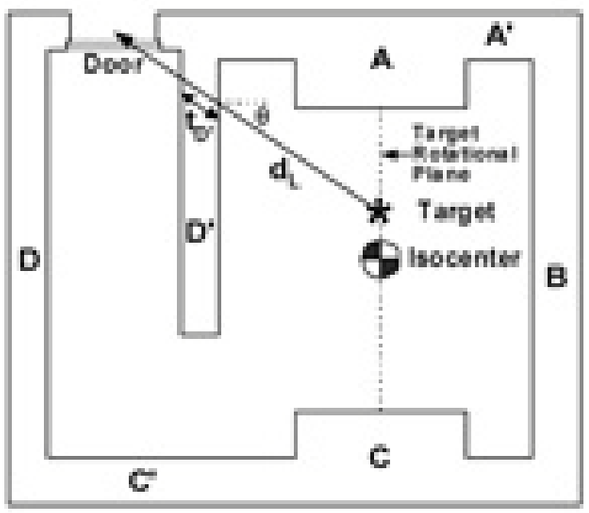
Project Management for Medical Physicists

David Hintenlang, Ph.D.
University of Florida



Training of Medical Physicists

- Graduate Training
- Residency or Post-Doctoral Training
- Board Exams
- On-the-job experience

No formal management training:

- Fiscal management
- Personnel management
- Project management
- Technical skills and Interpersonal skills

My Qualifications

- No Formal Training
- Trial and Error Experience
  - Research Projects
  - Clinical Projects
  - Inherited Project
  - Others

Examples of "Projects"

- Definition: a temporary endeavor with a defined beginning and end (usually time-constrained, and often constrained by funding or deliverables), undertaken to meet unique goals and objectives.

- Specification for equipment purchases (MR, CT, linac)
- Facility design
- Oversee install
- New construction
- Integration of new systems (i.e. patient EMR....)
- Developing Task Group Reports

Introduction to Project Management Principles and Strategies

- Project teams
- Clinical projects
- Tools and planning
- Scheduling and quantifying progress
- Dealing with changes and negotiation
- Completion & Closeout

Role(s) of the Physicist

- Project manager
- Team Member
  - Provide effective coordination
- Responsible for?

Getting Started

- Recognize that you have a Project!
- Identify your role
- Take stock of the available resources
  - Available and sufficient?
- Identify team members (resources) and stakeholders

Examples of Project Team Members and Stakeholders for clinical projects

- Physicians (owner)
- Clinic administrator
- Technologists/therapists
- Patients
- Equipment vendor
- Architects
- Installation engineers
- IT Staff
- Physicist

Physicists Roles

- Team Leader - overall responsibility
- Team member - responsible for specific project components
- Interested stakeholder

