Tools Supporting CMMI High Maturity for Small Organizations

Software Engineering Institute
Carnegie Mellon University
Pittsburgh, PA  15213

Robert W. Stoddard         September, 2008

Congreso Internacional en Ingeniería de Software y sus Aplicaciones
(International Congress of Software Engineering and its Applications)
Agenda

Why This Workshop?

Reminder of CMMI Process Performance Models and Baselines

Key Usage of Models and Baselines

Contrasting Large vs Small Organizational Settings:

- Origination of Models
- Staffing Model Development
- Method to Build Models
- Accessing Enough Data
- Data Collection and Storage

- Analytical Tool Choices by Topic
- Interpreting and Documenting Results
- Use in CAR Process Area
- Use in OID Process Area
- Importance of the DAR Process Area

Next Steps
**Why This Workshop?**

CMMI High Maturity Practices using process performance models and baselines have generally had more practice in large organizations and large projects.

However, there are appropriate and business-value added uses and approaches in small settings that should be discussed.

This workshop will provide the necessary insight to apply these CMMI High Maturity models and baselines including brief discussion on tools and techniques.
Caveat

The noted contrasts in this workshop are noted in general terms and are not absolute.

In fact, many of these contrasts may not exist for a given comparison of a large and small setting.

A small setting in this workshop refers to a project of 3-9 months and of 3-10 staff.
REMINDER OF CMMI PROCESS PERFORMANCE MODELS AND BASELINES
When and Why Do We Need Process Performance Models at the Project Level?
Process Performance Models View Processes Holistically

Processes may be thought of holistically as a system that includes the people, materials, energy, equipment, and procedures necessary to produce a product or service.
Healthy Ingredients of CMMI Process Performance Models

1. Statistical, probabilistic or simulation in nature

2. Predict interim and/or final project outcomes

3. Use controllable factors tied to sub-processes to conduct the prediction

4. Model the variation of factors and understand the predicted range or variation of the outcomes

5. Enable “what-if” analysis for project planning, dynamic re-planning and problem resolution during project execution

6. Connect “upstream” activity with “downstream” activity

7. Enable projects to achieve mid-course corrections to ensure project success
All Models (Qualitative and Quantitative)

Quantitative Models (Deterministic, Statistical, Probabilistic)

Statistical or Probabilistic Models

Interim outcomes predicted

Controllable x factors involved

Process Performance Model -
With controllable x factors tied to
Processes and/or Sub-processes

Anecdotal Biased samples

No uncertainty or variation modeled

Only final outcomes are modeled

Only uncontrollable factors are modeled

Only phases or lifecycles are modeled

© 2008 Carnegie Mellon University
KEY USAGE OF MODELS AND BASELINES
A Non-Exhaustive List of Model Uses

To predict outcomes during project planning and replanning

To predict outcomes during real-time project execution similar to a "what-if" mode

To predict outcomes related to a potential process improvement as an aid in deciding what improvement to make

To predict an expected outcome to be used to evaluate the effect of an implemented change

To screen improvement ideas without the need to pilot every idea in your setting before deciding to further pursue

To enable project managers to make mid-course corrections of projects headed for trouble

To statistically manage processes using prediction intervals from models
CONTRASTING LARGE VS SMALL ORGANIZATIONAL SETTINGS:

ORIGINATION OF MODELS
Origination of Models

Large Settings
- Inspiration for models comes primarily from Strategic Planning and annual Business Goal Setting
- Engineering Process Groups may also initiate models as needed
- Senior Technologists may initiate models to address product risk

Small Settings
- Inspiration for models derived from direct customer interactions and needs, and real-time business risks
- Generally a bottom-up approach with team review and usage
- Individuals may create personal models for their own use
Group Exercise #1
(10 minutes)

Within your group, share ideas on **what events would trigger** your small organization/project to build a process performance model

Record your group ideas on your group flip pad

Prepare to share 3-5 ideas with the audience at large
CONTRASTING LARGE VS SMALL ORGANIZATIONAL SETTINGS:

STAFFING MODEL
DEVELOPMENT
Staffing Model Development

Large Settings
- Dedicated individuals, if not entire teams, resourced to build models at request of Senior and Middle Managers
- Staff generally trained in model development via internal training curriculum
- Some experienced model builders hired externally

Small Settings
- Several or many members of project knowledgeable in basic modeling
- Generally, a bottom-up approach with team review and usage
- Staff receive training externally
- Occasionally, a temporary contractor may be hired
Group Exercise #2  
(10 minutes)

Within your group, share ideas on **staffing approaches** that your small organization/project would most likely use to build a process performance model.

