Project Management Professional (PMP®) Exam
PMBOK® Guide – Fifth Edition Aligned

Chuck Millhollan, MBA, MPM, PMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Copyrights**

- PMP®: “PMP” and the PMP logo are certification marks of the Project Management Institute which are registered in the United States and other nations.
- PMBOK®: “PMBOK” is a trademark of the Project Management Institute, Inc. which is registered in the United States and other nations.
- Note: The PMBOK is the primary source for this slide deck. When other sources are references, citations are provided.
## Introductions & Course Expectations

- **Personal Background**
  - Name
  - Organization, Title
  - Formal Education

- **Project Management Experience**

- **Expectations for this course**
Course Syllabus
## Workshop Approach

- Instructor presentation & guided discussion
- Student presentation (based on the Rita Mulcahy PMP® Exam Prep Textbook chapter tests)

- Presentations should include:
  - The questions with the correct answers highlighted
  - A justification for the correct answers
  - An explanation for why the distracters were not the appropriate choice
  - Sources for each question

- In-class exam review and discussion
  - Random selection 😊

<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Area</td>
<td>Integration</td>
<td>Scope</td>
<td>Time</td>
<td>Cost</td>
<td>Quality</td>
</tr>
</tbody>
</table>

### Student Copy – Not for Reproduction or Distribution
Student Presentations

• Let’s go the syllabus (last page…)
• Student presentations are based on learning from the following:
  – The PMBOK® required reading for the knowledge area
  – Rita Mulcahy PMP® Exam Prep textbook required reading & practice exams
  – Hot Topics flashcards
  – Additional research as appropriate
• Candidates are encouraged to provide copies of their presentations to all members of the class after their presentations (either hard copy or electronic copy is acceptable)
Student Presentations: Assignments

- **Integration Management**
  - Instructor assigned
    - Chapter 4
- **Scope Management**
  - Instructor assigned
    - Chapter 5
- **Time Management**
  - Instructor assigned
    - Chapter 6
- **Cost Management**
  - Instructor assigned
    - Chapter 7
- **Quality Management**
  - Instructor assigned
    - Chapter 8
- **Human Resource Management**
  - Instructor assigned
    - Chapter 9
- **Communications Management**
  - Instructor assigned
    - Chapter 10
- **Risk Management**
  - Instructor assigned
    - Chapter 11
- **Procurement Management**
  - Instructor assigned
    - Chapter 12
- **Stakeholder Management**
  - Instructor assigned
    - Chapter 13
- **Ethics & Prof Responsibility**
  - Instructor assigned
    - Chapter 14
The Test

- 200 questions
  - 25 are “pretest” questions that do not effect score – randomly placed throughout the exam
  - Passing rate is 106 of 175 scored questions (~ 61%)
- 4 hours
  - Preceded by a 15 minute tutorial (not part of your time)
- Pass/Fail indication immediately after submission
  - Diagnostic report will show breakdown of performance within each domain (5 process + professional responsibility)
- Cost:
  - PMI Members: $405/$275
  - Non-Members: $555/$375
**EXAM CONTENT OUTLINE**

The following table identifies the proportion of questions from each domain that will appear on the examination. These percentages are used to determine the number of questions related to each domain and task that should appear on the multiple-choice format examination.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Percentage of Items on Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Initiating the Project</td>
<td>13 %</td>
</tr>
<tr>
<td>II. Planning the Project</td>
<td>24 %</td>
</tr>
<tr>
<td>III. Executing the Project</td>
<td>30 %</td>
</tr>
<tr>
<td>IV. Monitoring and Controlling the Project</td>
<td>25 %</td>
</tr>
<tr>
<td>V. Closing the Project</td>
<td>8 %</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
# Study Time Commitment (PMPPath™)

**Source:** Dr. Robert Amason, PMP

<table>
<thead>
<tr>
<th>Study Element</th>
<th>Most Likely</th>
<th>Optimistic</th>
<th>Pessimistic</th>
<th>PERT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>17.75</td>
<td>13.31</td>
<td>35.5</td>
<td>20.0</td>
</tr>
<tr>
<td>Scope</td>
<td>13.40</td>
<td>10.05</td>
<td>26.8</td>
<td>15.1</td>
</tr>
<tr>
<td>Quality</td>
<td>15.10</td>
<td>11.33</td>
<td>30.2</td>
<td>17.0</td>
</tr>
<tr>
<td>Time</td>
<td>16.70</td>
<td>12.53</td>
<td>33.4</td>
<td>18.8</td>
</tr>
<tr>
<td>Cost</td>
<td>16.30</td>
<td>12.23</td>
<td>32.6</td>
<td>18.3</td>
</tr>
<tr>
<td>HR</td>
<td>25.00</td>
<td>18.75</td>
<td>50</td>
<td>28.1</td>
</tr>
<tr>
<td>Communications</td>
<td>13.30</td>
<td>9.98</td>
<td>26.6</td>
<td>15.0</td>
</tr>
<tr>
<td>Risk</td>
<td>14.70</td>
<td>11.03</td>
<td>29.4</td>
<td>16.5</td>
</tr>
<tr>
<td>Procurement</td>
<td>13.20</td>
<td>9.9</td>
<td>26.4</td>
<td>14.9</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>13.30</td>
<td>9.97</td>
<td>26.6</td>
<td>15.0</td>
</tr>
<tr>
<td>Professional Responsibility</td>
<td>11.70</td>
<td>8.77</td>
<td>23.4</td>
<td>13.2</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>169.45</strong></td>
<td><strong>127.84</strong></td>
<td><strong>340.9</strong></td>
<td><strong>191.8</strong></td>
</tr>
</tbody>
</table>

**Source:** Dr. Robert Amason, PMP
Study Groups
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Application Process**

**PMP Application**

**Step 1: Application**

- Contact Address
- Contact E-mail, Phone
- Attained Education
- Requirements
- Optional Information
- Certificate
- Agreement
- Review & Submit

**Step 2: Schedule Exam**

**Step 3: Exam Results**

**Step 1: Application | Review Mailing Address**

Please enter your address information below. You can change your preferred mailing or billing address by clicking "Set as Mailing" or "Set as Billing". If your addresses are not listed below, please add them by using the "Add Home" or "Add Work" buttons.

When you are done, click "Next".

<table>
<thead>
<tr>
<th>My Default Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Work)</td>
</tr>
<tr>
<td>Humana</td>
</tr>
<tr>
<td>501 West Main</td>
</tr>
<tr>
<td>Louisville, KY, USA, 40202</td>
</tr>
</tbody>
</table>

*Add Home Address*

**PMI**, the PMI logo, "PMBOK", "PgMP", "PMP", the PMP logo, and "CAPM" are marks or registered marks of the Project Management Institute, Inc. in the United States and/or other nations. For a comprehensive list of PMI marks contact the PMI Legal Department.

Chuck Millhollan, MBA, MPM, PMP, PgMP  
© 2014, Innovative Management Solutions, LLC
Application Process

PMP Application

Step 1: Application

Contact Address
Contact Email, Phone
Attained Education
Requirements
Optional Information
Certificate
Agreement
Review & Submit

Step 2: Schedule Exam
Step 3: Exam Results

Step 1: Application | Review Attained Education

Please indicate your highest level of education attained at the time of application below using the drop down menu and complete all applicable contact information for your school, college or university.

* Highest level of education attained: -- select -- or global equivalency

* Year degree awarded: 1980

* School/University:

* Address:

* City:

State/Province/Territory:

Zip/Postal Code:

* Country: Select a Country

* Field of Study: -- select --

* Indicates a required field

Support/FAQs
Your education attained will determine which category you are applying for.

PMI, the PMI logo, "PMP", "CAPM", "PMI-SP", "PMI-ACP", "PMI- PgMP", "PfMP", "PMBOK", "PMDI", and "PgMP" are marks or registered marks of the Project Management Institute, Inc. in the United States and/or other nations. For a comprehensive list of PMI marks contact the PMI Legal Department.
Application Process

Step 1: Application | Eligibility Worksheet

You can use the following worksheet to track your progress. Qualified requirements must equal or exceed the required totals before the application may be submitted to PMI for review and approval.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Required</th>
<th>Qualified</th>
<th>Still Need</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM Experience Months</td>
<td>36</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>PM Experience Hours</td>
<td>4500.00</td>
<td>0.00</td>
<td>4500.00</td>
</tr>
<tr>
<td>PM Education Hours</td>
<td>35.00</td>
<td>0.00</td>
<td>35.00</td>
</tr>
</tbody>
</table>

Meeting the requirements:

- You can update your Project Management Work Experience.
- Or update your Project Management Education.

"PMI", the PMI logo, "PMBOK", "PgMP", "PMP", the PMP logo, and "CAPM" are marks or registered marks of the Project Management Institute, Inc. in the United States and/or other nations. For a comprehensive list of PMI marks contact the PMI Legal Department.
Louisville Testing Locations

Thomson Prometric Test Center
7400 New La Grange Road, Suite #110
Louisville, KY 40222
Phone: (502) 423-0478
Site Code: 1101

U of L Belknap Campus
106 East Brandeis
Louisville, KY 40208
Phone: (502) 852-6607
Site Code: 1102
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Initiating</td>
</tr>
<tr>
<td></td>
<td>Planning</td>
</tr>
<tr>
<td></td>
<td>Executing</td>
</tr>
<tr>
<td></td>
<td>Monitoring &amp; Controlling</td>
</tr>
<tr>
<td></td>
<td>Closing</td>
</tr>
<tr>
<td>Scope</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
</tr>
</tbody>
</table>

**Our roles…**

- I am here as a facilitator
- You are the PMP® exam candidates!
<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Area</td>
<td>Integration</td>
<td>Scope</td>
<td>Time</td>
<td>Cost</td>
<td>Quality</td>
</tr>
</tbody>
</table>

Want the Answers Before the Test?

- Best practices and lessons learned from experienced faculty members, and even more important…
- PMP Exam candidates fresh from the fight
Note Taking

• Purposefully no “slide deck” once we move into the knowledge areas
  – The PMBOK® is your note taking guide…get into the source!

  – Note the slide headers; they guide you to the applicable sections of the PMBOK®
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
An Introduction to Project Management
1.2 What is a Project?

- Defined in terms of distinctive characteristics – a project is a **temporary** endeavor undertaken to create a **unique** product or service
  - A product (end item or component)
  - A capability to perform a service
  - A result (outcome or document)

- **Progressive elaboration**
  - Developed in steps and continuing by increments

- Operations and project similarities
  - Performed by people
  - Constrained by limited resources
  - Planned, executed, and controlled

- Program – A group of interrelated projects in which management is coordinated
1.3 Managing a Project

- **Identify requirements**
- **Assess & address stakeholder needs, concerns & expectations throughout the duration of the project**
- **Constrained**
  - Scope
  - Quality
  - Schedule
  - Budget
  - Resources
  - Risks
Definitions

• **Project Management**: The application of management methods (knowledge, skills, tools, techniques) to project activities (planning, scheduling and controlling) to deliver the product of the project.

• **Project Management** provides process or task focus; it provides specifics of who, what, when, and how.
# 1.4 Projects & Programs Defined

- **Project**
  - Temporary
  - Undertaken to create a unique product or service
  - Defined starting point
  - Defined objectives (determines end point)

- **Program**
  - Group of related projects
  - Coordinated management
  - Obtain benefits and/or control not possible if managed individually
Project Management

Process Group
Initiating  Planning  Executing  Monitoring & Controlling  Closing

Knowledge Area
Integration
Scope
Time
Cost
Quality
HR
Communications
Risk
Procurement
Stakeholder

Project Initiation (Proposal, CE, Approval, etc...)
Monitoring & Control
Project Planning (Charter, WBS, etc...)
Project Execution
Project Closure

Student Copy – Not for Reproduction or Distribution
Program Management

Process Group
- Initiating
- Planning
- Executing
- Monitoring & Controlling
- Closing

Knowledge Area
- Integration
- Scope
- Time
- Cost
- Quality
- HR
- Communications
- Risk
- Procurement
- Stakeholder

Overall Portfolio
- Program 1
- Program 2
- Project 5
- Portfolio 1

Student Copy – Not for Reproduction or Distribution
# Program vs Project: Important Differentiators

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Program
- Deliver long term business benefit
- Focus on ongoing support and full transition
- Focus on benefit realization
- Produce results

## Project
- Deliver: T, C, Q, and Scope
- Ends when deliverables are provided
- Goal is to satisfy users
- Produce product or service

*Student Copy – Not for Reproduction or Distribution*
Program vs Multi-Project: Important Differentiators

<table>
<thead>
<tr>
<th>Program</th>
<th>Multi-project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management of a group of interrelated projects</td>
<td>Manage several projects independently</td>
</tr>
<tr>
<td>Program level responsibility and manages project managers for component projects</td>
<td>Fully accountable for each individual project</td>
</tr>
<tr>
<td>Optimize resources across program</td>
<td>Manage resources assigned to tasks for projects</td>
</tr>
<tr>
<td>Manage multiple stakeholders; complex communications</td>
<td>Focused on meeting needs for different project stakeholders</td>
</tr>
<tr>
<td>Balanced time across program related activities</td>
<td>Balance between concurrent projects competing for time</td>
</tr>
</tbody>
</table>
Portfolio Management

Source: www.projectmasters.com

Process Group
Initiating        Planning        Executing        Monitoring & Controlling        Closing

Knowledge Area
Integration
Scope
Time
Cost
Quality
HR
Communications
Risk
Procurement
Stakeholder

Student Copy – Not for Reproduction or Distribution
<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Area</td>
<td>Integration</td>
<td>Scope</td>
<td>Time</td>
<td>Cost</td>
<td>Quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Communications</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Procurement</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Stakeholder</td>
</tr>
</tbody>
</table>

Projects focus on delivering a product or service

Programs focus on benefit realization

Portfolios demonstrate investment strategy
1.4.4 The “PMO”

• Management structure that standardizes project governance processes
  – Coordinate planning
  – Prioritization
  – Coordination communication
  – Resource sharing
  – Methodologies, tools & techniques
  – Responsibilities ranging from support to direct management
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PMO Structures

