Guesstimates to Estimates:

What can we do to get it right?

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Learning Objectives
for this Web Seminar

Clarify the use of some specific terms related to estimating

Identify some useful tools for estimating

Explore some concepts of good estimating
Definition:

**Estimate** (verb)

To form an approximate judgment or opinion regarding the worth, amount, size, weight, etc.
Estimating Concept

True estimates are based on historical data.
Estimating Concept

All estimates should be expressed as a range. The range associated with the estimate reflects our confidence level in the estimate.
Definition:

Quality  (noun)

The degree to which a set of inherent characteristics fulfills requirements.

PMBOK® Guide

“Fitness for use”
Which is value is a more accurate measure of the temperature?

78.634519°

or

77°
Definition:

**Accuracy** (noun)

The condition or quality of being true or correct; Freedom from error or defect.
Definition:

**Precision** (noun)

The state or quality of being strictly defined.

“minutely exact”

“something with no variation”
Estimating Concept

When making estimates we are not trying to be “precise” but we are trying to be “accurate”.
Definition:

Guess (verb)

To arrive at or commit oneself to an opinion about something without having sufficient evidence to support the opinion.
Definition:

**Guesstimate** (noun)

An estimate without substantial basis in facts or statistics.
Estimating Concept

A guess is a guess and should be acknowledged as such.
Definition:

**Exact** (adjective)

1. Strictly accurate or correct.
2. Precise, as opposed to approximate.
ROM (Rough Order of Magnitude)

Different in different industries.

Used when only high level information is available, detail levels have not yet been defined.

PMBOK® Guide, page 168 says:
+ or - 50%
ROM (Rough Order of Magnitude)

ROM Estimates should only be used to decide “IF” we want to take the next step.

The next step being a more detailed estimate, which will require effort and expense on our part to produce.
Definition:

Effort/Work Estimate

A measurement of the size or amount of work to be done.
Definition:

Effort/Work Estimate

We might read on a set of plans to build a home that there is an effort estimate of 600 hours of rough carpentry work to build the house described in this set of plans.
Definition:

**Duration Estimate**

An Effort or Work Estimate adjusted for resources.
Definition:

Duration Estimate

Duration = Effort/Resources

If there are 600 hours of rough carpentry work to build this house and we have two qualified carpenters, we would expect the “duration” estimate to be approximately 300 hours.
Definition:

**Definitive Estimate**

Most reliable or complete: Based on substantial historical data with the data tightly correlated around the mean of the data.
Definition:

**Probabilistic Estimate**

An estimate with a very large distribution in the range of values used to generate the estimate.
Probabilistic/Definitive Estimates

Large distribution in the range of the estimating data

Lots of closely correlated data

Probabilistic Estimates

Definitive Estimates
Techniques of Estimating

- Analogous Estimates
- Parametric Estimates
- Delphi Estimates
- Three Point Estimates
  - Triangular
  - PERT
Techniques of Estimating

Analogous Estimates

An estimating technique that uses the values of parameters, such as scope, cost, budget and duration or measures of scale such as size, weight and complexity from a previous similar activity or project as the basis for estimating the same parameter or measure for a future activity or project.
Techniques of Estimating

Parametric Estimates

An estimating technique that uses a statistical relationship between historical data and other variables to calculate an estimate for activity parameters, such as scope, cost, budget, and duration.
Techniques of Estimating

Delphi Estimates

An information gathering technique used as a way to reach a consensus of experts on a subject. (Time estimates, Cost Estimates, Risk Identification, etc.) The experts on the subject participate in this technique anonymously.
Delphi Estimates

John
Sharon
George
Delphi Estimates

John = $ 38,000

Sharon = $ 34,000

George = $ 18,000
Delphi Estimates

John = $38,000
    $28,000
    $28,000

Sharon = $34,000
    $29,000
    $29,000

George = $18,000
    $26,000
    $26,000
Techniques of Estimating

Three Point Estimates

Two types:

1. Triangular - Three Point Estimates
2. PERT - Three Point Estimates
Techniques of Estimating
Three Point Estimates

Triangular Estimates

\[ C_e = \frac{C_L + C_M + C_H}{3} \]
Techniques of Estimating
Three Point Estimates
PERT
Program Evaluation and Review Technique

\[ T_e = \frac{T_o + (4 \times T_{ml})}{+T_p} + \frac{6}{6} \]
Techniques of Estimating
Three Point Estimates

Standard Deviation Formula

\[
\frac{T_p - T_o}{6}
\]
Standard Deviation \( (\Sigma) \) = A measure of dispersion around some central point. Usually the MEAN.

<table>
<thead>
<tr>
<th>(\Sigma)</th>
<th>Value to seven decimals</th>
<th>Rounded</th>
</tr>
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<tr>
<td>1 (\Sigma)</td>
<td>68.2689492 %</td>
<td>68 %</td>
</tr>
<tr>
<td>2 (\Sigma)</td>
<td>95.4499736 %</td>
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<td>99.7300204 %</td>
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<td>5 (\Sigma)</td>
<td>99.999942 %</td>
<td></td>
</tr>
<tr>
<td>6 (\Sigma)</td>
<td>99.999999 %</td>
<td>Six Sigma</td>
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</tbody>
</table>
Techniques of Estimating

Normal Distribution

Normal Curve

Mean = 50/50
Techniques of Estimating

Normal Distribution

Normal Curve

Mean = 50/50

68%
Techniques of Estimating

Normal Distribution

Normal Curve

Mean = 50/50

68%

95%

-3s  -2s  -1s  +1s  +2s  +3s
Techniques of Estimating

Normal Distribution

Normal Curve

- Mean = 50/50
- 68% within ±1 standard deviation
- 95% within ±2 standard deviations
- 99% within ±3 standard deviations
Techniques of Estimating
Three Point Estimates (application)

Let’s say that we are trying to estimate the length (in days) that we think a specific task will take.