Record your group ideas on your group flip pad.

Prepare to share 3-5 ideas with the audience at large.
CONTRASTING LARGE VS SMALL ORGANIZATIONAL SETTINGS:

METHOD TO BUILD MODELS
Core Steps of Model Development

1. Identify business need or risk that demands a process performance model
2. Identify model build team
3. Identify performance outcome "y"
4. Identify the initial set of plausible "x" factors that influence the outcome "y" using basic root cause analysis
5. Collect historical or real-time samples of data
6. Ensure data quality and acceptably low measurement error
7. Construct performance baselines for all "y's" and "x's"
8. Determine data types and select proper analytical methods
9. Develop a regression equation, probabilistic model or simulation
10. Sanity test the model
11. Develop predictions and act!
12. Update models as needed
Method to Build Models

Large Settings
- Generally, process improvement teams follow a structured process, similar to Six Sigma DMAIC, to develop the models.
- Model development passes thru management review gates to ensure a successful model.

Small Settings
- A streamlined process for model development is followed.
- The process may be quite informal and executed by a single person.
- Generally takes less time.
- Generally, possesses less documentation as the author is the only user.
Group Exercise #3
(10 minutes)

Within your group, share experiences that you have in **building prediction models** in your small organizational/project settings. Briefly share your approach disregarding how informal it might have been.

Record your group experiences on your group flip pad

Prepare to share with the audience at large
Accessing Enough Data

**Large Settings**
- Large amounts of historical data sitting around possibly not being used
- Requests for new data fields very difficult as organization has a bureaucratic process to handle new requests
- The organization is reluctant to change data fields

**Small Settings**
- Normally very little historical data
- Historical data unique and dependent to individuals
- Normally real-time sampling of data occurs
- Easy to collect new fields with almost no approval
- May need to collect data across projects
Group Exercise #4  
(10 minutes)

Within your group, share ideas on **how you have accessed measurement data** in your small organizational/project settings and what you have done when you did not have enough data points from the current project.

Record your group ideas on your group flip pad.

Prepare to share 3-5 ideas with the audience at large.
CONTRASTING LARGE VS SMALL ORGANIZATIONAL SETTINGS:

DATA COLLECTION AND STORAGE
Data Collection and Storage

Large Settings

- Data collected from massive workflow automation systems
- Data automatically shared across databases with highly centralized databases accessible to model builders
- Mature data entry screens catching input errors

Small Settings

- Paper records
- Excel spreadsheets, possibly shared on a network drive
- Data manually collected by many, if not most, project members
- Variability in data format, integrity, quality, timeliness
Group Exercise #5
(10 minutes)

Within your group, share experiences you have with **data collection and storage issues** in your small organizational/project setting. Describe the actions you took to prevent or mitigate these issues.

Record your group ideas on your group flip pad

Prepare to share 3-5 ideas with the audience at large
CONTRASTING LARGE VS SMALL ORGANIZATIONAL SETTINGS:

ANALYTICAL TOOL CHOICES

BY TYPE
Analytical Tool Choices by Type

Large Settings
- Expensive, network shared, possibly enterprise-wide analytical tools
- Purchased on a volume discount sometimes reaching 1% of normal license fees
- Conflict exists as the organization mandates a standard tool to use

Small Settings
- Individual licenses pursued if fit in the budget
- Desire to find freeware if possible
- Excel platform desired
- Single licenses of expensive tools shared among team with default user
- Variety of tools in use
Developing Correlation and Regression Models

Continuous

Y

Discrete

Discrete

ANOVA & Dummy Variable Regression

Chi-Square & Logistic Regression

Correlation & Simple Regression

Logistic Regression

X

Continuous

Software Engineering Institute | Carnegie Mellon

Tools Supporting CMMI High Maturity for Small Organizations
Robert W. Stoddard II
September, 2008
© 2008 Carnegie Mellon University
Example Tool Choices Follow

The following slides depict example tools by analytical method.