- **Supportive** – Consultative, provide templates, share best practices, coordinate training, collect/manage lessons learned
- **Controlling** – Compliance with methodologies, governance (moderate control)
- **Directive** – Directly manage projects (high control)
# 1.5 Project vs Operations Management

- **Operations**
  - On-going activities
  - Business process or operations management
  - Product life cycle vs project life cycle
  - Intersection points (product enhancements, new product development, product close-out or disposal, etc…)

- **Similarities**
  - Performed by people
  - Limited by constraints
  - Planned, executed, monitored & controlled
  - Achieve organizational goals & contributes to strategic plans

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.6 Business Value

- Sum of all tangible & intangible assets
- Created through effective ongoing operations
- Created through effective use of portfolio, program and project management
- Strategic planning
  - Portfolios
    - Programs
      - Projects
Organizational Influences and Project Life Cycle

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
Organizational Structure

Let’s Deep Dive PMBOK Table 2-1
# 2.1.4 Organizational Process Assets

- Any and all process related assets
  - Plans, policies, procedures, guidelines
  - Historical information
  - Lessons learned
- Formal or informal
- Updated throughout the project
- Responsibility primarily rests with project team members
- Categories
  - Processes & procedures
  - Corporate knowledge base
2.1.5 Enterprise Environmental Factors

- Internal & external factors that influence a project’s success
- Not under the project team’s control
- Negative or positive
- Inputs to most processes
- Such as
  - Organizational culture, structure, processes
  - Industry standards
  - Existing human resources (capabilities)
  - Personnel administration (staffing, performance reviews)
  - Work authorization systems
  - The PMIS
2.2 Project Stakeholders

- An individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project

- Grouping and naming stakeholders is the primary aid to identifying who views themselves as stakeholders
# Project Stakeholders

- **Project Manager**: The person responsible for managing the project
- **Customer**: The individual or organization who will use the product
- **Sponsor**: The individual or group who creates and approves the project charter and (typically) provides the financial resources for the project
- **Expeditor**: Simply a communications coordinator w/o decision making or enforcing authority
### 2.4 Project Lifecycle

- **Generally defines…**
  - What
  - When
  - Who
  - How

- **Common Characteristics**
  - Cost & staffing requirements start low and peak during implementation (intermediate phases)
  - Level of uncertainty is highest at the beginning
  - Ability to influence “product” characteristics is highest at the beginning
Let’s Dig Into PMBOK Figure 2-8
Project “Phases”

- Completion of one (or possibly more) deliverables characterizes a phase
  - Logical segmentation for ease of management, planning, and control
    - Aids governance
    - Sequential or overlapping phases
- Deliverable = measurable, verifiable product or service
- One-size-does-not-fit-all
### Life Cycle Types

**Predictive**
- Waterfall
- Most planning (plan-driven) is completed early in the lifecycle

**Iterative (incremental)**
- Phases “repeat” as product understanding increases

**Adaptive**
- Agile, or change-driven
- Similar to iterative; however, rapid “sprints” with fixed time and cost
- Scope and requirements difficult to determine in advance

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Project Management Processes

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
Project Management Processes Groups

- **Initiating Process**
- **Planning Process**
- **Controlling Process**
- **Executing Process**
- **Closing Process**
Process Group Interaction

Process Groups are not Phases
3.8 Project Information

- Work performance data – observations and measurements during work (executing measurements input into controlling processes)
- Work performance information – data analyzed in context and integrated based on relationships across areas (status, forecasts)
- Work performance reports – Representation of work performance information
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapters 1 - 3
Project Integration Management

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
Project Interfaces

- Interface Management is critical during execution
- Interfaces:
  - Product
  - Infrastructure
  - Resources
  - People interfaces (cross organization)
  - System interfaces (organization, information)
- **Goal of project integration**: coordinate people, product, infrastructure, system (organization, information) together toward accomplishing the project goals.
<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 4.1 Develop Project Charter

Document that formally authorizes the project & provides PM authority to allocate resources

### 4.1.1 Inputs

1. Project SOW
2. Business case
3. Agreements
4. Enterprise environmental factors
5. Organizational process assets
## Constraints & Assumptions

- **Constraint** – a restriction that will affect the performance of the project
- **Assumptions** – factors, that for planning purposes, are considered to be true, real, or certain
- **Assumptions** – affect all aspects of the project planning, and are part of the progressive elaboration of the project
4.1 Develop Project Charter

4.1.2 Tools & Techniques

.1 Expert Judgment

Two broad categories of project selection methods:
1. Benefit measurement
2. Mathematical models
Reasons to Authorize a Project

- Market Demand
- Business Need
- Customer Request
- Technological Advance
- Legal Requirement
- Social Need
Models

- Non-numeric
  - Sacred Cow
  - Operating Necessity
  - Competitive Necessity
  - Product Line Extension
  - Comparative Benefit

- Numeric
  - Payback Period
  - Average Rate of Return
  - DCF or IRR (NPV)

What about TVM?

\[
NPV = -(Initial\ Investment) + \sum \text{of } CF/(1 + r)^t
\]
Models

<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Area</td>
<td>Integration</td>
<td>Scope</td>
<td>Time</td>
<td>Cost</td>
<td>Quality</td>
</tr>
</tbody>
</table>

- **Initial outlay** ($1,100)
  - $1,100.00
  - +454.54
  - +$180.99 NPV

- **Revenue** $1,000
  - Expenses $500
  - Cash flow $500
  - $500 x $1.10

- **Revenue** $2,000
  - Expenses $1,000
  - Cash flow $1,000
  - $1,000 x $1.10^2

Student Copy – Not for Reproduction or Distribution
NPV Exercise
NPV Exercise

- Initial cost = $12,500
- ERR = 15%
- Annual project cash flow
  - Year 1: Revenue - $4,500, Expenses - $750
  - Year 2: Revenue - $7,300, Expenses - $1,400
  - Year 3: Revenue - $11,000, Expenses - $3,200

\[
\text{NPV}_{(\text{project X})} = \left(-12,500\right) + \frac{4500 - 750}{(1 + 0.15)^1} + \frac{7300 - 1400}{(1 + 0.15)^2} + \frac{11000 - 3200}{(1 + 0.15)^3}
\]

\[
\text{NPV}_{(\text{project X})} = \left(-12,500\right) + \frac{3750}{1.15} + \frac{5900}{1.3225} + \frac{7800}{1.5209}
\]

\[
\text{NPV}_{(\text{project X})} = \left(-12,500\right) + 3260.87 + 4461.26 + 5128.63
\]

\[
\text{NPV}_{(\text{project X})} = \left(-12,500\right) + 12850.75 = 350.75
\]

Student Copy – Not for Reproduction or Distribution
# 4.1 Develop Project Charter

## 4.1.3 Outputs (Figure 4-3)

### 4.1 Project Charter

- Project purpose of justification
- Objectives (SMART)
- High level
  - Requirements
  - Project description
  - Risks
- Summary milestone schedule
- Summary budget
- Approval requirements
- Assign PM (responsibility and authority)
- Charter approval (sponsor)
4.2 Develop Project Management Plan

The PM Plan documents the collection of outputs from each of the processes in the “Planning” process group.

4.2.1 Inputs

.1 Project Charter
.2 Outputs from planning processes
.3 Enterprise Environmental Factors
.4 Organizational Process Assets
## 4.2 Develop Project Management Plan

### 4.2.2 Tools & Techniques

1. Expert Judgment
2. Facilitation Techniques
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
</tr>
</tbody>
</table>

**Process Group**

<table>
<thead>
<tr>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
</table>

### 4.2 Develop Project Management Plan

#### 4.2.3 Outputs (Figure 4-5)

**.1 PM Plan**

- Integrates and consolidates all of the subsidiary management plans and baselines from planning processes
4.3 Direct & Manage Project Execution

4.3.1 Inputs

.1 PM Plan
.2 Approved Change Requests
.3 Enterprise Environmental Factors
.4 Organizational Process Assets
Types of Approved Changes

- **Corrective**
  - Brings expected future performance in line with the plan

- **Preventative**
  - Reduces the probability of negative consequences associated with risk

- **Defect repair**
  - Documented identification and recommendation to repair or replace
<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
</table>

## Knowledge Area

### Integration

- **Scope**
- **Time**
- **Cost**
- **Quality**
- **HR**
- **Communications**
- **Risk**
- **Procurement**
- **Stakeholder**

### 4.3 Direct & Manage Project Execution

#### 4.3.2 Tools & Techniques

1. Expert Judgment
2. PMIS
3. Meetings
Work Authorization System

• Authorizes work to begin
  – Commits resources (people, funds, etc.) to the work
  – Starts the clock on that portion of the plan and schedule

• Large projects
  – Formal written system
  – Frequently, organizational form to prepare

• Small projects
  – Verbal, email, etc.
  – Still a ‘formal system’ and emphasis is needed to retain control of the work
4.3 Direct & Manage Project Execution

4.3.3 Outputs (Figure 4-7)

.1 Deliverables
   Unique…verifiable product, result, capability…

.2 Work Performance Data

.3 Change Requests

.4 Project Management Plan Updates

.5 Project Document Updates
PM Plan Updates

- Requirements Management Plan
- Schedule Management Plan
- Cost Management Plan
- Quality Management Plan
- Human Resource Plan
- Communications Management Plan
- Risk Management Plan
- Procurement Management Plan
- Project Baselines
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Product Document Updates

- Requirements Documents
- Project Logs
  - Issues log
  - Assumptions
- Risk Register (log)
- Stakeholder Register
### 4.4 Monitor & Control Project Work

Track, review, regulate…

#### 4.4.1 Inputs

1. **PM Plan**
2. **Schedule Forecasts**
3. **Cost Forecasts**
4. **Validated Changes (see 4.4.1.4)**
5. **Work Performance Information**
6. **Enterprise Environmental Factors**
7. **Organizational Process Assets**
4.4 Monitor & Control Project Work

4.4.2 Tools & Techniques

.1 Expert Judgment
.2 Analytical Techniques
.3 PMIS
.4 Meetings
<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Track Key Data</td>
</tr>
<tr>
<td></td>
<td>• Cost Performance</td>
</tr>
<tr>
<td></td>
<td>• Schedule Performance</td>
</tr>
<tr>
<td></td>
<td>• Quality</td>
</tr>
<tr>
<td></td>
<td>– Conformance to requirements and specifications (product quality)</td>
</tr>
<tr>
<td></td>
<td>– Quality of project reporting and tracking, too (project quality)</td>
</tr>
<tr>
<td></td>
<td>• Plan performance -- maintain the project plan</td>
</tr>
<tr>
<td></td>
<td>• Resource utilization -- compare to schedule and costs</td>
</tr>
<tr>
<td></td>
<td>• Team performance (group and individual)</td>
</tr>
<tr>
<td></td>
<td>• Risk triggers</td>
</tr>
</tbody>
</table>
4.4 Monitor & Control Project Work

4.4.3 Outputs (Figure 4-9)

.1 Change Requests
.2 Work Performance Reports
.3 Project Management Plan Updates
.4 Project Document Updates
Change Control Outcomes

- **Identify and influence** factors that create change
  - e.g., add-on requirement during execution phase of project
    - Drives scope change
    - Cost
    - Schedule

- **Recognize** when a change has occurred
  - Taking action to reflect the change in the plan
  - Identifying changes in performance baselines

- **Manage** actual changes when they occur
### Integrated Change Control

- Key activity in Execution Phase
- Retain control of revisions
  - Scope: Schedule, Cost, Staffing
  - Requirements and specifications: Quality
- Important to keep performance baselines intact
  (baselines = the plan)
- Not necessary to ‘ban’ changes...just identify, control (and manage) them
  - Identify & Influence, Recognize, Manage
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Monitoring &amp; Controlling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Integration</strong></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
</tr>
</tbody>
</table>

4.5 Perform Integrated Change Control

4.5.1 Inputs

.1 PM Plan
.2 Work Performance Reports
.3 Change Requests
.4 Enterprise Environmental Factors
.5 Organizational Process Assets
## Configuration Management

### Three main objectives:
- Establish processes to identify, request, and assess value of changes
- Continuously validate and improve through considering impact of changes
- Processes used to communicate changes to stakeholders

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
</tr>
</tbody>
</table>

**Student Copy – Not for Reproduction or Distribution**
# 4.5 Perform Integrated Change Control

## 4.5.2 Tools & Techniques

1. Expert Judgment
2. Meetings
2. Change Control Tools
4.5 Perform Integrated Change Control

4.5.3 Outputs (Figure 4-11)

.1 Approved Change Requests
.2 Change Log
.3 Project Management Plan Updates
.4 Project Document Updates

If a change request is feasible, approved, and outside of scope, the approval requires a baseline change
4.6 Close Project or Phase

4.6.1 Inputs

.1 PM Plan
.2 Accepted Deliverables
.3 Organizational Process Assets
Impact of Termination

- Project transfer
- Ongoing operations
- Project personnel
- Equipment/material assets
- Future projects
- PM
## Termination by...

- **Extinction**
  - Successful or not
  - Deliverable is external to or not a fundamental function of the parent organization
- **Addition**
  - Institutionalized
  - New Division
- **Integration**
  - Most Common
  - Project assets redistributed
- **Starvation**
  - Budget decrement
## Close Project or Phase

### 4.6 Tools & Techniques

1. **Expert Judgment**
2. **Analytical Techniques**
3. **Meetings**
4.6 Close Project or Phase

4.6.3 Outputs (Figure 4-13)

.1 Final Product, Service, or Result Transition

.2 Organizational Process Asset Updates
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapter 4 Project Integration Management
Project Scope Management

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
## Scope Management

### “Scope” Defined:

The sum of the products and services to be provided by a project.