Project Phases

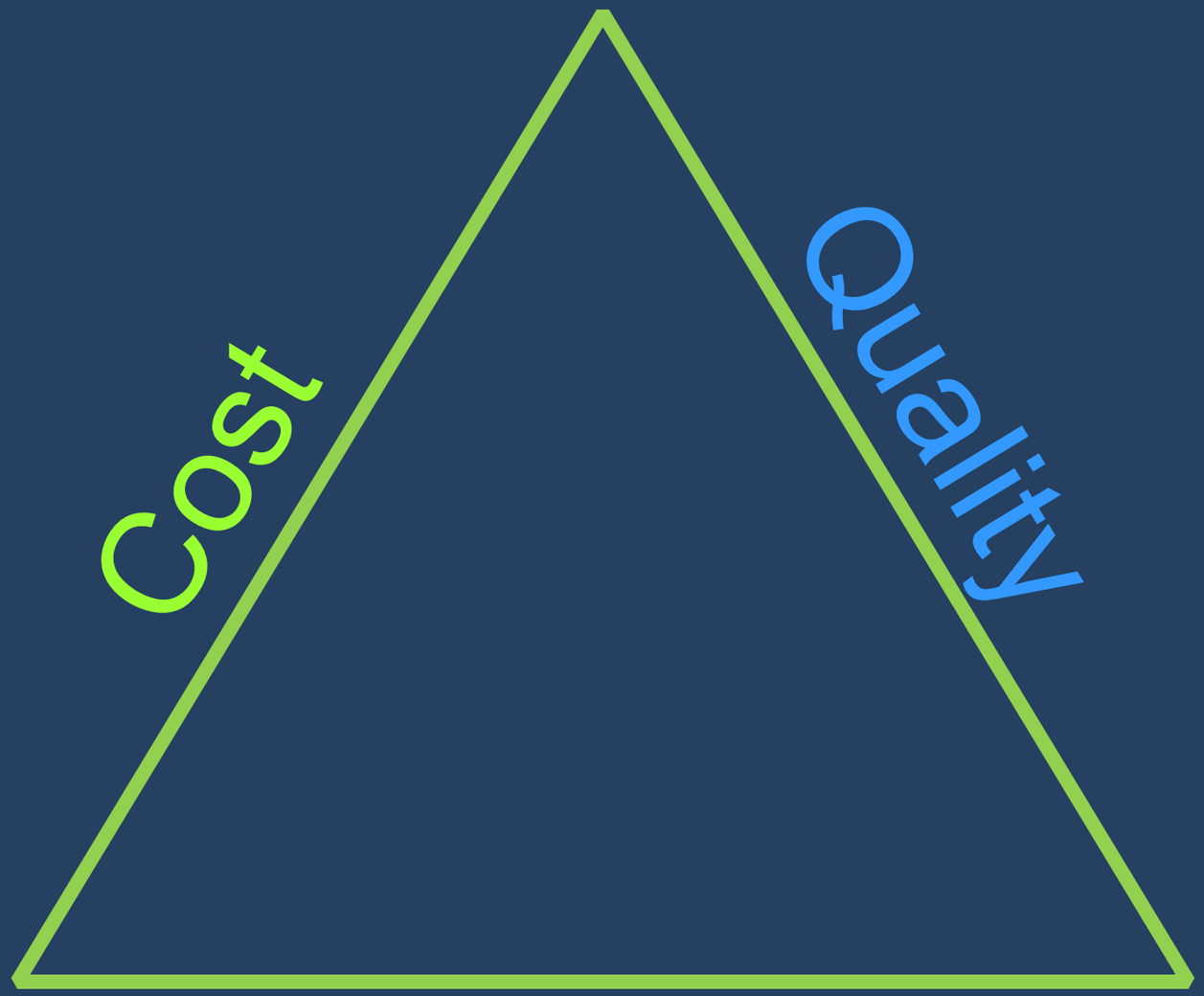
- Concept/Proposal
- Planning
- Design
- Installation
- Acceptance
- Commissioning
- Closeout

Concept

- ***Vision***
- Communicate and solicit input from stakeholders
- Clearly and specifically identify goal
- Requirements: Functional vs. Non-Functional

- ***Proposal***
- Constraints: Scope Triangle
- Design Budget & Time Frame

Scope Triangle



Planning

- Spend time on planning and design
- Map a path to completion (Project Plan)
- Original Plan may not be followed:
  - Provides an understanding of what needs to be done
  - Identifies potential problems and approach

Planning (cont’d)

- Decompose the project into discrete tasks
  - Every project is just a series of small tasks
- Project management tools

Project Plan

- Central reference for project
  - Ensures common expectations
- Highlights potentially ambiguous tasks
- Anticipates likely problems and strategies to avoid

Useful Elements of the Project Plan

- Goal
- Identify responsible individuals and contact info
- Costs and Budgeting
- Scheduling
  - Gantt Charts- help visualization- but is a tool for monitoring and evaluation
- Risk Management
  - review in project meetings, possible resolutions and alternatives
- Change Management
  - how are changes requested, who has authority to approve/reject, Documentation and distribution of decisions, implementation)
- Tracking, evaluated and record changes
- Document scope of acceptance testing

Review and Update of Project Plan

- Provides agenda for Project Review Meetings
- Evaluation and monitoring of project
- ID Tasks as complete/incomplete
  - not % complete
- Manages changes to a project