This is not an endorsement by the SEI for any particular tool, but rather is meant to stimulate awareness and investigation into tools that can make these methods practical

A wide variety of commercially-available tools now exist and you should conduct a thorough investigation before deciding on a solution

Recognize that CMMI High Maturity organizations will leverage the concepts of the DAR Process Area to decide on an appropriate solution for their organization
Statistical Package Tools – Examples

Address: [http://www.minitab.com/](http://www.minitab.com/)

Minitab

Address: [http://www.sigmaxl.com/](http://www.sigmaxl.com/)

SigmaXL

A Leading Provider of User Friendly Excel Add-Ins for Statistical and Graphical Analysis

Address: [http://www.jmp.com/](http://www.jmp.com/)

JMP

Address: [http://www.qimacros.com/](http://www.qimacros.com/)

Lean Six Sigma Software Resources
Statistics Software on the Internet

Statistical software listed by the American Statistical Association (No endorsements; listings only)

http://www.amstat.org/profession/index.cfm?fuseaction=software

CMU Statlib: data, software and news from the statistics community

http://lib.stat.cmu.edu/lib.stat.cmu.edu/

Free statistical software (no endorsements)

http://statpages.org/javasta2.html
Where to Get Statistics Help on the Internet

Electronic Statistics Textbook
http://www.statsoftinc.com/textbook/stathome.html

WWW Virtual Library of Statistics
http://www.stat.ufl.edu/vlib/statistics.html

Online Introductory Statistics Textbook
http://davidmlane.com/hyperstat/

The Little Handbook of Statistical Practice
http://www.tufts.edu/%7Egdallal/LHSP.HTM

A New View of Statistics
http://www.sportsci.org/resource/stats/index.html

American Statistical Association
http://www.amstat.org/index.cfm?fuseaction=main

NIST/SEMATECH e-Handbook of Statistical Methods
http://www.itl.nist.gov/div898/handbook/
Monte Carlo Simulation Tools – Examples

@RISK
The world's most powerful risk analysis tool. Take into account all possible scenarios using Monte Carlo simulation. Work directly in Excel, create presentation-quality graphs, use distribution fitting, and more!

@RISK for Project
Analyze cost and schedule risks in Microsoft Project using Monte Carlo simulation.
• STANDARD
• PROFESSIONAL
Discrete Event Simulation Tools – Examples

http://www.processmodel.com

http://www.savvion.com
Probabilistic Modeling Tools – Examples

“AGENARISK”  [URL: http://www.agena.co.uk/]

“NETICA”  [URL: http://www.norsys.com/]

“HUGIN”  [URL: http://www.hugin.com/]

Tools Supporting CMMI High Maturity for Small Organizations
Robert W. Stoddard II
September, 2008
© 2008 Carnegie Mellon University
Reliability Growth Modeling Tool – Example

http://www.openchannelfoundation.org/projects/CASRE_3.0/

CASRE 3.0

Computer Aided Software, Version 3

CASRE (Computer Aided Software Reliability Estimation) was developed as a software reliability measurement tool that is easier for nonspecialists in software reliability engineering to use than many other currently-available tools. CASRE incorporates the mathematical modeling capabilities of the public domain tool SMERFS (Statistical Modeling and Estimation of Reliability Functions for Software), and runs in a Microsoft Windows environment.

The command interface is menu driven; enabling and disabling of menu options guides users through the selection of a set of failure data, execution of a model, and analysis of model results. Input to the models is simultaneously displayed as text and as a high-resolution display that can be controlled to let users view the data in several different ways (e.g., time between successive failures, cumulative number of failures). Model predictions and statistical evaluations of a model’s applicability (e.g., sequential likelihood ratio, model bias, bias trend) may be superimposed on the plot of the data used as input to the model. CASRE also incorporates earlier findings - that prediction accuracy may be increased by combining the results of several models in a linear fashion. Users can define their own model combinations, store them as part of the tool’s configuration, and execute them in the same way as any other model.
Group Exercise #6
(10 minutes)

Within your group, share notes on **what analytical tools are used or would most likely be used** in your small organizational/project setting.

Record your group ideas on your group flip pad.

Prepare to share 3-5 ideas with the audience at large.
CONTRASTING LARGE VS SMALL ORGANIZATIONAL SETTINGS:

INTERPRETING AND DOCUMENTING RESULTS
### Measures vs Score

<table>
<thead>
<tr>
<th>Measures</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution Time of Technical Inquiries</td>
<td>☢️</td>
</tr>
<tr>
<td>Requirements Volatility</td>
<td>🍔</td>
</tr>
<tr>
<td>Staff Turnover</td>
<td>🍓</td>
</tr>
<tr>
<td>Average Domain Experience of team</td>
<td>🍓</td>
</tr>
<tr>
<td>Complexity Values of the Architecture</td>
<td>🍓</td>
</tr>
<tr>
<td>Instability of key interfaces</td>
<td>🍓</td>
</tr>
<tr>
<td>Code Coupling and Cohesion</td>
<td>🍓</td>
</tr>
<tr>
<td>Degree of Testable Requirements</td>
<td>🍓</td>
</tr>
<tr>
<td>Stability of Test Environment</td>
<td>⚡️</td>
</tr>
<tr>
<td>Brittliness of Software</td>
<td>⚡️</td>
</tr>
</tbody>
</table>

Having only these lagging Indicators is less effective than…

Having these additional leading Indicators!
A Second Comparison

Traditional management review would conclude that corrective action is needed…

while management in High Maturity organizations understand that corrective action is not needed!
Analyzing Customer Survey Data

Traditional analysis reacts to any perceived differences in average percentage results…

while management in High Maturity organizations understands that only statistically significant differences matter!