What the project **will** deliver and …

….what the project **will not** deliver

---

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.1 Plan Scope Management

5.1.1 Inputs

.1 Project Management Plan
.2 Project Charter
.3 Enterprise Environmental Factors
.4 Organizational Process Assets

Documents how scope will be defined, validated, and controlled
Guidance and direction for managing scope
## 5.1 Plan Scope Management

### 5.1.2 Tools & Techniques

1. **Expert Judgment**
2. **Meetings**
5.1 Plan Scope Management

5.1.3 Outputs (Figure 5-3)

.1 Scope Management Plan

.2 Requirements Management Plan
5.2 Collect Requirements

- Active stakeholder involvement during discover and decomposition
- Foundation for the WBS
  - Business: high-level needs (issues/opportunities)
  - Stakeholder: needs of a group
  - Solution: features, functions and characteristics
    - Functional = behavior
    - Nonfunctional = conditions or qualities
  - Transition: temporary (e.g. training)
  - Project: actions, processes, or conditions the project needs to meet
  - Quality: condition or criteria required to validate deliverable
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope</strong></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
</tr>
</tbody>
</table>

5.2 Collect Requirements

5.2.1 Inputs

.1 Scope Management Plan
.2 Requirements Management Plan
.3 Stakeholder Management Plan
.4 Project Charter
.5 Stakeholder Register
## 5.2 Collect Requirements

### 5.2.2 Tools & Techniques

- 1. Interviews
- 2. Focus Groups
- 3. Facilitated Workshops
- 4. Group Creativity Techniques
- 5. Group Decision Making Techniques
- 6. Questionnaires and Surveys
- 7. Observations
- 8. Prototypes
- 9. Benchmarking
- 10. Context Diagram: visual representation
- 11. Document Analysis
<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
</table>

**Knowledge Area**

- Integration
- Scope
- Time
- Cost
- Quality
- HR
- Communications
- Risk
- Procurement
- Stakeholder

### 5.2 Collect Requirements

#### 5.2.3 Outputs (Figure 5-4)

1. Requirements Documentation
2. Requirements Management Plan
3. Requirements Traceability Matrix
### Requirement Stability

**Limited executive involvement:** requirements never stabilize

**Focused, early agreement = requirement stability!**


**Moral: Agree upon requirements early**

**Student Copy – Not for Reproduction or Distribution**
Scope Management

The processes required to insure that:

- the project includes all of the work required
- only the work required
- the project completes successfully
- controlling what is and is not included in the project
Two Types of Scope

- **Product Scope**
  - Features
  - Functions
  - **Completion** measured against product requirements

- **Project Scope**
  - Work that must be done to deliver product
  - **Completion** measured against the project plan
Scope Definition

- Develops a detailed description of the project and product or service (result)
5.3 Define Scope

5.3.1 Inputs

.1 Scope Management Plan
.2 Project Charter
.3 Requirements Documentation
.4 Organizational Process Assets
5.3 Define Scope

5.3.2 Tools & Techniques

.1 Expert Judgment

.2 Product Analysis: Product breakdown, system analysis, value stream mapping, etc.

.3 Alternatives Identification

.4 Facilitated Workshops
5.3 Define Scope

5.3.3 Outputs (Figure 5-8)

.1 Project Scope Statement

Provides common understanding of scope and describes major objectives

Enables detailed planning, guides work, and provides baseline for evaluating change requests

Acceptance criteria

.2 Project Documentation Updates
Table 5-1. Elements of the Project Charter and Project Scope Statement

<table>
<thead>
<tr>
<th>Project Charter</th>
<th>Project Scope Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project purpose or justification</td>
<td>Project scope description (progressively elaborated)</td>
</tr>
<tr>
<td>Measurable project objectives and related success criteria</td>
<td>Acceptance criteria</td>
</tr>
<tr>
<td>High-level requirements</td>
<td>Project deliverables</td>
</tr>
<tr>
<td>High-level project description</td>
<td>Project exclusions</td>
</tr>
<tr>
<td>High-level risks</td>
<td>Project constraints</td>
</tr>
<tr>
<td>Summary milestone schedule</td>
<td>Project assumptions</td>
</tr>
<tr>
<td>Summary budget</td>
<td></td>
</tr>
<tr>
<td>Stakeholder list</td>
<td></td>
</tr>
<tr>
<td>Project approval requirements (what constitutes success, who decides it, who signs off)</td>
<td></td>
</tr>
<tr>
<td>Assigned project manager, responsibility, and authority level</td>
<td></td>
</tr>
<tr>
<td>Name and authority of the sponsor or other person(s) authorizing the project charter</td>
<td></td>
</tr>
</tbody>
</table>
The WBS!

- Deliverable oriented hierarchal decomposition
- Organizes and defines “total” scope of the project
- WBS subdivides into manageable components
- Represents current work specified in the current approved project scope statement
WBS Type Examples

- Deliverable-oriented
  - New Bank
  - New Laboratory
  - New Manufacturing Plant
  - New Software
  - Software Upgrade
  - New facility design

- Process-oriented
  - Conducting annual close out at bank
  - Converting chemicals to plastics
  - Monitoring productivity at outlying site
  - Issuing monthly payroll checks
### Four Steps to Creating a WBS

- Specify the project objectives (scope)
- Identify specific products, services or results (deliverables)
- Identify 100 percent of the work
- Subdivide the elements until a level is achieved that is suitable for planning and control
5.4 Create WBS

5.4.1 Inputs

1. Scope Management Plan
2. Project Scope Statement
3. Requirements Documentation
4. Enterprise Environmental Factors
5. Organizational Process Assets

Know the PMBOK®’s WBS!
What is a WBS?

- Deliverable-oriented grouping of project elements
- Organizes and defines the total work scope of the project
- Each descending level represents increasing detail

Activity vs. Deliverable

• **Activity = work to be done**
  – Steps or “how”
  – Defined discrete elements of work on a project
  – Consumes time & resources

• **Deliverable = output of work done**
  – Tangible item or product
Why use WBS?

- Assists in developing schedule and cost
- Primary input to:
  - Activity Definition
  - Resource planning
  - Cost estimation and budgeting
  - Risk Management Planning
- Communicates to stakeholders
- Assists in reporting progress

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Integration</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Group</td>
<td>Initiating</td>
<td>Planning</td>
</tr>
<tr>
<td></td>
<td>Executing</td>
<td>Monitoring &amp; Controlling</td>
</tr>
<tr>
<td></td>
<td>Closing</td>
<td></td>
</tr>
</tbody>
</table>

### 5.4 Create WBS

#### 5.4.2 Tools & Techniques

**.1 Decomposition**

Subdividing the work into smaller, more manageable “work packages.” Work packages are the lowest level of detail. Often referred to as “rolling wave” or “iterative” planning.

**.2 Expert Judgment**

---

Student Copy – Not for Reproduction or Distribution
5.4 Create WBS

5.4.3 Outputs (Figure 5-10)

.1 Scope Baseline
   Project Scope Statement
   WBS
   WBS Dictionary

.2 Project Documents Updates
## 5.5 Validate Scope

### 5.5.1 Inputs

1. Project Management Plan
2. Requirements Documentation
3. Requirements Traceability Matrix
4. Verified Deliverables
5. Work Performance Data (e.g. degree of compliance with requirements, number & severity of nonconformance, etc.)

Process of obtaining formal *acceptance* from stakeholders. If terminated early, establishes and documents level of completion.

Not concerned with *correctness* of work – that’s quality control.

---

### Knowledge Area

<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Student Copy – Not for Reproduction or Distribution

© 2014, Innovative Management Solutions, LLC
<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Integration</th>
<th>Scope</th>
<th>Time</th>
<th>Cost</th>
<th>Quality</th>
<th>HR</th>
<th>Communications</th>
<th>Risk</th>
<th>Procurement</th>
<th>Stakeholder</th>
</tr>
</thead>
</table>

**Validate Scope vs Control Quality**

- **Validate Scope**: Primarily concerned with acceptance of project deliverables
- **Control Quality**: Primarily concerned with correctness of the deliverables (requirements)
5.5 Validate Scope

5.5.2 Tools & Techniques

.1 Inspection

.2 Group Decision Making Techniques
5.5 Validate Scope

5.5.3 Outputs (Figure 5-15)

.1 Accepted Deliverables
  Document “non-accepted” deliverables with reasons

.2 Change Requests

.3 Work Performance Information

.4 Project Documentation Updates

Note this is in the “Monitoring and Control” Process Group
Scope Creep

- Small “enhancements” can screw up major functionality!
- What causes “Scope Creep?”
- How has scope creep impacted your job?….projects in your organization?
Scope Relationships

- **Scope translates into requirements**
  - Requirements: the stakeholders’ specific needs or wants

- **Quality is “conformance to requirements”**

5.6 Control Scope

5.6.1 Inputs

.1 Project Management Plan
.2 Requirements Documentation
.3 Requirements Traceability Matrix
.4 Work Performance Data
.5 Organizational Process Assets
5.6 Control Scope

5.6.2 Tools & Techniques

.1 Variance Analysis
5.6 Control Scope

5.6.3 Outputs (Figure 5-17)

.1 Work Performance Information
.2 Change Requests
.3 Project Management Plan Updates
.4 Project Documentation Updates
.5 Organizational Process Asset Updates
Scope Change Control

- Concerned with three things:
  - “…influencing factors that create scope changes to ensure changes are agreed upon,
  - determining that a scope change has occurred
  - managing actual changes when and if they occur.”
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapter 5 Project Scope Management
Project Time Management

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
6.1 Plan Schedule Management

6.1.1 Inputs

.1 Project Management Plan
.2 Project Charter
.3 Enterprise Environmental Factors
.4 Organizational Process Assets
6.1 Plan Schedule Management

6.1.2 Tools & Techniques

.1 Expert Judgment
.2 Analytical Techniques
.3 Meetings
6.1 Plan Schedule Management

6.1.3 Outputs (Figure 6-4)

.1 Schedule Management Plan
## 6.2 Define Activities

### 6.2.1 Inputs

- **1 Schedule Management Plan**
- **2 Scope Baseline**
- **3 Enterprise Environment Factors**
- **4 Organizational Process Assets**
6.2 Define Activities

6.2.2 Tools & Techniques

.1 Decomposition – in the context of activity definition, decomposition involves subdividing work packages into smaller, more manageable components (basis for estimating, scheduling, executing, monitoring and controlling work)

.2 Rolling Wave Planning
Near-term work planned in detail and future work planned at high level

.3 Expert Judgment
6.2 Define Activities

6.2.3 Outputs (Figure 6-6)

.1 Activity List: Must include all activities that will be performed on the project

.2 Activity Attributes: Distinct from milestones in that they have durations and may have resources and cost requirements

.3 Milestone List
6.3 Sequence Activities

6.3.1 Inputs

.1 Schedule Management Plan
.2 Activity List
.3 Activity Attributes
.4 Milestone List
.5 Project Scope Statement
.6 Enterprise Environmental Factors
.7 Organizational Process Assets
6.3 Sequence Activities

6.3.2 Tools & Techniques

.1 Precedence Diagramming Method

.2 Dependency Determinations
  Mandatory – Hard logic
  Discretionary – Soft logic, preferred, etc…
  External – Relationship with non-project activities
  Internal – Relationship between project activities

.3 Leads & Lags
  Lead allows acceleration of the successor activity

In PDM, F-S is the most commonly used logical relationship
6.3 Sequence Activities

6.3.3 Outputs (Figure 6-8)

.1 Project Schedule Network Diagrams
.2 Project Document Updates
Network Diagram

“Facts”

- All have beginning point and an end point
- Represent “predecessor” relationships
  - Complex relationships can be represented in AON
    • F-S, S-S, S-F, F-F
  - All activities have predecessors
  - Exception: first task of network has no predecessor
- No “hangers”
  - Every task has a “successor”
  - Exception: last task has no “successor”
- No “loops”
Network Flow Diagram

<table>
<thead>
<tr>
<th>Activity</th>
<th>TE</th>
<th>Predecessor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>15</td>
<td>A</td>
</tr>
<tr>
<td>E</td>
<td>10</td>
<td>B, C</td>
</tr>
<tr>
<td>F</td>
<td>14</td>
<td>B, C</td>
</tr>
<tr>
<td>G</td>
<td>4</td>
<td>B, C</td>
</tr>
<tr>
<td>H</td>
<td>11</td>
<td>C</td>
</tr>
<tr>
<td>I</td>
<td>18</td>
<td>G, H</td>
</tr>
<tr>
<td>J</td>
<td>8</td>
<td>D, E</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
</table>

### Knowledge Area

<table>
<thead>
<tr>
<th>Integration</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Scope</th>
<th>Cost</th>
<th>Quality</th>
<th>HR</th>
<th>Communications</th>
<th>Risk</th>
<th>Procurement</th>
<th>Stakeholder</th>
</tr>
</thead>
</table>

**Slack (or Float)**

- **Free slack** – task delay w/o delaying successor’s early start
- **Total slack** – task delay w/o delaying project completion
- **Project slack** – project delay w/o affecting required due date (desired – actual)
Network Flow Diagram Exercise
Resource Planning

- What
- How much
- Output: list of resource requirements
Resource Planning Considerations

- Difficulty of the work
- Uniqueness of project scope
- Organization’s history of doing similar tasks
- Resource availability
- Outsourcing requirements
- Organizational policies
6.4 Estimate Activity Resources

Closely coordinated with Cost Estimating

6.4.1 Inputs

.1 Schedule Management Plan
.2 Activity Lists
.3 Activity Attributes
.4 Resource Calendars
.5 Risk Register
.6 Activity Cost Estimates
.7 Enterprise Environmental Factors
.8 Organizational Process Assets
6.4 Estimate Activity Resources

6.4.2 Tools & Techniques

.1 Expert Judgment
.2 Alternatives Analysis
.3 Published Estimating Data
.4 Bottom-up Estimating
.5 PM Software
6.4 Estimate Activity Resources

6.4.3 Outputs (Figure 6-13)

.1 Activity Resource Requirements
Types and quantities of resources required
Note: “When” is determined during Schedule Development

.2 Resource Breakdown Structure

.3 Project Document Updates
6.5 Estimate Activity Durations

Note: Overall project duration is determined during Schedule Development

6.5.1 Inputs

.1 Schedule Management Plan
.2 Activity List
.3 Activity Attributes
.4 Activity Resource Requirements
.5 Resource Calendar
.6 Project Scope Statement
.7 Risk Register
.8 Resource Breakdown Structure
.9 Enterprise Environmental Factors
.10 Organizational Process Assets
# 6.5 Estimate Activity Durations

## 6.5.2 Tools & Techniques

1. **Expert Judgment**
2. **Analogous Estimating**
   - Using actual durations from “experience”
   - Accurate if previous activities are similar in fact & team members have needed expertise
3. **Parametric Estimating**
   - Quantitatively determined
4. **Three-point Estimates**
5. **Group Decision Making Techniques**
6. **Reserve Analysis**
6.5 Estimate Activity Durations

6.5.3 Outputs (Figure 6-15)
   .1 Activity Duration Estimates
   .2 Project Document Updates

Activity duration estimates should always include some indication of range of possible results (e.g.: +/- time, or % probability)
Concepts for Duration Estimating

- Beta Distribution: $t_E = \frac{t_O + 4t_M + t_P}{6}$
- SD = $\frac{P - O}{6}$
- Variance = $\left(\frac{P - O}{6}\right)^2$
- Triangular distribution: $t_E = \frac{t_O + t_M + t_P}{3}$
Normal Distribution

\[ \sigma q = 98\% \]
\[ \sigma q = 95\% \]
\[ q = 99.7\% \]
\[ q = 99.9997\% \]
\[ \pm 1 \sigma \]
\[ \pm 2 \sigma \]
\[ \pm 6 \sigma \]
Pert Exercise

• If P = 24, ML = 12, O = 6

• What is the probability that activity will be completed within 10 – 16 days?

\[ \frac{6 + 4(12) + 24}{6} = 13 \]

• SD: \( \frac{24 - 6}{6} = 3 \)

13 – 3 (1SD) = 10, 13 + 3 (1SD) = 16; Roughly 68% chance!

