Project Management and Management Tools

Geography 176C
Thanks to: Sean Benison

What is Project Management?

- Framework and tools for planning, managing, and completing large-scale projects
- New professional field
- Bottom line: IT tools can apply to all stages of project management and improve it
Formal Description

- A way of thinking systematically about the behavior of people at work in an organizational setting
- A vocabulary of terms, concepts, theories, and methodologies that allow work experiences to be clearly analyzed, shared, and discussed
- Techniques for dealing with many of the problems that commonly occur in the work setting *(Springer 2006)*

Why It’s Important

- Tremendous growth in recent years
- Tools are increasingly used in businesses and organizations
- Measurable benefits
- New career possibilities
- Especially critical in large projects such as GIS
- Source and systems integration
History

- “Scientific” approach to industry and business in early 20th Century
  - Ford, Taylor, etc

- Advent of very large projects in Second World War
  - Realization that new management techniques were needed for such projects

Outcomes:

<table>
<thead>
<tr>
<th>WW2 Fighter Projects</th>
<th>P-51 Mustang</th>
<th>Outstanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-38 Lightning</td>
<td>Fairly Good</td>
<td></td>
</tr>
<tr>
<td>P-39 Airacobra</td>
<td>Poor</td>
<td></td>
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</tbody>
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History (2)

- Project management techniques developed in 1950s-1960s
  - Primarily military projects
- Increasing popularity in variety of businesses & organizations from 1980s-present
  - Creation of “Project Manager” as distinct occupation
  - Project Management Professional (PMP) and other certifications

Paradigm

- General systems theory (Bertalanffy 1936)
- Tools and diagrams formalized for GST
- Flow diagrams -> Programming
- Led to structuring of industry, e.g. vertical and horizontal
- Critical points
- JIT planning
- Also, complex systems theory
Basic Tools

- Organization
  - Project Lifecycle
  - Project Proposal
  - Work Breakdown Structure

- Scheduling and visualization
  - Gantt Chart
  - PERT
  - Critical Path Method

Organization Tools
Project Lifecycle

- Understanding and planning for entire lifespan of project
- Four basic stages
  - Initiation
  - Planning
  - Execution
  - Closure

Project Proposal

- Document outlining and arguing for proposed project
- Provides foundation for project planning
- Often in response to Request for Proposal (RFP)
  - Open or targeted call for proposed projects to address given need
Project Proposal (2)

- Typical components
  - Problem definition
  - Mission, goals, and scope
  - Stakeholders
  - Benefits
  - Resources needed (incl. budget)
  - Tasks and milestones (SOT)
  - Risks
  - Outcome/deliverables

Work Breakdown Structure

- Defines and organizes work elements of project
- Work broken down into set of major tasks
- Values assigned for portion of total work represented by each task
Scheduling and Visualization Tools

Gantt Chart

- Developed in 1917 by Henry Gantt as tool for managing factory production
- Depicts start times and lengths of major tasks (i.e. WBS)
- Can be used to monitor ongoing progress
Gantt Chart Example

- Blue bars show time periods for tasks
- Arrows depict dependencies
- Black inner lines and percentages show amount of progress

Program Evaluation & Review Technique (PERT)

- Developed in 1958 for Polaris missile program
- Used extensively in Cold War projects such as CORONA and SR-71
- Time estimates, scheduling, and interdependencies of WBS tasks
- Visualized in network model
PERT Network

- Illustration of WBS with time estimates
- Nodes = “milestones” (completion of major tasks)
- Arcs = “activities” (tasks) with required times

Critical Path Method (CPM)

- Similar to PERT (and developed at same time)
- Different emphases
  - “Critical path”: Longest set of tasks – determines overall time for project
  - “Crash” time estimates: Shortest time required in “emergency” situation
CPM Chart

- Time estimates given on nodes
  - Including crash times
- Critical path highlighted

Implications

- Project “Success” can be measured
- Can use customer satisfaction as the metric
- In business, can use sales
- In problem-solving, can establish metrics at each project phase
- Can tie goals to metrics
- BUT No Child Left Behind
Software

- Dozens of programs!
  - Commercial desktop
    - Microsoft Project
    - Primavera
  - Open source
    - dotProject
  - Web-based
    - eProject

Examples: Projette (add on to MS Project)
Example: Open Project

Some newer project methods

- Brainstorming
- Rapid prototyping
- Focus groups
- Scenario-based planning
- SWOT
- Red teaming
- Delphi methods
- Source code control systems
- Fault tolerant systems planning
First stage in project planning

- Define a project
- Set project objectives
- Identify data sources
- Discuss collective and individual responsibilities
- Set up a timeline
Conclusion

- Project Management provides a framework for planning large-scale projects
- Tools aid in organizing, scheduling, and visualizing required work
- Likely to encounter in your future career