We consult with the individual that is expected to do the work as well as some other individuals that have done similar tasks in the past.
Techniques of Estimating
Three Point Estimates (application)

There seems to be a general consensus that the most likely number of days that it would take would be 22 days.

An optimistic estimate would be 16 days, and a reasonable pessimistic estimate would be 34 days.
Techniques of Estimating

Three Point Estimates (application)

\[ T_e = 16 + \frac{(4 \times T_{ml}) + T_p}{6} \]
Techniques of Estimating
Three Point Estimates (application)

\[ T_e = \frac{16 + (4 \times 22)}{6} + T_p \]
Techniques of Estimating
Three Point Estimates  (application)

\[ T_e = \frac{16 + (4 \times 22) + 34}{6} \]
Techniques of Estimating
Three Point Estimates (application)

\[ T_e = \frac{16 + (88) + 34}{6} \]
Techniques of Estimating
Three Point Estimates (application)

$$T_e = \frac{138}{6} = 23 \text{ days}$$
Techniques of Estimating
Three Point Estimates (application)

Standard Deviation = \( \frac{34 - 16}{6} = 3 \) days
Techniques of Estimating
Three Point Estimates (application)

PERT Estimate = 23 days
Standard Deviation = 3 days
Techniques of Estimating
Normal Distribution

Normal Curve

Mean = 23 days

One Standard Deviation
= 3 days

50/50 Chance
Techniques of Estimating Normal Distribution

Normal Curve

One Standard Deviation = 3 days

Mean = 23 days

-3 days = 20 days

+3 days = 26 days
Techniques of Estimating
Normal Distribution

Normal Curve

One Standard Deviation = 3 days

Mean = 23 days

- 3 days = 20 days
+ 3 days = 26 days

16/84 84/16
Techniques of Estimating
Normal Distribution

Normal Curve

Mean = 23 days

One Standard Deviation
= 3 days

-6 days = 17 days

+6 days = 29 days
Techniques of Estimating
Normal Distribution

Normal Curve

One Standard Deviation = 3 days

95%

Mean = 23 days

-6 days = 17 days

-3s

-2s

-1s

X

+1s

+2s

+3s

2/98

98/2

+6 days = 29 days
Techniques of Estimating Normal Distribution

One Standard Deviation = 3 days

Mean = 23 days

Almost 100% - 9 days = 14 days

Almost 100% + 9 days = 32 days
Techniques of Estimating

Three Point Estimates (application)

Let's consider two sets of PERT estimates

**Set 1:**
- Optimistic Estimate = 16 days
- Most likely Estimate = 22 days
- Pessimistic Estimate = 34 days

**Set 2:**
- Optimistic Estimate = 10 days
- Most likely Estimate = 22 days
- Pessimistic Estimate = 40 days

Press Estimate = 23 days
- Standard Deviation = 3 days

Press Estimate = 23 days
- Standard Deviation = 5 days
Techniques of Estimating

Three Point Estimates (application)

The standard deviation also serves as an expression of our confidence level in the estimates.

An estimate of 22 days with a standard deviation of 3 days provides us with a reasonably limited range of expectation for this estimate. In other words, we are pretty confident in this estimate.
Techniques of Estimating

Three Point Estimates (application)

HOWEVER!

An estimate of 23 days with a standard deviation of 5 days is an estimate that we are much less certain about.
The VALUE of the estimates

- Limited Range Estimates
- Wide Range Estimates

Quality of Historical Data

- Low
- High

Quantity of Historical Data

- Low
- High

The graph illustrates the relationship between the quality and quantity of historical data, showing how different combinations of these factors affect the value of the estimates.
Estimating Concept

Dempster’s Triangle

TIME

SCOPE

COST
Estimating
Concept

Dempster’s Triangle

You must estimate scope first, then time, and ONLY then can you estimate costs.
Estimating Concept

There are no facts about the future, there are only estimates.
Estimating Concept

Documentation (lessons learned) can provide great insight to assist us in becoming good estimators.
Rough Order of Magnitude

Is a **TYPE** of estimate

Please Note!

Delphi Technique
Parametric Model
Analogous
Three Point Estimates

Are **TECHNIQUES** of estimating
What we have discussed in this Web Seminar

Clarify the use of some specific terms

Work with some estimating tools

Explore some concepts of good estimating
Questions?

If you have questions for Richard, please submit them in the Q&A function at the bottom right hand side of your screen.

If we do not get to your question, they will be answered by Richard and posted to the ASPE-SDLC blog. You will receive a link to that blog post in the next few days, along with a copy of today’s slides and a link to the recording of today’s seminar.
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