• Variance: \( 3^2 = 9 \)
# Path Standard Deviation and Variances

<table>
<thead>
<tr>
<th>Activity</th>
<th>Optimistic</th>
<th>Most Likely</th>
<th>Pessimistic</th>
<th>Triangulation</th>
<th>PERT Weighted Average</th>
<th>Standard Deviation (P - O)/6</th>
<th>Variance SD Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12</td>
<td>15</td>
<td>24</td>
<td>17</td>
<td>16</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>8.67</td>
<td>8.33</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>15</td>
<td>22</td>
<td>33</td>
<td>23.33</td>
<td>22.67</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>D</td>
<td>8</td>
<td>11</td>
<td>20</td>
<td>13</td>
<td>12</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>56</strong></td>
<td><strong>62</strong></td>
<td><strong>59</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Duration if estimates are taken at face value
- Duration if optimistic, pessimistic & most likely are averaged
- Duration, considering optimistic & pessimistic, and weighting the most likely estimates

<table>
<thead>
<tr>
<th></th>
<th>One Standard Deviation</th>
<th>Two Standard Deviations</th>
<th>Three Standard Deviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path SD</td>
<td>54.76</td>
<td>50.51</td>
<td>46.27</td>
</tr>
<tr>
<td></td>
<td>63.24</td>
<td>67.49</td>
<td>71.73</td>
</tr>
</tbody>
</table>
6.6 Develop Schedule

Determine planned start and finish dates

6.6.1 Inputs

.1 Schedule Management Plan
.2 Activity List
.3 Activity Attributes
.4 Project Schedule Network Diagrams
.5 Activity Resource Requirements
.6 Resource Calendars
.7 Activity Duration Estimates
.8 Project Scope Statement
.9 Risk Register
.10 Project Staff Assignments
.11 Resource Breakdown Structure
.12 Enterprise Environmental Factors
.13 Organizational Process Assets
6.6 Develop Schedule

6.6.2 Tools & Techniques

.1 Schedule Network Analysis
.2 CPM
.3 Critical Chain Method: Leverages buffers to manage for limited resources and uncertainties
.4 Resource Leveling
.5 Modeling techniques
.6 Leads/Lags
.7 Schedule Compression
.8 Scheduling Tool
6.6 Develop Schedule

- **Tools & Techniques Key Concepts**
  - CPM: ES, EF, LS, LF calculated w/o resource limitations
  - Crashing: Compressing (reducing) the duration of activities (CBA)
  - Fast Tracking: Completing tasks concurrently that are normally sequential
  - Critical Chain Method: Modifies schedule to account for limited resources by managing buffer activity durations and resource assignments
## Gantt Chart

- **Horizontal time scale**
- **Easy to read**
- **Tool for expediting, sequencing and reallocation**
- **Does NOT show technical dependencies**
Gantt Chart Diagram Exercise
Project Crashing
12 days

Activity
Foundation Prep

Predecessors

Successors

• Cost implications
• Resource implications
• Advantages?
• Disadvantages?
Goldratt’s Critical Chain

- Use Expected Times vs Estimated Times
- Replace slack with buffers
  - Feeding buffer
  - Project buffer
- Theory of Constraints
  - Any barrier to successful, on-time, on-budget completion
  - What resources are in heavy demand?
  - What resources have scheduling conflicts?

6.6 Develop Schedule

6.6.3 Outputs (Figure 6-17)

.1 Project Schedule

.2 Schedule Baseline
  Defines baseline start dates and finish dates

.3 Schedule Data

.4 Project Calendars

.5 Project Management Plan Updates

.6 Project Document Updates
Schedule Calculations

- Overall window of project time defined by:
  - Estimated Start Time
  - Required Completion Time
6.7 Control Schedule

Influencing…, determining…, managing…

6.7.1 Inputs

.1 Project Management Plan
.2 Project Schedule
.3 Work Performance Data
.4 Project Calendars
.5 Schedule Data
.6 Organizational Process Assets
6.7 Control Schedule

6.7.2 Tools & Techniques

.1 Performance Reviews
.2 PM Software
.3 Resource Optimization Techniques
.4 Modeling Techniques
.6 Leads & Lags
.7 Schedule Compression
.8 Scheduling Tool
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Initiating</td>
</tr>
<tr>
<td>Scope</td>
<td>Planning</td>
</tr>
<tr>
<td>Time</td>
<td>Executing</td>
</tr>
<tr>
<td>Cost</td>
<td>Monitoring &amp; Controlling</td>
</tr>
<tr>
<td>Quality</td>
<td>Closing</td>
</tr>
<tr>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
</tr>
</tbody>
</table>

### 6.7 Control Schedule

**6.7.3 Outputs (Figure 6-23)**

1. Work Performance Information
2. Schedule Forecasts
3. Change Requests
4. Project Management Plan Updates
5. Project Document Updates
6. Organizational Process Assets Updates
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapter 6 Project Time Management
Project Cost Management
Cost Management Processes

- **Estimate Costs**
  - Approximation of the cost for the resources needed

- **Determine Budget**
  - Allocating the cost estimate to individual work items
  - Output: cost baseline

- **Control Costs**
  - Controlling changes to the budget
Assumption of Finance 101

- Profits
- Profit margin
- Life-cycle Costing
- Cash Flow Analysis
- Internal Rate of Return (IRR)

- Tangible Costs (Benefits)
- Intangible Costs (Benefits)
- Direct Costs
- Indirect Costs
- Sunk Costs
7.1 Plan Cost Management

7.2.1 Inputs

.1 Project Management Plan
.2 Project Charter
.3 Enterprise Environment Factors
.4 Organizational Process Assets
7.1 Plan Cost Management

7.2.2 Tools & Techniques

.1 Expert Judgment
.2 Analytical Techniques
.3 Meetings
7.1 Plan Cost Management

7.2.3 Outputs (Figure 7-2)

.1 Cost Management Plan
7.2 Estimate Costs

Developing “approximation” of cost of resources
Includes evaluation of different alternatives

7.2.1 Inputs

.1 Cost Management Plan
.2 HR Management Plan
.3 Scope Baseline
.4 Project Schedule
.5 Risk Register
.6 Enterprise Environmental Factors
.7 Organizational Process Assets
# 7.2 Estimate Costs

## 7.2.2 Tools & Techniques

1. Expert Judgment
2. Analogous estimating
3. Parametric Estimating
4. Bottom-up Estimating
5. Three-point Analysis
6. Reserve Analysis
7. Cost of Quality
8. PM Estimating Software
9. Vendor Bid Analysis
10. Group Decision Making Techniques
Cost Estimation Techniques

• Analogous (Top Down)
  – Actual cost of similar project
  – Less costly, less accurate

• Bottom Up estimating
  – Estimating individual work items and summing
  – More Accurate, time consuming
  – General approach used by software tools

• Parametric
  – Using known rates and quantities
  – Accurate
## Types of Cost Estimates

<table>
<thead>
<tr>
<th>Type Estimate</th>
<th>When</th>
<th>Why</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rough Order of Magnitude</td>
<td>Very Early</td>
<td>Estimate of costs for project selection</td>
<td>-25% to +75%</td>
</tr>
<tr>
<td>Definitive</td>
<td>Later</td>
<td>Provides detail, estimates actual cost</td>
<td>-5% to + 10%</td>
</tr>
</tbody>
</table>

## Knowledge Area

<table>
<thead>
<tr>
<th>Integration</th>
<th>Scope</th>
<th>Time</th>
<th>Cost</th>
<th>Quality</th>
<th>HR</th>
<th>Communications</th>
<th>Risk</th>
<th>Procurement</th>
<th>Stakeholder</th>
</tr>
</thead>
</table>

## Process Group

- Initiating
- Planning
- Executing
- Monitoring & Controlling
- Closing

## Concepts for Cost Estimating

- **Beta Distribution:** \( cE = \frac{cO + 4cM + cP}{6} \)

- **SD:** \( SD = \frac{P - O}{6} \)

- **Variance:** \( \left( \frac{P - O}{6} \right)^2 \)

- **Triangular distribution:** \( cE = \frac{cO + cM + cP}{3} \)
7.2 Estimate Costs

7.2.3 Outputs (Figure 7-5)

.1 Activity Cost Estimates

.2 Basis of Estimates

.3 Project Document Updates
## 7.3 Determine Budget

Establishes a cost baseline for measuring project performance

### 7.3.1 Inputs

- .1 Cost Management Plan
- .2 Scope Baseline
- .3 Activity Cost Estimates
- .4 Basis of Estimates
- .5 Project Schedule
- .6 Resource Calendars
- .7 Risk Register
- .8 Agreements
- .0 Organizational Process Assets
7.3 Determine Budget

7.3.2 Tools & Techniques

.1 Cost Aggregation

Schedule Activity – Work Package – Higher Components – Entire Project

.2 Reserve Analysis

.3 Expert Judgment

.4 Historical Relationships

.5 Funding Limit Reconciliation
## Reserves

- **Contingency Reserves**
  - Can be partially planned for
  - Known-unknowns
  - e.g., known rate of personnel turnover

- **Management Reserves**
  - Unpredictable
  - Unknown-unknowns

- Not a part of the baseline, but included in the project budget (which means not a part of EVA)
7.3 Determine Budget

7.3.3 Outputs (Figure 7-7)

.1 Cost Performance Baseline
Baseline, or time-phased budget used to measure, monitor, and control cost performance; excluding management reserves (including work package estimates and contingency reserves)

.2 Project Funding Requirements

.3 Project Document Updates
Budget Components

- Check out figure 7-8 (PMBOK, 2013, p. 213)
Budget Estimate Question

- Projected cost = $2,200,000
- Estimate SD = $110,000
- Budget (including reserve) = $2,420,000
- Assuming cost estimates are normally distributed, what is the probability of completing the project over budget?

+/- 1 SD = $2,310,000 ~ $2,090,000
+/- 2 SD = $2,420,000 ~ $1,980,000

Here’s the logic…
- 95% of the results fall within +/- 2 SDs of an “in control” process
- So…5% of the results fall outside of +/- 2 SDs
- We’re only concerned about half of those…over budget…so, we have a 2.5% chance of going over budget 😊
7.4 Control Costs

Influencing, recording, informing

7.4.1 Inputs

.1 PM Plan
.2 Project Funding Requirements
.3 Work Performance Data
.4 Organizational Process Assets
7.4 Control Costs

7.4.2 Tools & Techniques

.1 EVM
.2 Forecasting
.3 TCPI
.4 Performance Reviews
.5 PM Software
.6 Reserve Analysis
Earned Value Management (EVM)

- **Budgeted Cost of Work Performed** (EV):
  - Earned Value
  - Amount budgeted for the work “as of” a date

- **Actual Cost of Work Performed** (AC):
  - Actual Costs for the work ‘as of’ a date

- **Budgeted Cost of Work Scheduled** (PV):
  - Planned Value
  - Sometimes called Performance Baseline or Performance Measurement Baseline
## Variance (Earned Value)

- **Cost Variance** \((CV) = EV - AC\)
  - Negative indicates over budget
  - **CPI**: Represent as a % by \(EV/AC\)

- **Schedule Variance** \((SV) = EV - PV\)
  - Negative indicates behind schedule
  - **SPI**: Represent as a % by \(EV/PV\)

- **Budget at Completion** \((BAC = Baseline or revised budget)\)
Cost/Schedule Performance Index (CPI/SPI)

- Indicates Cost or Schedule Efficiency for accomplished work.
  - $> 1.0$ - Ahead of Schedule
  - $= 1.0$ - On Schedule
  - $< 1.0$ - Behind Schedule
Earned Value

- **Estimate at Completion (EAC)**
  - For ETC work at budgeted rate (optimistic):
    \[ EAC = AC + (BAC - EV) \]
    Note: \( BAC - EV = \text{Remaining PV} \)
  - For ETC work at present CPI (pessimistic):
    \[ EAC = AC + \left[ \frac{(BAC - EV)}{CPI} \right] \]
    \[ EAC = \frac{BAC}{CPI} \]
  - For ETC considering both SPI & CPI
    \[ EAC = AC + \left[ \frac{(BAC - EV)}{(CPI \times SPI)} \right] \]
  - Fundamentally flawed estimates:
    \[ EAC = AC + \text{ETC} \]