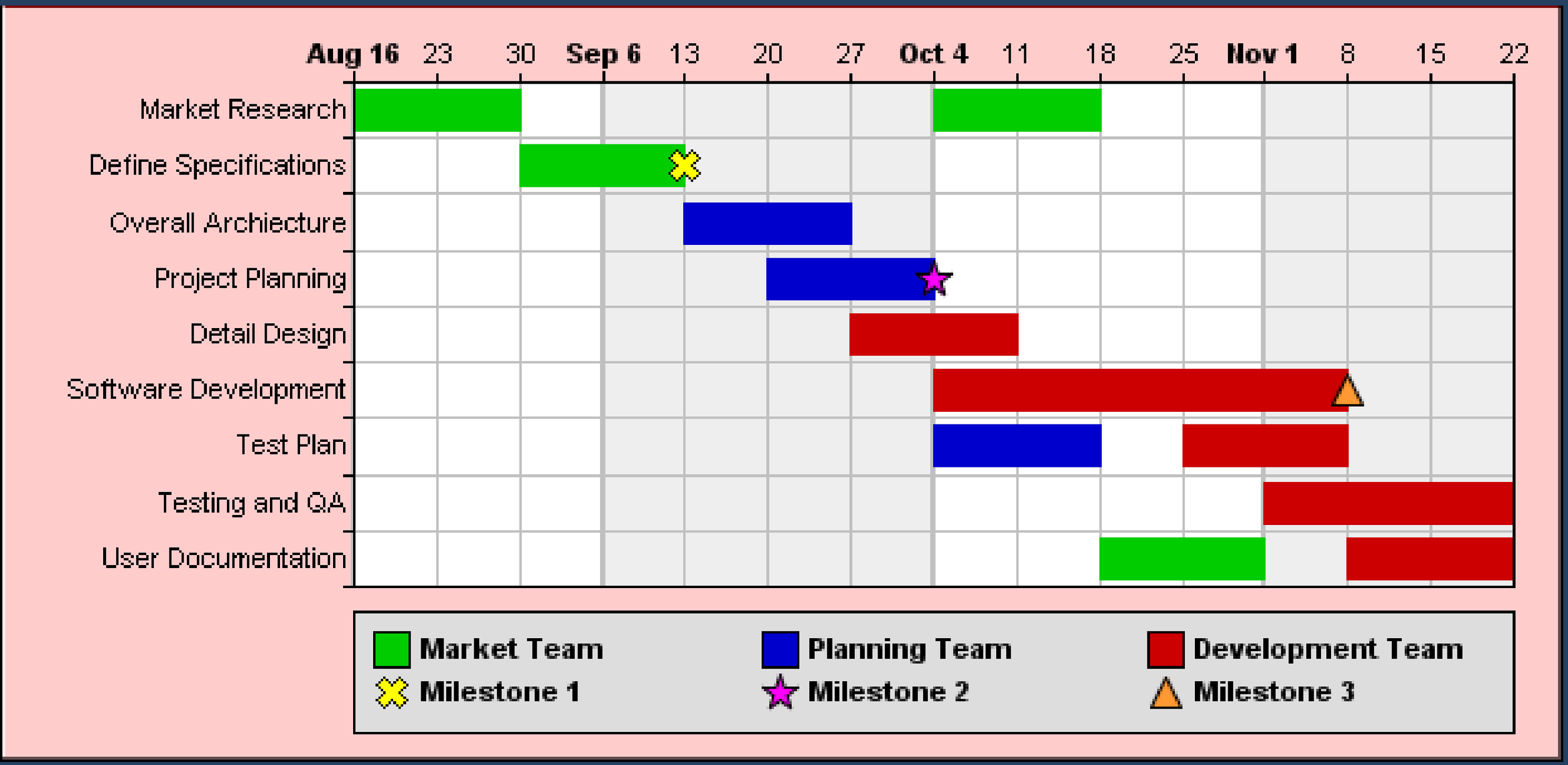
Review and Project Plan

- Provides agenda for Project Review Meetings
- Evaluation and monitoring of project
- ID Tasks as complete/incomplete (not % complete)
- Manages changes to a project

