purpose of this process is to establish Quality Assurance plans and perform Quality Assurance throughout the project life, from inception to closing.

6. *Configuration Management Process*

The purpose of this process is to control project components at any given time and prevent unauthorized changes to project deliverables.

7. *Statement of Work (SOW) development Process*

The purpose of this process is to describe steps necessary to create SOW, which is the single most important legal document laying foundation for the project.

2.3 Implementation phase

1. *Change Management Process*

The purpose of this process is to identify how changes to the project scope are managed, and to integrate the approved changes into the project schedule.

2. *Schedule Tracking Process*
The purpose of this process is to ensure the project's proceeding as planned.
3. *Financial Management and the Earned Value Analysis Process*
The purpose of this process is to describe steps necessary to provide the financial control of the project.
4. *Project Control and the Balanced Scorecard Process*
The purpose of this process is to provide senior management with the "bird eye's" view of the project and its health.
5. *People Management*
The purpose of this process is to describe different types of the Project Manager's authority and describe the conflict management and the conflict resolution process.

2.4 Closing phase

1. *User Acceptance Test Process and methods*
The purpose of this process is to describe steps necessary to run the acceptance test. The process includes test planning, script development, defect management, root cause analysis and tracking of defects that occur before and after product release into production.
2. *Deliverables Management Process*
The purpose of this process is to manage project deliverables identified in the Statement of Work and to describe release of intermediate and final project deliverables to clients.
3. *Project Rollout Process*
The purpose of this process is to establish methods to roll out the project from development to production environment.
4. *User Training Process*
The purpose of this process is to identify training needs and establish user training.
5. *Project Closing and the "postmortem" Analysis*
The purpose of this process is to analyze the finished project and identify successes and failures during the project execution in order to avoid their repeat in future.
6. *Troubled Projects Assessment*
The purpose of this process is to assess reasons for troubled projects and identify methods to rectify the situation.

3.0 The Project Management Process Flow Description

The abbreviated version of the Project Management High Level Process Flow Diagram is shown in Fig.1. Some of the smaller processes are not shown on the diagram in order to keep the diagram on a single page.

The process flow starts when a project request is received from a client in the Initiation Phase of the project. It is an extremely rare occurrence when clients provide the detailed and complete project requirements. The establishment of project requirements and its analysis is a major separately funded and planned process. The Project Requirements Analysis process describes methods of gathering and documenting business requirements from clients. The process ends when a Business Requirements Document (BRD) is produced and signed off by both the developing organization and the client.

The part of BRD is the Requirements Traceability Matrix, which is used to trace all changes to all requirements throughout the course of the project. The Traceability process describes methods of documenting traceability and provides the matrix template.

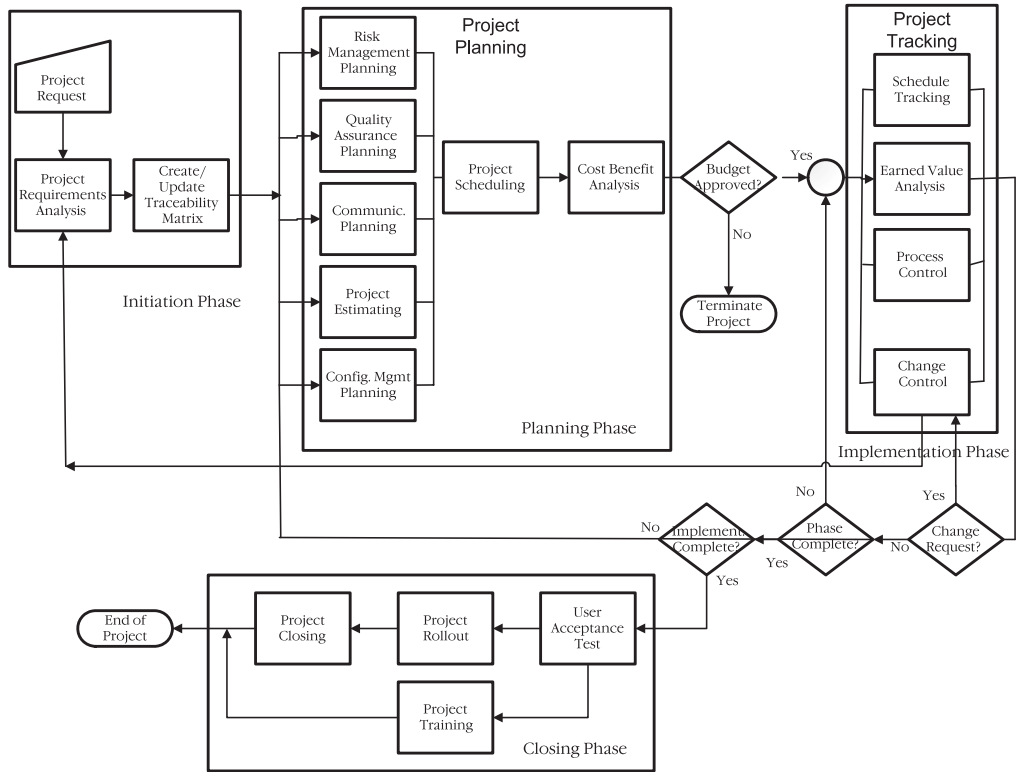


Fig 1.

Before the Planning Phase of the project starts, the Project Charter Document must be received from client. The Project Charter is the authorization to start the project.