- **Estimate to Complete (ETC)**
  \[ ETC = EAC - AC \]
To-Complete Performance Index

• Performance that must be achieved on remaining work to meet a specified goal (i.e. BAC or EAC)

\[
TCPI = \frac{(BAC - EV)}{(BAC - AC)}
\]
or

\[
TCPI = \frac{\text{Work Remaining}}{\text{Funds Remaining}}
\]
EVM in Action

- **Month 1**: Start Date
- **Month 2**: BCWP 30
- **Month 3**: ACWP 45

Cost Metrics:
- BCWS
- SV
- CV

- **Start Date**: $10K
- **Month 1**: $20K
- **Month 2**: $30K
- **Month 3**: $40K
- **Finish Date**: $70K
### Process Group
- Initiating
- Planning
- Executing
- Monitoring & Controlling
- Closing

### Knowledge Area
- Integration
- Scope
- Time
- Cost
- Quality
- HR
- Communications
- Risk
- Procurement
- Stakeholder

### Earned Value (Exercise)

**IF:**

- \( EV = $6000 \)
- \( PV = $7000 \)
- \( AC = $8000 \)

Find CV, SV, CPI, SPI
## Budget Variance

<table>
<thead>
<tr>
<th>Activity</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Garage)</td>
<td>$1000</td>
<td>$2000</td>
<td>$500</td>
<td>$1000</td>
<td>$6000</td>
<td>$4500</td>
<td>$3500</td>
<td>$2000</td>
</tr>
<tr>
<td>B (Storage)</td>
<td>$2000</td>
<td>$1000</td>
<td>$1500</td>
<td>$2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Budget: $27,000

Activity A is 50% complete & AC are $12,000; \( \text{EV (A)} = \)

Activity B is 100% complete & AC were $8,000; \( \text{EV (B)} = \)

\[
\text{PV(A)} = \quad \text{PV (B)} = \quad \text{PV(P)} =
\]

\[
\text{CV (A)}? \quad \text{CV (B)}? \quad \text{CV} = - =
\]

\[
\text{SV (A)}? \quad \text{SV (B)}? \quad \text{SV} = - =
\]
7.4 Control Costs

7.4.3 Outputs (Figure 7-11)

.1 Work Performance Measurements
.2 Cost Forecasts
.3 Change Requests
.4 PM Plan Updates
.5 Project Documentation Updates
.6 Organizational Process Asset Updates
EVM Exercise
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapter 7 Project Cost Management
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remember...

• Cost Management should consider effect of decisions on the following costs as related to the project product/service…
  – Using
  – Maintaining
  – Supporting
Project Quality Management

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
What is Quality?
Quality Concepts

- Who defines quality?
- How have customer expectations evolved?
- What are the benefits of a quality program?
## Elements of a Quality Focus

- Quality first – not short-term profit
- Consumer orientation – not producer orientation
- The next process is your customer
- Use facts and data to make decisions
- Respect for knowledge base is a management philosophy
- Cross-functional management

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Initiating</td>
</tr>
<tr>
<td>Scope</td>
<td>Planning</td>
</tr>
<tr>
<td>Time</td>
<td>Executing</td>
</tr>
<tr>
<td>Cost</td>
<td>Monitoring &amp; Controlling</td>
</tr>
<tr>
<td>Quality</td>
<td>Closing</td>
</tr>
<tr>
<td>HR</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
</tr>
</tbody>
</table>

**Student Copy – Not for Reproduction or Distribution**
## Bottom Line...

- **External customers define quality**
- **Internal customers produce quality**

- **Albrecht’s Theory of Service Relativity**
  - \[ V = R - E \]
  - Determines net gain or loss

---

Responsibility for Quality

• The primary responsibility for quality is with the **project manager**

• Quality is not an assignable task. It must be rooted and institutionalized in every process

• It is everyone’s responsibility:
  – Self inspection
  – It’s the system that causes the problems - and that is management’s responsibility
8.1 Plan Quality Management

Project quality management must address management of the project and the product of the project.

Involves identifying which quality standards are relevant to project and determining how to satisfy them.

8.1.1 Inputs

1. Project Management Plan
2. Stakeholder Register
3. Risk Register
4. Requirements Documentation
5. Enterprise Environmental Factors
6. Organizational Process Assets
### Quality Standards

- Six Sigma
- TQL
- ISO (e.g. 14000)
- MBNQA
- Systems Perspective…
Normal Distribution

\[ f(x) = \frac{1}{\sigma \sqrt{2\pi}} e^{-\frac{x^2}{2\sigma^2}} \]

- \( q = 68\% \)
- \( q = 95\% \)
- \( q = 99.7\% \)
- \( q = 99.9997\% \)

\[ \pm 1 \sigma \]
\[ \pm 2 \sigma \]
\[ \pm 6 \sigma \]
Six Sigma Phases

• DMAIC processes
  – Define
    • Process map, VOC, Stakeholder analysis
  – Measure
    • Sampling, Data collection, Process Capability
  – Analyze
    • Cause analysis, Hypothesis testing, DOE
  – Improve
    • Evaluate, plot, & implement solution
    • Verify and measure gains
  – Control
    • Control charts
    • Lessons learned, standardization, train
### 8.1 Plan Quality Management

#### 8.1.2 Tools & Techniques

1. Benefit/Cost Analysis
2. Cost of Quality
   - Crosby – Cost of conformance vs non-conformance
3. Seven Basic Quality Tools
4. Benchmarking
5. Design of Experiments
   - A structured, organized method for determining the relationship between factors (Xs) affecting a process and the output of that process (Y)
6. Statistical Sampling
7. Additional Quality Planning Tools
8. Meetings
PMBOK 5th Edition Figure 8-5

Cost of Conformance

Prevention Costs
(Build a quality product)
- Training
- Document processes
- Equipment
- Time to do it right

Appraisal Costs
(Assess the quality)
- Testing
- Destructive testing loss
- Inspections

Cost of Nonconformance

Internal Failure Costs
(Failures found by the project)
- Rework
- Scrap

External Failure Costs
(Failures found by the customer)
- Liabilities
- Warranty work
- Lost business

Money spent during the project to avoid failures

Figure 8-5. Cost of Quality
Deming’s PDCA Cycle

- Plan what to do.
  - Could be design features or an improvement in the process itself. Use Pareto analysis to identify the most important aspects.

- Do the experimentation.
  - Explore the problem by experimentation, identify and investigate causes.

- Check the solutions.
  - To see if the assumptions and ideas were correct.

- Act on the results.
  - Implement on a scale appropriate to the problem

The Seven Basic Quality Tools

Know what they’re used for…
1. Cause-n-Effect Analysis (Fishbone, Ishikawa)

- Visual tool used to logically organize possible causes for a problem by graphically displaying them in increasing detail
- Helps to identify root causes and ensures common understanding of the causes

[Diagram showing cause and effect relationships]

- People
  - Crowded Hallways
  - No Directions Provided
- Policies
  - Mandatory Dept Location
  - Sign Limitations
- Building
  - Hallway Layout
- Procedures
  - Sign Locations
- Training
  - Patients cannot find X-ray department

Visual tool used to logically organize possible causes for a problem by graphically displaying them in increasing detail.
2. Flow Charts

- Show the order or sequence of activities
- Indicates action items & decision points
- Used to map a process
3. Checksheets

- Tally sheet
- Use for…
  - Gathering data
  - Organizing facts
  - Collecting attribute data during inspections
4. Pareto Chart, 80/20 Rule

- Distribution arranged in frequency
- Graphical picture of the most frequent causes
- Used to determine greatest potential for improvement

**Graph Example**

- Reduced Payment Freight Bills
  - After Standardization
  - January bills (329)  June bills (56)

**Axes**

- # of bills

**Categories**

- Contract rate, Jipules, Class, Caraca, Original destination, Wis., Weight, Reconciled, Debt, Byrd.
5. Histograms

- Distribution of variables
- Summarize data collected over a period of time
- Helps identify the cause from the shape & width of the distribution.
  - Exam scores

![Histogram of Exam Scores](chart.png)
6. Control Charts

- Run chart with control limits
- Mathematically constructing UCL & LCL at 3 standard deviations above and below the average
- Common causes - random events
- Special causes - unique events
- Goal is to determine variation source, then eliminate special causes & reduce common causes to improve quality
- Rule of “7s”
7. Scatter Diagram

- Shows relationship between two variables
  - Joint failures and temperature
- The closer the points...the more closely the variables are related
What Should You Benchmark?

- Systems, Processes, or Practices which…
  - Incur the highest costs
  - Major impact on customer satisfaction
  - Major impact on cycle time
  - Major impact on quality
  - High impact on competitive position
  - Present the most significant area for improvement
  - Have high probability of support and resources if selected
8.1 Plan Quality Management

8.1.3 Outputs (Figure 8-4)

.1 Quality Management Plan
   Must address QC, QA, and Continuous Improvement

.2 Process Improvement Plan

.3 Quality Metrics
   What is measured, how it is measured

.4 Quality Checklists

.5 Project Document Updates
Quality Assurance

- The process of auditing quality requirements and results from quality control to ensure standards and definitions are used
- Primary purpose is to facilitate the improvement of quality processes
8.2 Perform Quality Assurance

Ensure project will employ all processes to meet defined requirements

8.2.1 Inputs to Quality Assurance

.1 Quality Management Plan
.2 Process Improvement Plan
.3 Quality Metrics
.4 Quality Control Measurements
.5 Project Documents
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Integration</th>
<th>Scope</th>
<th>Time</th>
<th>Cost</th>
<th>Quality</th>
<th>HR</th>
<th>Communications</th>
<th>Risk</th>
<th>Procurement</th>
<th>Stakeholder</th>
</tr>
</thead>
</table>

**Process Group**

- Executing
- Monitoring & Controlling
- Closing

### 8.2 Perform Quality Assurance

#### 8.2.2 Tools & Techniques

1. **Quality Management and Control Tools**

2. **Quality Audits** – the objective of a quality audit is to identify inefficient and ineffective policies, processes, and procedures.

   Audits also confirm implementation of approved change requests, corrective actions, defect repairs, and preventive actions.

3. **Process Analysis**
8.2 Perform Quality Assurance

8.2.3 Outputs (Figure 8-9)

.1 Change Requests
.2 PM Plan Updates
.3 Project Document Updates
.4 Organizational Process Assets Updates
Quality Control

The process of monitoring and recording results to assess performance and recommend changes.

Key benefits

- Identify the causes of poor process or product quality and recommended and/or taking action to eliminate the causes
- Validating that deliverables and work meet requirements for final acceptance
8.3 Perform Quality Control

Involves *monitoring* specific project results to determine if they comply with relevant standards & identifying ways to *eliminate causes* of unsatisfactory results.

### 8.3.1 Inputs to Quality Control

1. PM Plan
2. Quality Metrics
3. Quality Checklists
4. Work Performance Data
5. Approved Change Requests
6. Deliverables
7. Project Documents
8. Organization Process Assets
### 8.3 Perform Quality Control

#### 8.3.2 Tools & Techniques

1. **Seven Basic Quality Tools**
2. **Statistical Sampling**
3. **Inspection**
4. **Approved Change Request Review**
8.3 Perform Quality Control

Gold Plating is adding “scope” that does not add value or quality to the deliverables

8.3.3 Outputs (Figure 8-11)

.1 Quality Control Measurements
.2 Validated Changes: Accepted or rejected
.3 Verified Deliverables: Correctness of deliverables; Input to Validate Scope
.4 Work Performance Information
.5 Change Requests
.6 PM Plan Updates
.7 Project Document Updates
.8 Organizational Process Assets Updates
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapter 8 Project Quality Management
Project Human Resource Management

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
crack.millhollan@gmail.com
Innovative Management Solutions, LLC
9.1 Plan Human Resource Management

9.1.1 Inputs

.1 Project Management Plan

.2 Activity Resource Requirements

.2 Enterprise Environmental Factors

  Organizational – Working arrangements, formal/informal relationships

  Technical – What disciplines and specialties are required

  Interpersonal – Formal/informal “reporting” relationships, cultural impacts, language, etc…

.3 Organizational Process Assets
9.1 Plan Human Resource Management

9.1.2 Tools & Techniques

.1 Organizational Charts and Position Descriptions
  OBS
  Resource Breakdown Structure (RBS) – breaks down the project by “types” of resources
  Matrix-based – RAM: e.g. RACI (Responsible, Accountable, Consult, Inform)

.2 Networking

.3 Organizational Theory

.4 Expert Judgment

.5 Meetings

Student Copy – Not for Reproduction or Distribution
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Integration</th>
<th>Scope</th>
<th>Time</th>
<th>Cost</th>
<th>Quality</th>
<th>HR</th>
<th>Communications</th>
<th>Risk</th>
<th>Procurement</th>
<th>Stakeholder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Group</td>
<td>Initiating</td>
<td>Planning</td>
<td>Executing</td>
<td>Monitoring &amp; Controlling</td>
<td>Closing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Organizational Influences

- Project-based organizations have management systems that help projects
  - Matrix (PM budget authority varies…highest in “strong”)
  - Projectized (PM has almost total authority)

- Project management is more difficult in non-project-based organizations
  - Functional

- The maturity of an organization with respect to PM systems, culture, style, structure, and PMO can influence project work
## Functional, Divisional Organizations

- Hierarchies with many levels of management
- People become relatively confined to their own area of specialization
- Driven by a top-down approach in which managers provide considerable direction and have considerable control over others
- Reduces duplication of activities (single division)
- Encourages technical expertise (peer groups)
- Creates narrow perspectives (can foster rivalry)
- Difficult to coordinate across functions
## Matrix Structures

- Reinforces & broadens technical excellence
- Facilitates efficient use of resources
- Balances conflicting objectives of the organization
- Increases power conflicts
- Increases confusion & stress for 2-boss employees
- Impedes decision making