Project management software tools

- Gantt Charts
- Scheduling
- Notification
- Communication
  - Documents and Reports
- Track Costs

Gantt Chart


Aug 16
23
30
Sep 6
13
20
27
Oct 4
11
18
25
Nov 1
8
15
22
Market Research
Define Specifications
Overall Archiecture
Project Planning
Detail Design
Software Development
Test Plan
Testing and QA
User Documentation
Market Team
Planning Team
Development Team
Milestone 1
Milestone 2
Milestone 3

Utilization of software tools

- Usually provides opportunity for more detailed task planning and schedule layout
- Identify responsible individual for each task
- Outline scheduling of tasks and allotted time
- Tasks in the critical path
- Communicate to rest of the team
- Centralize updates and readily distribute to team members

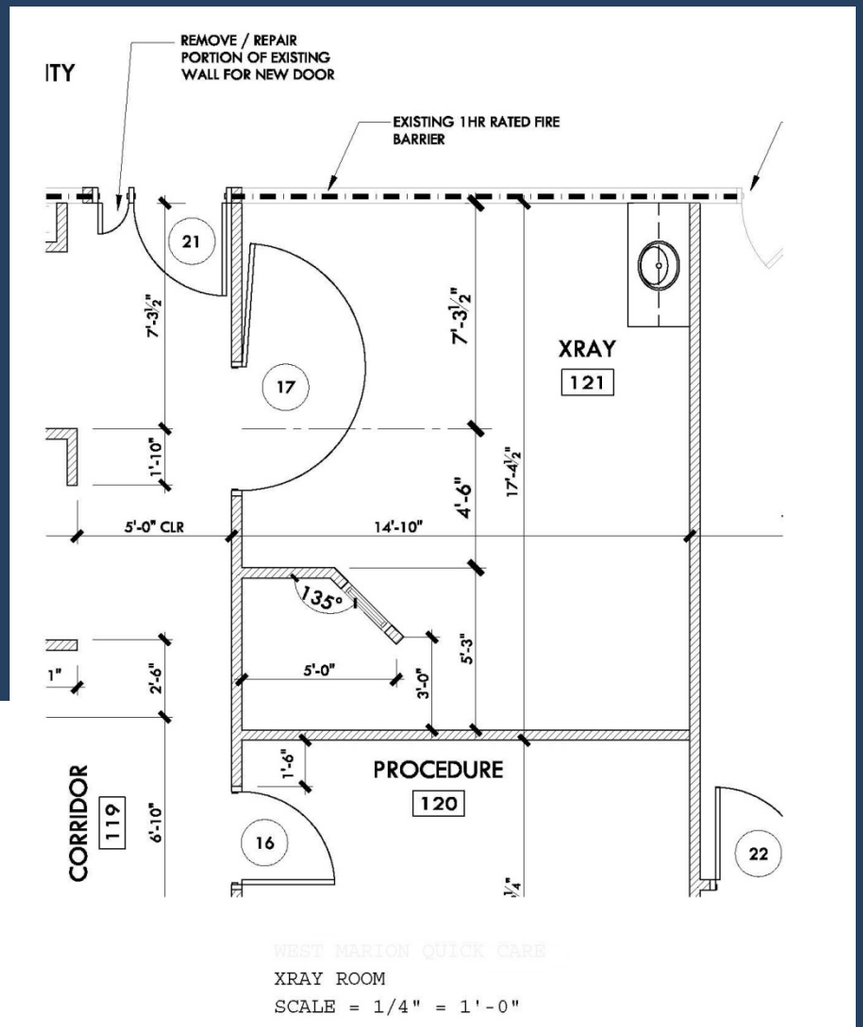
Project Management Software

Software	Collaborative software	Issue tracking system	Scheduling	Project Portfolio Management	Resource Management	Document Management	Workflow system	Reporting and Analyses
24SevenOffice	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5pm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AceProject	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Apollo	Yes	No	No	No	Yes	No	?	?
Assembla	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

