Decision Analysis Overview

SMA-OV-WBT-112

v2.1

Developed by the Academy of Program/Project & Engineering Leadership (APPEL)
Decision Analysis Overview

Level 1 Course Map

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4. You are here

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8. STEP Level 1: What's Next?
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FINISH
Instructor Bio > Dr. John Chiorini

Dr. John R. Chiorini, is a senior member of the CSM technical staff responsible for system engineering and project management instruction and consulting with over 40 years of project experience. His most recent assignment is as the Program Manager for creation of a systems engineering certificate program between CSM and Stanford University. He has nineteen years experience as a classroom/workshop/seminar instructor and has facilitated over 300 seminars and workshops for various CSM clients including NASA, the CIA, NSA, and NASA. In addition to teaching in NASA’s Advanced Project Management curriculum for ten years, he also facilitated numerous mission project planning sessions and team builds for that agency. He has consulted in management process improvement with Northrop Grumman, Ball Aerospace, Lockheed Martin, Whirlpool Corporation, Colgate Palmolive, and GTE. He currently provides training support for CSM clients including among others: SAIC, BATC, NGST, and GD.
Objectives

At the completion of this course, the learner will be able to:

- Differentiate between Decision Making and Outcome
- Outline the decision making process
Main Menu

A transcript of the presentation appears on the following pages.
DECISION ANALYSIS

An Overview
Objectives

Upon completion of the course you will be able to:

– Differentiate between Decision Making and outcome
– Outline the Decision Making Process
Why Learn How to Make a Decision?

**The trite answer:** A Decision Analysis Process is a standard process within NPR-7123.1A

**The real answer:** The decisions you make on your job can affect:

- Personnel safety and survivability
- Mission success

*Space Shuttle Columbia leaps toward space on mission STS-107.*
A good decision is an alternative selection based on sound logic and relevant information and the selection is consistent with the decision-maker's preferences and ethics-based instincts.

A decision process provides guidance to achieving a logical selection.
Outcomes (Consequences)

A good decision can result in a good or bad outcome. A bad decision can result in a good or bad outcome.

Criticism of a good decision that resulted in a bad outcome is unjustified, but is common.
Decisions and Outcomes

- Decision makers control decision process and decisions
- Decision makers cannot control decision outcomes
- But...using a proven fact-based process will increase the probability of achieving the desired outcome
- Guessing is not a process
A Word About the Value of a Decision Making Process

- Most important decisions involve uncertainty
- Therefore, even application of a good process can lead to a bad outcome
  - Even the most proficient field-goal kicker misses occasionally
- However, use of a good fact-based process is the best insurance for achieving a desired outcome
  - Focuses the team on the critical issues
  - Makes sure all relevant information is considered
  - Minimizes emotion
What I’ll Summarize

✓ What Makes Decision Making at NASA So Difficult
✓ What About our NASA Culture (and Changing It)
✓ The Traps and Cognitive Biases
✓ The Process
What Makes NASA’s (and anyone else’s) Decisions Difficult?

**Uncertainty**
- Technical Unknowns

**Conflict**
- Disagreements among stakeholders

**Ambiguity**
- Key information is unclear

**Stress**
- Time pressure erodes analytic cognition

**High Stakes Consequences**
- Human life at risk

All within the Agency culture!
Historical Traps and Cognitive Biases to Good Decision Making

**Wishful Thinking**
- Hope is not a management tool!

**“Group Think”**
- “I hate conflict”

**“Status Quo” Bias**
- Ever heard “we’ve not had a problem yet”?

**“Overconfidence” Bias**
- “We’ve always been successful in the past”

**“Currency” Bias**
- We remember recent events and forget history

**“Confirming Evidence” Bias**
- “I’ve read smoking doesn’t really cause cancer!”

**“Anchoring” Bias**
- The first information we receive gets more weight

**“Sunk Cost” Bias**
- “But look at what we’ve already spent”
The Decision Making Process

Frame the Problem
- Define the Decision Question

Generate Alternatives
- Identify Criteria for Evaluation
- Identify Alternative Solutions

Evaluate Alternatives
- Select Evaluation Method & Tools
- Evaluate Alternative Solutions with respect to Criteria

Make a Choice

Test and Evaluate
- Evaluate Impact of Decision as Implemented
Define the Decision Question:

How you define a problem will largely determine how you will go about solving it.

Frame = Decision Context

A good solution to a well-framed problem is almost always smarter than an excellent solution to a poorly-posed one.

- Smart Choices, John Hammond
Generating Alternatives

“Alternatives are the raw material of decision-making”

- *Smart Choices* by Hammond, Keeney & Raiffa

After the problem has been framed correctly, ask:

“How can I/we obtain the desired outcome?”

- Challenge constraints – look at the problem from new angles
- Be creative, let process diverge
- Gather information, if necessary
- Withhold judgment until the evaluation phase
Some Examples of Techniques and Tools

- Decision Trees
- Decision Criteria
- Kepner-Tregoe Analysis
- Simplifying Decision Matrices
- Rating and Weighing
- Analytic Hierarchy Process
- Optimization Techniques
Make a Choice

Select recommended solution
- Based on analysis,
- Not directed by analysis

Document analysis process, alternatives
- Results and rationale

Use appropriate process for selection
- Consensus and other methods
- Team decision-making considerations
- Conflict resolution techniques
None of us can **predict** the future

A good process will not necessarily result in a good consequence

- Evaluate your process separately from outcome
- Assess outcome in the context of probability of occurrence
  - Be careful of Hindsight Bias
  - However, consistently bad outcomes may indicate a process problem!
Some Key Takeaways

- Think about your decision process before you dive into making a choice
- Take sufficient time to frame the decision problem
- Guard against decision traps and cognitive biases
- Generate sufficient alternatives
- Use analysis and intuition appropriately
- Evaluate your decision process to improve your decision making
Summary

The learner should now be able to:

- Differentiate between Decision Making and Outcome
- Outline the decision making process
Questions? Comments?

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The Help Desk will pass your inquiry on to the appropriate instructor or subject matter expert for their response. We’ll make every effort to get back to you in a timely manner.

Thank you.

STEP Development Team
You have completed the Decision Analysis Overview Course.

In order to receive credit within SATERN for completing this course, please click Complete.