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Integration</th>
<th>Scope</th>
<th>Time</th>
<th>Cost</th>
<th>Quality</th>
<th>HR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reinforces &amp; broadens technical excellence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facilitates efficient use of resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Balances conflicting objectives of the organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increases power conflicts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increases confusion &amp; stress for 2-boss employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impedes decision making</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Student Copy – Not for Reproduction or Distribution**
Projectized Structures

- Project manager is the resource manager
- Project manager has the most authority
- Can lead to less efficient use of resources
- Can limit access to technical expertise

Student Copy – Not for Reproduction or Distribution
9.1 Plan Human Resource Management

9.1.3 Outputs (Figure 9-3)

.1 Human Resource Management Plan

Roles & responsibilities
Project organizational chart
Staffing management plan
Staff release plan
Training needs
Recognition and rewards
Compliance (regulation, unions, etc.)
Safety
9.2 Acquire Project Team

9.2.1 Inputs

.1 Human Resource Management Plan
.2 Enterprise Environmental Factors
.3 Organizational Process Assets
9.2 Acquire Project Team

9.2.2 Tools & Techniques

.1 Pre-assignment

.2 Negotiations (with both functional managers to ensure competent/available resources and with other PMs to procure scarce/specialized resources)

.3 Acquisition

.4 Virtual Teams (Communications planning more important)

.5 Multi-Criteria Decision Analysis: Availability, cost, experience, ability, etc.
Assign the Project Team

• “Continuity” is important…
  – Concept Team
  – Planning Team
  – Execution Team

• Key skills and players

• May need contract (third-party) help
  – Procurement Planning
## 9.2 Acquire Project Team

### 9.2.3 Outputs (Figure 9-8)

1. **Project Staff Assignments**
2. **Resource Calendars:** Time periods resources are available for work
3. **PM Plan Updates**
Responsibility Assignment Matrix

- Shows level of responsibility for groups and/or individuals
- Graphically links the work to be done to those doing it

<table>
<thead>
<tr>
<th>Task</th>
<th>Sales</th>
<th>Billing &amp; Enrollment</th>
<th>Product Build</th>
<th>Applications Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.1</td>
<td>Primary</td>
<td>Support</td>
<td>Support</td>
<td>Primary</td>
</tr>
<tr>
<td>4.2.1</td>
<td>Support</td>
<td>Primary</td>
<td>Support</td>
<td>Primary</td>
</tr>
<tr>
<td>4.2.5</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
</tr>
<tr>
<td>5.4</td>
<td></td>
<td></td>
<td>Primary</td>
<td>Support</td>
</tr>
</tbody>
</table>
9.3 Develop Project Team

Individual development is the foundation necessary to facilitate team development. Improve team member skills and feelings to trust and cohesiveness among team members.

9.3.1 Inputs

.1 Human Resource Management Plan
.2 Project Staff Assignments
.3 Resource Calendars
9.3 Develop Project Team

9.3.2 Tools & Techniques

.1 Interpersonal Skills
.2 Training
.3 Team Building Activities
.4 Ground Rules
.5 Co-location
.6 Recognition & Rewards
.7 Personnel Assessment Tools: Attitudinal surveys, structured interviews, ability tests, etc.
### Knowledge Area

<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Stages of Team Development

- **Forming**: Independent, not open
- **Storming**: Not collaborative
- **Norming**: Adjusting work habits and behaviors, learning to trust
- **Performing**: Functioning as a well-organized unit, working through issues
- **Adjourning**: Released from the project
SWOTt Analysis

- **Strengths** Characteristics that allow the business to take advantage of opportunities or reduce the impact of barriers.
- **Weaknesses** Characteristics that could stand in the way of the business taking advantage of opportunities or reducing the impact of barriers.
- **Opportunities** Factors outside the business that allow it to take action to grow the business.
- **Threats** Factors outside the business that stands in the way of its efforts to grow the business.
- **Trends** Current factors that contribute to the business success within its industry.
Power “Bases”

- Formal (legitimate)— Invested by the PM role
- Reward – Duh 😊
- Penalty (coercive) - consequences
- Expert – PM knowledge
- Referent – team likes the PM, or wants to be liked by the PM
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Initiating</td>
</tr>
<tr>
<td>Scope</td>
<td>Planning</td>
</tr>
<tr>
<td>Time</td>
<td>Executing</td>
</tr>
<tr>
<td>Cost</td>
<td>Monitoring &amp; Controlling</td>
</tr>
<tr>
<td>Quality</td>
<td>Closing</td>
</tr>
</tbody>
</table>

**Theory X**

- People inherently dislike work
- People must be coerced or controlled to do work to achieve objectives
- People prefer to be directed

---

**Student Copy – Not for Reproduction or Distribution**
Theory Y

- People view work as being as natural as play and rest
- People will exercise self-direction and self-control towards achieving objectives they are committed to
- People learn to accept and seek responsibility
Maslow’s Hierarchy of Needs

- Physiological
  - Food, water, oxygen, etc…

- Safety
  - Shelter, security, etc…

- Social
  - Belonging, friends, love, etc…

- Esteem
  - Respect, fame, recognition, etc…

- Self Actualization
  - Doing what you’re “fitted for, true to your “nature”

(ABraham Maslow, Motivation and Personality, 1954)
# Motivator vs Hygiene Factors Theory

- **Motivator factors increase job satisfaction**
  - Achievement
  - Recognition
  - Work itself
  - Responsibility
  - Advancement
  - Growth

- **Hygiene factors are those whose absence can create job dissatisfaction**
  - Supervision
  - Company policy
  - Working conditions
  - Salary
  - Peer relationship
  - Security
Vroom’s Expectancy Theory

- An individual will act in a certain way based on the expectation that the act will be followed by a given outcome and on the attractiveness of that outcome to the individual
- **Effort ~ Performance linkage** (How hard will I have to work?)
- **Performance ~ Reward linkage** (What is the reward?)
- **Attractiveness** (How attractive is the reward?)
Ouchi’s Theory Z

- Referred to as the “Japanese Management Style”
- Places a large amount of freedom and trust with workers, and assumes that workers have a strong loyalty and interest in team-working and the organization
- Places more reliance on the attitude and responsibilities of the workers vice management perspective (Theories X & Y)
Blanchard & Hershey’s Leadership Behavior

- **D4 Competent / Commitment**
  - Experienced at the job, and comfortable with their own ability to do it well

- **D3 Competent / Variable Commitment**
  - Experienced and capable, but may lack the confidence/motivation to go it alone

- **D2 Some Competence / Low Commitment**
  - May have some relevant skills, but won't be able to do the job without help

- **D1 Low Competence / Low Commitment**
  - Lacks the specific skills required for the job in hand & and lacks confidence/motivation
Situational Leadership

- **Directing** - Leaders define the roles and tasks of the 'follower', and supervise them closely.
- **Coaching** - Leaders still define roles and tasks, but seek ideas and suggestions from the follower.
- **Supporting** - Leaders pass day-to-day decisions, such as task allocation and processes, to the follower.
- **Delegating** - Leaders are still involved in decisions and problem-solving, but control is with the follower.
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Initiating</td>
</tr>
<tr>
<td>Scope</td>
<td>Planning</td>
</tr>
<tr>
<td>Time</td>
<td>Executing</td>
</tr>
<tr>
<td>Cost</td>
<td>Monitoring &amp; Controlling</td>
</tr>
<tr>
<td>Quality</td>
<td>Closing</td>
</tr>
<tr>
<td>HR</td>
<td>Executing</td>
</tr>
<tr>
<td>Communications</td>
<td>Executing</td>
</tr>
<tr>
<td>Risk</td>
<td>Executing</td>
</tr>
<tr>
<td>Procurement</td>
<td>Executing</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Executing</td>
</tr>
</tbody>
</table>

Team Building

- Necessary to move toward project goals/deliverables

- Symptoms of need for team building:
  - Frustration
  - Conflict and unhealthy competition
  - Unproductive meetings
  - Lack of trust or confidence in PM

*Team building is a key integration activity during project execution*

Team Building Ground Rules

• Start early - it takes \textit{time}
• Don’t stop - it takes \textit{effort}
• Get the right team and manage toward success
  – Best qualified members
  – People who want to be on the team
• Get team agreement on all major points
• Don’t manipulate members, but do review and evaluate team success/effectiveness
• Watch for symptoms of team breakdown
• Plan and use a team building process

9.3 Develop Project Team

9.3.3 Outputs (Figure 9-10)

.1 Team Performance Assessments
.2 Enterprise Environmental Factors Updates
9.4 Manage Project Team

Tracking team member performance, providing feedback, resolving issues, & coordinating changes

9.4.1 Inputs

.1 HR Management Plan
.2 Project Staff Assignments
.3 Team Performance Assessments
.4 Issue Log
.5 Work Performance Reports
.6 Organizational Process Assets
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Initiating</td>
</tr>
<tr>
<td></td>
<td>Planning</td>
</tr>
<tr>
<td></td>
<td>Executing</td>
</tr>
<tr>
<td></td>
<td>Monitoring &amp; Controlling</td>
</tr>
<tr>
<td></td>
<td>Closing</td>
</tr>
</tbody>
</table>

9.4 Manage Project Team

9.4.2 Tools & Techniques

.1 Observation and Conversation

.2 Project Performance Appraisals

360 degree feedback: feedback provided from many sources, including peers and team members

.3 Conflict Management

.4 Interpersonal Skills
## Sources of Conflict

- Schedules
- Resource allocation
- Changing, conflicting priorities
- Technical perspectives
- Note: personality conflicts are not included in this list
Conflict Resolution

- **Withdraw or Avoid**
- **Smooth or Accommodate**: Emphasize agreements or conceding to build relationships
- **Compromise or Reconcile**: Tends to temporarily or partially resolve the conflict
- **Force or Direct**: Win-lose
- **Collaborate or Problem Solve**: Pick this one! 😊
9.4 Manage Project Team

9.4.3 Outputs (Figure 9-12)

.1 Change Requests

Remember, staffing issues/changes can disrupt the project plan and impact both schedule and budget…Integrated Change Control processes may be used to document impacts

.2 PM Plan Updates

.3 Enterprise Environmental Factor Updates

.4 Organizational Process Assets Updates
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapter 9 Project Human Resources Management
Project Communications Management

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
# Communications Importance

- 78-90% of project manager’s job
- Affects every part of a project
- Can make or break a project
- Employed by everyone involved
- There is a direct correlation between the ability to communicate and project performance
Communications Realities

- Majority of project communication is done in the early stages of the project.
- Communications Breakdown (23-27% lost in upward communications)
- Meetings - 50% of project managers’ time
### 10.1 Plan Communications Management

The majority of Communications Planning should be completed in the early phases.

#### 10.1.1 Inputs

1. Project Management Plan
2. Stakeholder Register
3. Enterprise Environmental Factors
4. Organizational Process Assets
10.1 Plan Communications Management

10.1.2 Tools & Techniques

.1 Communications Requirements Analysis
.2 Communications Technology
.3 Communications Models
.4 Communications Methods
.5 Meetings
Communications Channels

- How many communications channels are there for a team of 9?
- For a team of 6?
- Remember, about 55% of communication is non-verbal & a PM spends about 90% of their time communicating

# of Channels = \( \frac{N^2 - N}{2} \)
Basic Communications Model

- **Key components:**
  - Encode: translate thoughts/ideas into language tailored for audience
  - Message: the output of encoding
  - Medium: “how” the encoder chooses to transmit the message
  - Noise: barriers to either transmission or receipt of the message
  - Decode: translation from language into thoughts/ideas
Communications Models
Communications Methods

• Formal
  – Presentations
  – Letters
  – Policies & Procedures

• Informal
  – Email
  – Meetings
  – Conference calls
10.1 Plan Communications Management

10.1.3 Outputs (Figure 10-3)

.1 Communications Management Plan
Describes how project communications will be planned, structured, monitored and controlled

.2 Project Documentation Updates
Project Communications Plan

- Stakeholders
- Informational Needs
- Medium
- Timing/Frequency
- Responsibility
- Feedback
# 10.2 Manage Communications

## 10.2.1 Inputs

1. Communications Management Plan
2. Work Performance Reports
3. Enterprise Environmental Factors
4. Organizational Process Assets
10.2 Manage Communications

10.2.2 Tools & Techniques

.1 Communication Technology
.2 Communications Models
.3 Communications Methods
.4 Information Management Systems
.5 Performance Reporting: Project performance
### 10.2 Manage Communications

#### 10.2.3 Outputs (Figure 10-6)

- **.1 Project Communications**
- **.2 PM Plan Updates**
- **.3 Project Document Updates**
- **.4 Organizational Process Assets (Updates)**
  Lessons Learned, Project Records, Reports, Presentations, etc…

**Status** – where the project stands related to schedule & budget

**Progress** – what has been accomplished

**Forecasting** – predict future status and progress
10.3 Control Communications

10.3.1 Inputs

.1 PM Plan
.2 Project Communications
.3 Issue Log
.4 Work Performance Data
.5 Organizational Process Assets
## 10.3 Control Communications

### 10.3.2 Tools & Techniques

1. **Information Management Systems**
2. **Expert Judgment**
3. **Meetings**
10.3 Control Communications

10.3.3 Outputs (Figure 10-8)

.1 Work Performance Information
.2 Change Requests
.3 PM Plan Updates
.4 Project Document Updates
.5 Organizational Process Asset Updates
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapter 10 Project Communications Management
Project Risk Management

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
What is “risk?”
<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Risk Management**

- The objective of Risk Management is to increase the probability/impact of positive and decrease the probability/impact of the negative risk.
### Themes that Influence Risk Attitudes

- **Risk Appetite**: Acceptable degree of uncertainty for anticipated benefit
- **Risk Tolerance**: Level of risk an organization, or individual, will withstand
- **Risk Threshold**: Measure of the level of uncertainty or impact; below = accept, above = not tolerate
## 11.1 Plan Risk Management