The purpose of the Planning Phase is to develop the complete project plan package, which consists of the detailed project schedule, Communication Plan, Risk Management Plan, Quality Assurance Plan, Configuration Management Plan and others. The detailed project estimates are made and included in the project schedule. The phase starts with the development of the preliminary Work Breakdown Structure (WBS). Each of the above processes is defined using detailed steps and methods described in the corresponding process document.

When the project plan is complete and both the schedule and budget are defined, the cost benefit analysis must be conducted to determine whether the project benefits justify the cost of the project.

The next step is to get the budget approval by the sponsor. If budget is not approved, the project will be terminated. Otherwise the project Implementation Phase starts.

During the Implementation Phase the schedule is tracked to ensure the timely completion of the project. In parallel the Earned Value Analysis process is executed to ensure that the project is within the budget. The Process Control ensures that all processes are being followed.

When a scope change is requested at any time during the project execution, the Change Control process guides its approval and implementation. Once change is approved, the process flow is directed back to the Requirements Management process in the Initiation Phase and then to the Traceability Matrix in order to update it. From there the flow moves to the Planning Phase, which invokes again the Risk Management and Project Estimating processes. The other processes within the Planning Phase may also be executed, depending on specific circumstances. Since most project scope changes involve additional work, the extra budget and new completion date must be approved as well. The change will be implemented in the Implementation Phase with all its processes involved.

If the “phase complete” test condition is true, this will direct the project flow back to the Project Planning Phase. After completion of each phase, the work breakdown structure is usually modified to reflect new available project details. The project plan for next phase must be updated, the risk analysis performed, new estimates made, budget approved etc.

If the “implementation complete” test is true, the process flow is directed to the Closing Phase. At that time the User Acceptance Test is conducted and the project is rolled out to production. Then the project closing process is executed and all resources are released. At the same time as the User Acceptance Test starts running, the User Training is provided.

4.0 Training Aids

4.1 Lectures

The university training class consists of 14 lectures of two academic hours each, plus 14 labs, also two academic hours each. Classes outside the university may be adjusted as needed. The total volume of the project management process documentation exceeds 400 pages, which may discourage students from learning. Therefore, each lecture is presented using 35 to 45 PowerPoint slides. This content is considered adequate to fully understand the class material. In addition, students will be using the following templates in labs:

1. Statement of Work (SOW) template for “time and material” project
2. Team Status Report Template
3. Management Status Report Template

The complete text of all project management process documentation may also be available to students, as well as many other templates, checklists and the following three tools:

1. MS Project
2. Risk Assessment Tool for Small Projects (under \$1M)
3. Earned Value Analysis Tool

4.2 Labs

No project management training can be completed without students’ practical exercises. While it is irrelevant which project scheduling tool is used, the most probable tool available for training is Microsoft Project.

Usually, it is not acceptable to teach any commercial software package in universities. Therefore, apart from the first introduction of MS Project in the first very simple schedule and general consultations, no MS Project training is conducted. However, one of two weekly parts of homework is the independent study of MS Project of about 1.5-2 hours each.

After the first lab, only description of labs is provided. The first two labs require building of small project schedules (about 40 tasks), and the list of project tasks is provided in the lab assignment. Students learn MS Project skills in those two labs, entering tasks, assigning task dependencies, and learning the efficient resource allocation and resource leveling.

The next to follow exercise provides only business requirements for more practical project of the relocating a business. Here students have to develop complete schedule of no less than 80 tasks.

This lab has six 6 parts, two academic hours each:

1. Identify all tasks needed and build the Work Breakdown Structure
2. Enter Task Dependencies and obtain project estimates using process and methods taught in the class. Here students will break out in groups of three in order to use estimating techniques effectively.
3. Run risk analysis using the developed by the author Risk Analysis Tool for small projects.
4. Complete project schedule and develop Statement of Work using the template provided.
5. Baseline the project, change the “today’s project date” to the middle of the project schedule. Receive status reports from team members (instructor will play this role) and start tracking to “today’s date” week by week. There will be some intentional schedule delays and cost overruns based on the specific reasons, which won’t be disclosed to students at this time. In addition, student will process two change requests provided by the instructor and incorporate them into the schedule.
6. Run the Earned Value Analysis to identify financial performance of the project, first doing calculations manually, and then using the Earned Value Analysis Tool developed by the author. Also develop the project status report for the senior management.
7. Conduct analysis of troubled project and identify the root cause of project’s poor performance using the process and methods taught in class.

Three or four labs that follow the above labs will offer the use of various project templates according to their profession. Thus, business students may use the Business Plan implementation template to build a new business or develop marketing plan for new product. The software engineering students will build the software development project for the specified by instructor small product. Students will develop project estimates and perform risk analysis before building the complete schedule.

It is not possible to complete each lab in the allocated 1.5 hours. Therefore, the second part of their homework will be the independent work to complete lab at home and submit it before the next class. The estimated additional time is approximately 3 hours.

4.3 Quizzes

Students will take a weekly quiz in writing with 15 to 20 False/True questions. This will ensure that students refresh the memory by reading the materials of the previous week lecture. The understanding of theoretical material is the prerequisite for lab exercises. In addition, there will be short quizzes during each lecture to encourage students’ participation.

References:

1. Peters, Tom. 1987. *Thriving in Chaos: Handbook for a Management Revolution*. California Limited Partnership.
2. *Project Management Body of Knowledge*. 2006. Project Management Institute, USA.