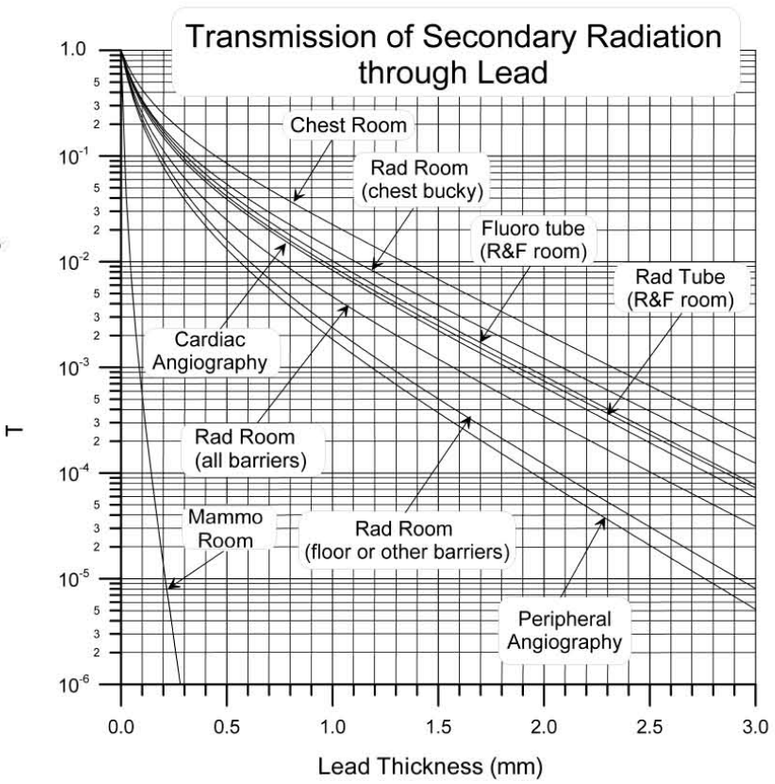
Review compares ~ 140 software packages

Design Phase

- Team coordination
- Changes
- Schedules
- Frozen design

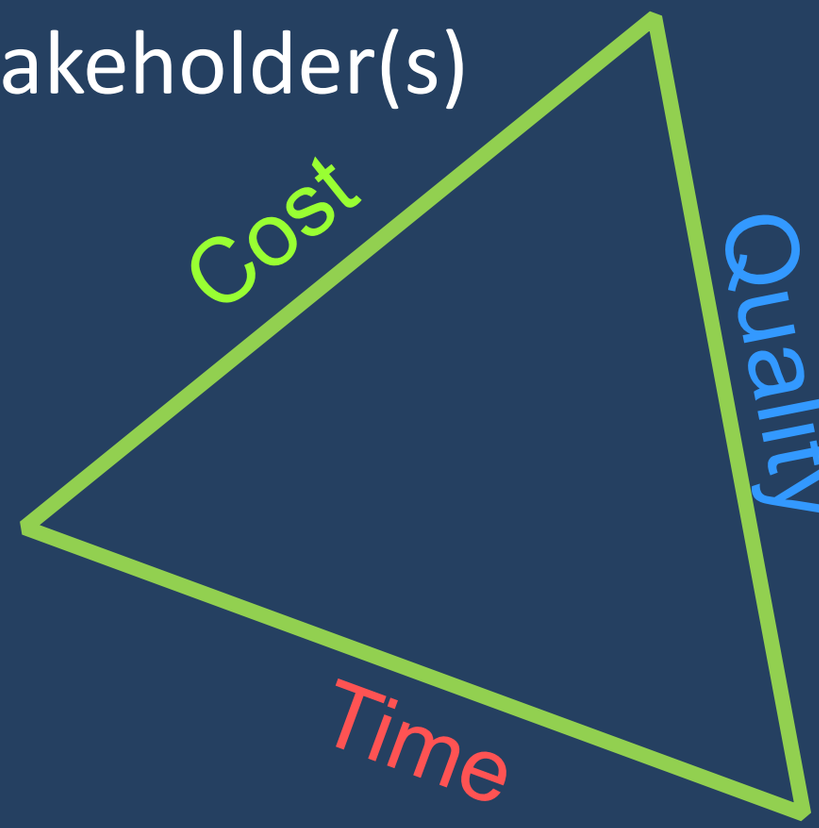


$$x_{\text{barrier}} = \frac{1}{\alpha\gamma} \ln \left[\frac{\left(\frac{N T K^{1}_{\text{sec}}}{P d^{2}_{\text{sec}}} \right)^{\gamma} + \frac{\beta}{\alpha}}{1 + \frac{\beta}{\alpha}} \right].$$