### 11.1.1 Inputs

1. PM Plan
2. Project Charter
3. Stakeholder Register
4. Enterprise Environmental Factors
5. Organizational Process Assets
11.1 Plan Risk Management

11.1.2 Tools & Techniques

.1 Analytical Techniques
.2 Expert Judgment
.3 Meetings
11.1 Plan Risk Management

11.1.3 Outputs (Figure 11-3)

.1 Risk Management Plan

Includes definitions of risk probability and impact

* Tailored for each project for use in Qualitative Risk Analysis
Risk Plan

- Risk: the uncertainty associated with an event
- Identify risks to the project
  - Both positive and negative
  - Identify threats and opportunities
- Focus on those most likely to occur
- Develop pre-planned responses to most likely with big impact
11.2 Identify Risks

11.2.1 Inputs

.1 Risk Management Plan
.2 Cost Management Plan
.3 Schedule Management Plan
.4 Quality Management Plan
.5 HR Management Plan
.6 Scope Baseline
.7 Activity Cost Estimates
.8 Activity Duration Estimates
.9 Stakeholder Register
.10 Project Documents
.11 Procurement Documents
.12 Enterprise Environmental Factors
.13 Organizational Process Assets
Risk Categories

- **Technical, Quality or Performance risks**: such as reliability, unproven, unrealistic, changes to technology or industry standards
- **Project Management risks**: poor allocation of time and resources, poor project plan, and poor use of project management disciplines
- **Organizational risks**: cost, time and scope objectives that are inconsistent, lack of prioritization of projects, funding problems, and resource conflicts
- **External risks**: shifting legal or regulatory environment, labor issues, changing owner priorities, country risks, weather, Force majeure risks (acts of god) usually require disaster recovery
11.2 Identify Risks

11.2.2 Tools & Techniques

.1 Documentation Reviews
.2 Information Gathering Techniques
.3 Checklist Analysis
.4 Assumptions Analysis
.5 Diagramming Techniques
.6 SWOT Analysis
.7 Expert Judgment

Student Copy – Not for Reproduction or Distribution
Information Gathering Techniques

- **Brainstorming** - is probably the most frequently used technique

- **Delphi technique** - using a questionnaire to solicit ideas, circulate the responses to anonymous experts on the subject, until reaching consensus
  - Helps reduce bias in the data
  - Keeps any one person from influencing the outcome

- **Interviewing** - the responsible person identifies appropriate individuals, briefs them on the project, provides information (WBS & assumptions) and gathers information based on their experience

- **Strengths, weakness, opportunities and threats (SWOT) analysis** - ensures examination from each of the SWOT perspectives to increase the breadth of the risk considered
Information Gathering Techniques

- **Checklists** - Risk identification may be gathered from historical data
  - Quick and simple, but may not be comprehensive enough
  - Important to update the checklist after each project closeout for possible additions

- **Diagramming techniques** -
  - Cause-and-Effect Diagrams- (Ishikawa or fishbone diagrams) are useful in identifying causes of risks
  - System or Process Flow Charts- shows how each element interacts and the mechanism of causation
  - Influence Diagrams- A graphical representation of a problem showing relationships among variables and outcomes
## 11.2 Identify Risks

### 11.2.3 Outputs (Figure 11-6)

1. **Risks Register**
   - Document that contains outputs from Risk Management processes (identified risks, potential responses, root causes, etc…)

---

**Knowledge Area**

<table>
<thead>
<tr>
<th>Integration</th>
<th>Scope</th>
<th>Time</th>
<th>Cost</th>
<th>Quality</th>
<th>HR</th>
<th>Communications</th>
<th>Risk</th>
<th>Procurement</th>
<th>Stakeholder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
11.3 Perform Qualitative Risk Analysis

Methods for prioritizing risks, improving project performance, etc…by focusing on high priority risks

11.3.1 Inputs

.1 Risk Management Plan
.2 Scope Baseline
.3 Risk Register (key item for Qualitative Risk Analysis)
.4 Project Scope Statement
.5 Organizational Process Assets
11.3 Perform Qualitative Risk Analysis

11.3.2 Tools & Techniques

.1 Risk Probability & Impact Assessment
.2 Probability & Impact Matrix
.3 Risk Data Quality Assessment
.4 Risk Categorization
.5 Risk Urgency Assessment
.6 Expert Judgment

• Probability, Impact, Timing, Frequency
## Probability & Impact Matrix (See PMBOK 5th Edition Figure 11-10)

<table>
<thead>
<tr>
<th>Risk</th>
<th>Impact</th>
<th>Likelihood</th>
<th>Quantification (I X L)</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>High</td>
<td>High</td>
<td>25</td>
<td>X</td>
</tr>
<tr>
<td>B</td>
<td>High</td>
<td>Med</td>
<td>15</td>
<td>Y</td>
</tr>
<tr>
<td>C</td>
<td>Med</td>
<td>Med</td>
<td>9</td>
<td>Z</td>
</tr>
<tr>
<td>D</td>
<td>Low</td>
<td>Low</td>
<td>1</td>
<td>N/A</td>
</tr>
</tbody>
</table>

High = 5
Med = 3
Low = 1
### 11.3 Perform Qualitative Risk Analysis

#### 11.3.3 Outputs (Figure 11-9)

.1 Project Document Updates
Life-Cycle Risk Analysis

LIFE-CYCLE PHASES

<table>
<thead>
<tr>
<th>PROJECT APPROVAL</th>
<th>PRELIMINARY &amp; DETAILED PLANNING</th>
<th>EXECUTION</th>
<th>CLOSURE</th>
</tr>
</thead>
</table>
| TOTAL PROJECT RISK
| AMOUNT AT STAKE |

TYPICAL RISK EVENTS PER PHASE

- UNAVAILABLE SUBJECT MATTER EXPERTS
- POOR DEFINITION OF PROBLEM
- NO FEASIBILITY STUDY
- UNCLEAR OBJECTIVES
- BUY-IN (BY COMPETITIVE BIDDING)

- NO RISK MANAGEMENT PLAN
- HASTY PLANNING
- POOR SPECIFICATIONS
- UNCLEAR SOW
- NO MANAGEMENT SUPPORT
- POOR ROLE DEFINITION
- INEXPERIENCED TEAM

- UNSKILLED LABOR
- MATERIAL AVAILABILITY
- STRIKES
- WEATHER
- CHANGES IN SCOPE
- CHANGES IN SCHEDULE
- REGULATORY REQUIREMENTS
- OSHA/EP A COMPLIANCE
- NO CONTROL SYSTEMS IN PLACE

Reference: Kerzner, page 880

© 1999 International Institute for Learning, Inc.
Version 1.0 - 1999
11.4 Perform Quantitative Risk Analysis

Performed on risks prioritized in Qualitative Risk Analysis as potentially and substantially impactful

11.4.1 Inputs

.1 Risk Management Plan
.2 Cost Management Plan
.3 Schedule Management Plan
.4 Risk Register
.5 Enterprise Environmental Factors
.6 Organizational Process Assets
11.4 Perform Quantitative Risk Analysis

11.4.2 Tools & Techniques

.1 Data Gathering and Representation Techniques
.2 Quantitative Risk Analysis and Monitoring Techniques
  Monte Carlo simulation: numerically analyze the probability of each event and the event’s consequences
  Decision Tree Analysis
  Expected Monetary Value (EMV) Analysis: statistically calculates average outcomes in uncertainty
.3 Expert Judgment
Expected Monetary Value

- **Expected Monetary Value** - Is the summation of risk probability and risk consequences

- **Example**: There is 1% probability that I will fail the PMP Exam and consequence of doing so cost me $275 to retake the test

\[
\text{Expected Monetary Value} = 275 \times .01 = 2.75
\]
## Expected Monetary Value

<table>
<thead>
<tr>
<th>Task</th>
<th>Probability</th>
<th>Impact (Amount at Stake)</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10%</td>
<td>$41,000</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>30%</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>68%</td>
<td>$20,000</td>
<td></td>
</tr>
</tbody>
</table>
# Expected Monetary Value

<table>
<thead>
<tr>
<th>Task</th>
<th>Probability</th>
<th>Impact (Amount at Stake)</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10%</td>
<td>$41,000</td>
<td>$4,100</td>
</tr>
<tr>
<td>B</td>
<td>30%</td>
<td>$50,000</td>
<td>$15,000</td>
</tr>
<tr>
<td>C</td>
<td>68%</td>
<td>$20,000</td>
<td>$13,600,  $32,700</td>
</tr>
</tbody>
</table>
EMV / Decision Tree Exercise
11.4 Perform Quantitative Risk Analysis

11.4.3 Outputs (Figure 11-12)

.1 Project Documents Updates
Probabilistic analysis, probability of meeting cost/time objectives, prioritized list of “quantified” risks, etc…
11.5 Plan Risk Responses

11.5.1 Inputs

.1 Risk Management plan
.2 Risk Register
## 11.5 Plan Risk Responses

### 11.5.2 Tools & Techniques

1. Strategies for Negative Risks or Threats
   - Avoidance
   - Transference
   - Mitigation

2. Strategies for Positive Risks or Opportunities
   - Exploit
   - Share
   - Enhance

3. Contingent Response Strategies

4. Expert Judgment
### Risk Responses

Determining **HOW** to respond to the identified risk

- **Avoidance** - Eliminate the specific threat by eliminating the cause
- **Mitigation** - Reducing the impact by reducing the probability or reducing the occurrence of the risk
- **Transference** – Passing the risk on to another
- **Exploit** – Ensure opportunity is realized
- **Share** – Allocate ownership to 3rd party to capture benefit
- **Enhance** – Modify “size” of opportunity
- **Accept** – Accepting the risk consequence by:
  - Developing a contingency plan
  - Accepting the impact
## 11.5 Plan Risk Responses

### 11.5.3 Outputs (Figure 11-19)

.1 PM Plan Updates

.2 Project Documents Updates
11.6 Control Risks

11.6.1 Inputs

.1 PM Plan
.2 Risk Register
.3 Work Performance Data
.4 Work Performance Reports
11.6 Control Risks

11.6.2 Tools & Techniques

.1 Risk Reassessment: Remember…living document
.2 Risk Audits: Document effectiveness of responses and the risk management processes
.3 Variance and Trend Analysis
.4 Technical Performance Measurement
.5 Reserve Analysis
    Compare contingency reserves to amount of remaining risks (adequate?)
.6 Status Meetings
11.6 Control Risks

11.6.3 Outputs (Figure 11-21)

.1 Work Performance Information
.2 Change Requests
.3 PM Plan Updates
.4 Project Document Updates
.5 Organizational Process Assets Updates
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapter 11 Project Risk Management
Project Procurement Management

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
Procurement Management

- Includes the processes required to acquire goods and services, to attain project scope, from outside the performing organization

- *Key thought: make or buy*

- *Note: Project procurement management is discussed from the perspective of the buyer in the buyer-seller relationship.*
Procurement Management

• **Contract**
  
  – Mutually binding agreement that obligates seller and buyer
  
  – Legally binding
  
  – Includes terms and conditions
12.1 Plan Procurement Management

12.1.1 Inputs

.1 PM Plan
.2 Requirements Documentation
.3 Risk Register
.4 Activity Resource Requirements
.5 Project Schedule
.6 Activity Cost Estimates
.7 Stakeholder Register
.8 Enterprise Environmental Factors
.9 Organizational Process Assets
12.1 Plan Procurement Management

12.1.2 Tools & Techniques

.1 Make-or-Buy Analysis
.2 Expert Judgment
.3 Market Research
.4 Meetings

Student Copy – Not for Reproduction or Distribution
# Make or Buy Analysis

## Knowledge Area

<table>
<thead>
<tr>
<th>Integration</th>
<th>Scope</th>
<th>Time</th>
<th>Cost</th>
<th>Quality</th>
<th>HR</th>
<th>Communications</th>
<th>Risk</th>
<th>Procurement</th>
<th>Stakeholder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Process Group

<table>
<thead>
<tr>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Make or Buy Analysis

### Make
- Cost
- Integration of operations
- Idle existing capacity
- Direct control
- Design secrecy
- Unreliable suppliers
- Stabilize work force

### Buy
- Cost
- Supplier skills
- Small volume requirements
- Limited capacity
- Augment labor force
- Maintain multiple sources
- Indirect control

---

*Student Copy – Not for Reproduction or Distribution*
Make or Buy Exercise

You are trying to decide whether to buy or lease an item for your project. The daily lease cost is $120. To purchase the item the investment cost is $1000 and the daily cost is $20. How long will it take for the lease cost to be the same as the purchase cost?