These are 95% Confidence Intervals of the Central Tendency!
Details of the Requirements Phase PPM

The outcome, Y, is the predicted number of Requirements defects for a given feature team.

The x factors used to predict the Requirements defects are:

- x1: Req’ts Volatility (continuous data)
- x2: Risk of Incomplete Req’ts (nominal data)
- x3: Risk of Ambiguous Req’ts (nominal data)
- x4: Risk of Non-Testable Req’ts (nominal data)
- x5: Risk of Late Req’ts (nominal data)
Development of the Req’ts Phase PPM

\[
\text{Prediction Expression} = 7.5937439072846 + 32.8600305113136 \times \text{Volatility} \\
+ \text{Match(Risk of Incompleteness)} \begin{cases} 
0 \Rightarrow -0.2406507338728 \\
1 \Rightarrow 0.24065073387281 \\
\text{else} \Rightarrow .
\end{cases} \\
+ \text{Match(Risk of Ambiguity)} \begin{cases} 
0 \Rightarrow -0.0312842155195 \\
1 \Rightarrow 0.03128421551947 \\
\text{else} \Rightarrow .
\end{cases} \\
+ \text{Match(Risk of Non Testability)} \begin{cases} 
0 \Rightarrow 0.00179694498247 \\
1 \Rightarrow -0.0017969449825 \\
\text{else} \Rightarrow .
\end{cases} \\
+ \text{Match(Risk of Late Reqs)} \begin{cases} 
0 \Rightarrow -0.107577311748 \\
1 \Rightarrow 0.10757731174804 \\
\text{else} \Rightarrow .
\end{cases} \\
+ \text{Match(Risk of Unsafe Reqs)} \begin{cases} 
0 \Rightarrow 0.16470472563596 \\
1 \Rightarrow -0.164704725636 \\
\text{else} \Rightarrow .
\end{cases}
\]
Details of the Software Brittleness PPM

The outcome, $Y$, is the measure of software brittleness, measured on an arbitrary scale of 0 (low) to 100 (high), which will be treated as continuous data.

The x factors used in this prediction example are the following:

- Unit path complexity
- Unit data complexity
- Number of times the unit code files have been changed
- Number of unit code changes not represented in Design document updates
Development of the Brittleness PPM

Regression Analysis: Britteness versus PathComplexi, NumOfFileCha, ...

The regression equation is

$$\text{Britteness} = 6.62 + 0.793 \times \text{PathComplexity} + 0.743 \times \text{NumOfFileChanges}$$
$$\quad + 5.04 \times \text{NumChangesNotDocumented}$$

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>SE Coef</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>6.6168</td>
<td>0.4192</td>
<td>15.78</td>
<td>0.000</td>
</tr>
<tr>
<td>PathComplexity</td>
<td>0.79281</td>
<td>0.01173</td>
<td>67.58</td>
<td>0.000</td>
</tr>
<tr>
<td>NumOfFileChanges</td>
<td>0.74298</td>
<td>0.01197</td>
<td>62.07</td>
<td>0.000</td>
</tr>
<tr>
<td>NumChangesNotDocumented</td>
<td>5.04283</td>
<td>0.04320</td>
<td>116.75</td>
<td>0.000</td>
</tr>
</tbody>
</table>

$$S = 2.99998 \quad \text{R-Sq} = 69.0\% \quad \text{R-Sq(adj)} = 69.0\%$$
Details of the System Testing PPM

The outcome, \( Y \), is the relative likelihood of occurrence of the different standard defect types (e.g. nominal categories such as: logical, data, and algorithmic)

The \( x \) factor used in this prediction example is a measure of staff turnover of the feature development team prior to System Test (e.g. continuous data as a percentage)

This \( x \) factor was chosen because it historically surfaced as a significant factor in explaining types of defects found in System Test.
Development of the System Test PPM
### Escaped Defect Analysis Matrix