Changes

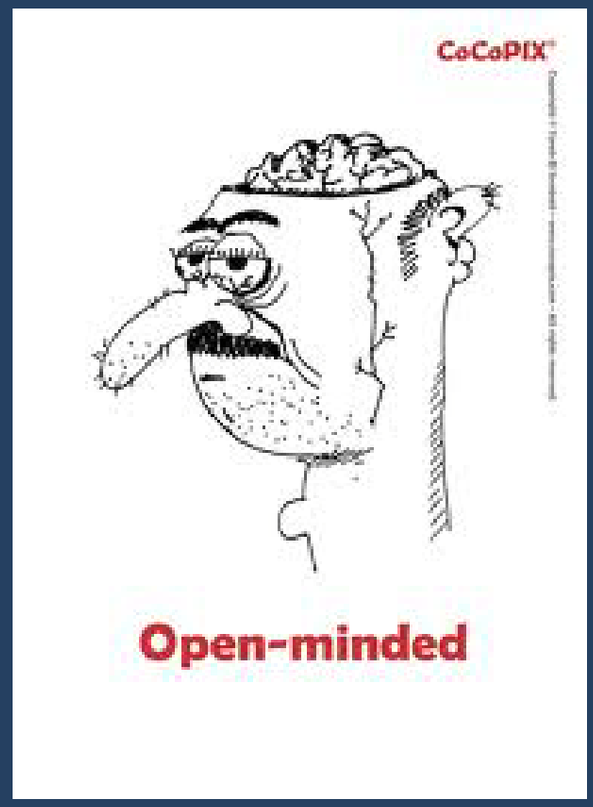
- Change happens
- Typically at request of stakeholder(s)
- Affects scope triangle



- Plan to filter unnecessary deviations (avoids scope creep)
- Flexibility to absorb necessary deviations

Approach to Changes

- Remain open minded and flexible
- Find the happy medium
- Stakeholders should be happy with end product
- Likely required negotiation (achieving a new win/win consensus)



Negotiations

- Achieve consensus while avoiding conflict
- Understand : options and proposals available
- Understand : what each party seeks
- Understand : what can be brought to the table and what can be conceded

Elements of successful negotiation

- Empathy
- Trust
- Contributions from all parties
- Consensus

The mediator sensed that the negotiations were in trouble.

Installation

- Verify, Inspect and Test
  - Component by component
  - Early and often

- Acceptance test in phases if possible

Monitoring Progress

Gantt Charts / Project Plan provide the schedule

Doesn't mean it will be followed

Schedule needs to be tracked "on-site" by responsible individual

Feedback to project management

Installation

- Acceptance testing
  - scope previously defined and agreed to by all parties
- Definition of Maintenance upgrades and schedules
- Training and Applications: scheduling and appropriate arrangements
- Documentation provided

Project delays

Unavoidable vs other types

Cost of delays

- Dollars and time (=$)

May result in renegotiation

Ripple effect

Ripple Effect

Likely results in further delays and costs

Resources may not be available at unscheduled times

Value of currency may change on international markets

Value of materials (I.e shielding materials) may change

On-Site Monitoring

Progress checks

Testing

Inspections - FL Agency for Health Care Administration

Building Codes

- Institutional, local, state

Testing

Acceptance - meet contractual requirements

Training - included in contract

Commissioning - Ready for patients

Close out documents

- Reports to document inspections
  - Completion of tasks
  - Completion of tests

- Billing and Receipts
  - Authorization and payment

Summary

- Infinitely many types of projects
- Variety of roles for physicist
  - Recognize role
  - Contribute to the team
- Take time to Plan!
- Be flexible
- Many tools available to assist with coordination