Let \( D = \) the number of days when the purchase and lease costs are equal.

\[
120D = 1000 + 20D
\]

\[
120D - 20D = 1000
\]

\[
100D = 1000
\]

\( D = 10 \). What does this mean?
# Buy vs. Lease vs. Rent

- Length of use (future projects?)
- Cash flow; cost of money; financial statement
- Technology life span
- Depreciation and taxes
- Maintenance; cost & expertise
- Insurance
## Contract Type Selection

- **Goal**: To have reasonable distribution of risk between the buyer and seller and the greatest incentive for the seller’s efficient and economical performance
  - Degree of cost and schedule risk
  - Extent of work definition
  - Need for fast-tracking
  - Extent of price competition
  - Marketplace conditions
Contract Types

- **Fixed Price**
  - Firm fixed price (FFP)
  - FFP with economic price adjustment (FPEPA)
  - Fixed price incentive fee (FPIF) or FPI

- **Cost Reimbursable**
  - Cost plus fixed fee (CPFF)
  - Cost plus incentive fee (CPIF)
  - Cost plus award fee (CPAF)
  - Cost plus percentage of cost (illegal in gov)

- **Time and Materials**
- **Purchase Order (unilateral agreement)**
## Fixed Price Contract Type Comparison

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Integration</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td></td>
</tr>
<tr>
<td><strong>HR</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Communications</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Advantages
- Know cost up front
- **Risk to seller**
- Competition
- Compare multiple vendors bids
- Little experience needed - less work for buyer to manage
- **Seller has strong incentive to control costs**

### Disadvantages
- May not get consistent quality
- Not flexible
- Can be costly
- **Seller may under price the work and try to make up profits on change orders**
- **Seller may not complete some of the scope of work if they begin to lose money.**
Cost Plus Contract Type Comparison

- **Advantages**
  - More influence & flexibility
  - Could be less expensive
  - Share risk
  - Scope definition can be more flexible

- **Disadvantages**
  - Level of involvement - auditing of seller invoices
  - No incentive to finish quickly or control costs
  - Harder to evaluate proposals
  - Total cost unknown
Contracts and Procurement Risk

High Risk for Seller/Contractor

- High Risk for Buyer/Owner

Confidence

- Low
- High

Risk

- Fixed Firm Price (FFP)
- Fixed Price Plus Incentive (FPPI)
- Cost Plus Fixed Fee (CPIF)
- Cost Plus Percentage Fee (CPPF)
12.1 Plan Procurement Management

12.1.3 Outputs (Figure 12-3)

.1 Procurement Management Plan
.2 Procurement Statements of work – describes the procurement item in sufficient detail to allow prospective sellers to determine if they are capable of providing the item
.3 Procurement Documents
.4 Source Selection Criteria
.5 Make or Buy Decision
.6 Change Requests
.7 Project Documents Updates
12.2 Conduct Procurements

12.2.1 Inputs

.1 PM Plan
.2 Procurement Documents
.3 Source Selection Criteria
.4 Seller Proposals
.5 Project Documents
.6 Make-or-Buy Analysis
.7 Procurement Statement of Work
.8 Organizational Process Assets
12.2 Conduct Procurements

12.2.2 Tools & Techniques

.1 Bidder Conferences
Used to ensure all prospective sellers have a clear understanding of the requirements…all potential sellers are given equal standing during this process.

.2 Proposal Evaluation Techniques

.3 Independent Estimates

.4 Expert Judgment

.5 Advertising
Used to expand existing list of potential sellers (may be a requirement)

.6 Analytical Techniques

.7 Procurement Negotiations
12.2 Conduct Procurements

12.2.3 Outputs (Figure 12-5)

.1 Selected Sellers
.2 Agreements
.3 Resource Calendars
.4 Change Requests
.5 PM Plan Updates
.6 Project Documents Updates
12.3 Control Procurements

Contracts can be amended any time prior to closure (mutual consent & associated change control terms)

12.3.1 Inputs

.1 PM Plan
.2 Procurement Documents
.3 Agreements
.4 Approved Change Requests
.5 Work Performance Reports
.6 Work Performance Data
12.3 Control Procurements

12.3.2 Tools & Techniques
  .1 Contract Change Control System
  .2 Procurement Performance Reviews
  .3 Inspections & Audits
  .4 Performance Reporting
  .5 Payment Systems
  .6 Claims Administration
  .7 Records Management System

  – Contract Administrator – only person authorized to change contractual agreements (may not be the PM)
12.3 Control Procurements

12.3.3 Outputs (Figure 12-7)

.1 Work Performance Information
.2 Change Requests
.3 PM Plan Updates
.4 Project Documents Updates
.5 Organizational Process Asset Updates
12.4 Close Procurements

12.4.1 Inputs

.1 PM Plan

.2 Procurement Documents
Contract Close-out

- Contract close-out includes
  - Product verification (work completed correctly and satisfactorily)
  - Administrative activities (update records to reflect final results)
  - Archiving information for future use

- Procurement audits identify lessons-learned
- Contract audits
  - Identify best practices and areas for improvement
12.4 Close Procurements

12.4.2 Tools & Techniques

.1 Procurement Audits
Structured review of procurement process from planning through administration

.2 Procurement Negotiations

.3 Records Management System
12.4 Close Procurements

12.4.3 Outputs (Figure 12-9)

.1 Closed Procurements

.2 Organizational Process Assets Updates – requirements for formal acceptance and closure are usually defined in a contract
## Termination by...

- **Extinction**
  - Successful or not
  - Deliverable is external to or not a fundamental function of the parent organization

- **Addition**
  - Institutionalized
  - New Division

- **Integration**
  - Most Common
  - Project assets redistributed

- **Starvation**
  - Budget decrement
Incentive Contract Example

Target Cost: $100,000
Target Fee: $10,000
Target Price: $110,000
Sharing Ratio: 80/20
Actual Cost: $95,000

Fee = $100,000 - $95,000 = $5,000
$5,000 X 20% = $1,000
$10,000 + $1,000 = $11,000
Final Price = $95,000 + $11,000 = $106,000
Incentive Contract Exercise

Target Cost $100,000
Target Fee $10,000
Target Price $110,000
Sharing Ratio 80/20
Actual Cost $105,000

Fee = $100,000 - $105,000 = -$5,000 (reduction in fee)
$5,000 X 20% = $1,000
$10,000 - $1,000 = $9,000
Final Price = $105,000 + $9,000 = $114,000
Ready for a spin? What if CPPC?

Target Cost $120,000
Fee 10% of Cost
Actual Cost $130,000

Fee = $130,000 + (10% of $130,000) = $143,000

Remember…most risky contract type for buyer!
Sharing w/ Ceiling Exercise

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Cost</td>
<td>$130,000</td>
</tr>
<tr>
<td>Target Fee</td>
<td>$15,000</td>
</tr>
<tr>
<td>Target Price</td>
<td>$145,000</td>
</tr>
<tr>
<td>Ceiling Price</td>
<td>$160,000</td>
</tr>
<tr>
<td>Sharing Ratio</td>
<td>80/20</td>
</tr>
<tr>
<td>Actual Cost</td>
<td>$150,000</td>
</tr>
</tbody>
</table>

Fee = $130,000 - $150,000 = -$20,000 (reduction in fee)
   $20,000 X 20% = $4,000
   $15,000 - $4,000 = $11,000

Final Price = $150,000 + $10,000 (not $11,000) = $160,000
Point of Total Assumption (For FPIC with a Ceiling)

\[ PTA = \frac{\text{Ceiling Price} - \text{Target Price}}{\text{Buyer’s Ratio}} + \text{Target Cost} \]

- Target Cost: $130,000
- Target Fee: $15,000
- Target Price: $145,000
- **Ceiling Price**: $160,000
- Sharing Ratio: 80/20
- Actual Cost: **$150,000**

\[
PTA = \left\{ \frac{(160,000 - 145,000)}{.80} \right\} + 130,000 \\
= 15,000/.8 + 130,000 \\
= 12,000 + 130,000 = 142,000
\]

What is this? A risk trigger.
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition

Student Copy – Not for Reproduction or Distribution
Practice Test Time!

Chapter 12 Project Procurement Management
Project Stakeholder Management

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
Project Stakeholder Management

• Process used to identify people, groups or organizations that could impact or be impacted
• Analyze expectations and their impacts
• Develop appropriate management strategies
• Focus
  – Continuous communications
  – Understand needs and expectations
  – Address issues, conflicts as they occur
  – Foster appropriate stakeholder engagement
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Student Copy – Not for Reproduction or Distribution</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 13.1 Identify Stakeholders

### 13.1.1 Inputs

1. Project Charter
2. Procurement Documents
3. Enterprise Environmental Factors
4. Organizational Process Assets
13.1 Identify Stakeholders

13.1.2 Tools & Techniques

1. Stakeholder Analysis: process of collecting and evaluating quantitative and qualitative information to determine whose interests should be taken into account during the project

2. Expert Judgment

3. Meetings
### Classification Models

- **Power / Interest Grid**: level of authority and level of concern (Figure 13-4)
- **Power / Influence Grid**: level of authority and level of active involvement
- **Influence / Impact Grid**: level of active involvement and ability to effect change
- **Salience Model**: describes classes of stakeholders based on their power, situational urgency, and legitimacy/appropriateness in their involvement
## 13.1 Identify Stakeholders

### 13.1.3 Outputs (Figure 13-3)

1. Stakeholder Register
13.2 Plan Stakeholder Management

13.2.1 Inputs

.1 PM Plan
.2 Stakeholder Register
.3 Enterprise Environmental Factors
.4 Organizational Process Assets
## 13.2 Plan Stakeholder Management

### 13.2.2 Tools & Techniques

1. **Expert Judgment**
2. **Meetings**
3. **Analytical Techniques**
Engagement Levels

- Unaware – of project and/or potential impacts
- Resistant – aware and resistant to change
- Neutral – aware and neither supporting nor resistant
- Supportive – aware and supportive
- Leading – aware and actively engaged

- Where are they currently?
- What is the desired level of engagement?
13.2 Plan Stakeholder Management

13.2.3 Outputs (Figure 13-6)

.1 Stakeholder Management Plan
.2 Project Document Updates
13.3 Manage Stakeholder Engagement

13.3.1 Inputs

.1 Stakeholder Management Plan
.2 Communications Management Plan
.3 Change Log
.4 Organizational Process Assets
13.3 Manage Stakeholder Engagement

13.3.2 Tools & Techniques

.1 Communications Methods

.2 Interpersonal Skills: building trust, conflict resolution, active listening, etc.

.3 Management Skills: facilitation, negotiate agreements, etc.

Note the fine line between what the PMI considers interpersonal and management skills
13.3 Manage Stakeholder Engagement

13.3.3 Outputs (Figure 13-9)

.1 Issue Log
.2 Change Requests
.3 PM Plan Updates
.4 Project Documents Updates
.5 Organizational Process Assets Updates
## 13.4 Control Stakeholder Engagement

### 13.4.1 Inputs

1. **PM Plan**
2. **Issue Log**
3. **Work Performance Data**
4. **Project Documents**
## 13.4 Control Stakeholder Engagement

### 13.4.2 Tools & Techniques

1. Information Management Systems
2. Expert Judgment
3. Meetings
### 13.4 Control Stakeholder Engagement

#### 13.4.3 Outputs (Figure 13-11)

1. **Work Performance Information:**
   Remember, work performance data is transformed into work performance information

2. **Change Requests**

3. **PM Plan Updates**

4. **Project Documents Updates**

5. **Organizational Process Assets Updates**
PMI-ism Break

Rita Mulcahy, PMP® Exam Prep, 8th Edition
Practice Test Time!

Chapter 13 Project Stakeholder Management
Code of Ethics & Professional Conduct

See the PMP® Handbook

Chuck Millhollan, MBA, MPM, PMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC
Vision & Applicability

- Committed to doing what is right and honorable
- High standards for ourselves
- Expect same from fellow practitioners
- Applies to volunteer roles
### Persons to Whom the Code Applies

- **All PMI members**, regardless of certification status
- **Non-PMI members** that meet any of the following criteria:
  - PMI certified
  - Applicants for PMI certification
  - Serve PMI in a volunteer capacity
<table>
<thead>
<tr>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Area</td>
<td>Integration</td>
<td>Scope</td>
<td>Time</td>
<td>Cost</td>
<td>Quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Individual Integrity**

- Common sense approach to conflict/issues
  - Be honest
  - Do what you “should” do
  - Follow the right processes
  - Report violations
### Core Values Supporting the Code

- Responsibility
- Respect
- Fairness
- Honesty
Aspirational & Mandatory Conduct

- Each section includes aspirational standards & mandatory standards

- Aspirational
  - Not easily measured, but not optional either

- Mandatory
  - Established firm requirements
  - Can limit or prohibit behavior
  - Failure can result in disciplinary action
Responsibility

- **Ownership of decisions we make or fail to make**
- **Aspirational**
  - Based on the best interests of society, public safety and environment
  - Accept assignments consistent with our background, experience, skills and qualifications
  - Fulfill commitments
  - Ownership of errors (early communication)
  - Protect proprietary or confidential info
  - Hold others accountable to Code
- **Mandatory**
  - Inform ourselves and uphold policies, rules, regulations and laws that govern our work and volunteer activities
  - Report unethical or illegal conduct
  - Bring violations of the Code to attention
  - Only file complaints when substantiated by facts
  - Pursue disciplinary action for retaliation
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Process Group</th>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring &amp; Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Respect**

- High regard for self, others and resources entrusted to us
- Respect fosters trust, confidence, and mutual cooperation
- Aspirational
  - Inform selves of norms and customers of others and avoid disrespectful behavior
  - List to others’ point of view
  - Approach conflict or disagreement directly
  - Professional, even when not reciprocated
- Mandatory
  - Negotiate in good faith
  - Do not exercise power for personal benefit
  - Do not act abusively
  - Respect others’ property rights

*Student Copy – Not for Reproduction or Distribution*
### Fairness

- **Make decisions and act impartially and objectively**
- **Aspirational**
  - Transparency in decision making
  - Constantly reexamine ourselves and make corrective action
  - Provide equal access to information to those authorized
  - Make opportunities equally available to qualified candidates
- **Mandatory**
  - Proactively disclose conflicts of interests
  - Refrain from decision making process or influencing outcomes if there is a potential conflict of interest
  - Do not hire/fire, reward/punish, award/deny contracts based on personal considerations (favoritism, nepotism, bribery)
  - Do not discriminate (gender, race, age, religion, disability, etc…)
  - Apply the rules of the organization (employer, PMI or other group) without favoritism or prejudice
### Honesty

- **Duty to understand the truth and act truthfully**
- **Aspirational**
  - Earnestly seek to understand the truth
  - Truthful in communications and conduct
  - Provide accurate info in a timely manner
  - Make commitments or promises in good faith (implied or explicit)
  - Create an environment that others feel safe to tell the truth
- **Mandatory**
  - Do not engage in behavior that is designed to deceive others (false statements, half-truths, provide info out of context, etc…)
  - Do not engage in dishonest behavior w/ the intent of personal gain or expense of others
Practice Test Time!

Chapter 13 Professional & Social Responsibility
Course Certificates & Critiques

Chuck Millhollan, MBA, MPM, PMP, PgMP
IIBA Certified Business Analysis Professional (CBAP)
ASQ Certified Six Sigma Black Belt
ASQ Certified Software Quality Engineer
ASQ Certified Manager of Quality / Organizational Excellence
chuck.millhollan@gmail.com
Innovative Management Solutions, LLC