<table>
<thead>
<tr>
<th>Phase Injected</th>
<th>All numbers per IMSLOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reqs Activity</td>
<td>Requirements Test 500</td>
</tr>
<tr>
<td>Design Activity</td>
<td>Design Test 2000</td>
</tr>
<tr>
<td>Code Activity</td>
<td>Code Test 3000</td>
</tr>
<tr>
<td>Integration</td>
<td>Integration Test 300</td>
</tr>
<tr>
<td>System Test</td>
<td>System Test 1000</td>
</tr>
<tr>
<td>User Test</td>
<td>User Test 100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase Found</th>
<th>Total Injection Rate</th>
<th>Escape Rate by Activity</th>
<th>Activity Injection Rate</th>
<th>Escape Rate by All Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>830</td>
<td>330</td>
<td>7%</td>
<td>40%</td>
</tr>
<tr>
<td>System Test</td>
<td>4200</td>
<td>2200</td>
<td>36%</td>
<td>52%</td>
</tr>
<tr>
<td>User Test</td>
<td>6340</td>
<td>2540</td>
<td>54%</td>
<td>40%</td>
</tr>
</tbody>
</table>

- **Phase Containment Rate**:
  - Reqts Activity: 500
  - Design Activity: 2080
  - Code Activity: 4110
  - Integration: 3560
  - System Test: 1300
  - User Test: 280

- **Screening Rate**:
  - Reqts Activity: 500
  - Design Activity: 2000
  - Code Activity: 3800
  - Integration: 300
  - System Test: 100
  - User Test: 5

- **Phase Containment Rate %**:
  - Reqts Activity: 60%
  - Design Activity: 46%
  - Code Activity: 47%
  - Integration: 71%
  - System Test: 83%
  - User Test: 100%

- **Screening Rate %**:
  - Reqts Activity: 60%
  - Design Activity: 48%
  - Code Activity: 60%
  - Integration: 85%
  - System Test: 100%
  - User Test: 100%

**For defects not caught in phase originally injected, this is the average number of times they escaped a phase**, 1.8

<table>
<thead>
<tr>
<th>Activity Injection Rate</th>
<th>Escape Rate by All Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>0%</td>
</tr>
</tbody>
</table>

5125/9210 = 43% of all defects escaped at least one phase
We are 95% confident that no more than 61% of Design defects will escape the Design activity.
Predicting Customer Satisfaction

Y = Customer Satisfaction Scores

Possible x factors that may be used in Multiple Regression to predict Y:
- Attributes of Customer including power user vs casual user
- Degree of “delighters” vs “satisfiers” vs “must-be” product features
- Timeliness in reaching the market window
- Price
- Time for competitors to catch up
- Economy
- Product return policy
- Customer service record
Recruiting Critical Resources

Y = Probability of Hiring a Critical Resource

Possible x factors that may be used in Multiple Regression to predict Y:

Availability of Critical Expertise in the local area
Salary willing to offer candidates
Other benefits including signing bonus
Career path available to new hires
Amount of professional development provided to employees
Retirement package
Profit sharing package
Vacation available to new employees
Retaining Critical Resources

$Y = \text{Probability of Retaining a Critical Resource}$

Possible $x$ factors that may be used in Multiple Regression to predict $Y$:

- Salary increases available to employees
- Career path available to employees
- Amount of professional development provided to employees
- Retirement package
- Profit sharing package
- Vacation available to new employees
- Mobility within the organization
- Degree of agile teaming employed vs bureaucracy of organization
Predicting Uncertain Schedules with Confidence - 1

<table>
<thead>
<tr>
<th>Process</th>
<th>Durations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step</td>
<td>Expected</td>
</tr>
<tr>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>90</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>8</td>
<td>45</td>
</tr>
<tr>
<td>9</td>
<td>70</td>
</tr>
<tr>
<td>10</td>
<td>25</td>
</tr>
</tbody>
</table>

What would you forecast the schedule duration to be?
Predicting Uncertain Schedules with Confidence - 2

<table>
<thead>
<tr>
<th>Process</th>
<th>Durations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>72</td>
</tr>
<tr>
<td>4</td>
<td>45</td>
</tr>
<tr>
<td>5</td>
<td>81</td>
</tr>
<tr>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>7</td>
<td>32</td>
</tr>
<tr>
<td>8</td>
<td>41</td>
</tr>
<tr>
<td>9</td>
<td>63</td>
</tr>
<tr>
<td>10</td>
<td>23</td>
</tr>
</tbody>
</table>

Would you change your mind in the face of unbalanced risk?
Monte Carlo Simulation enables Confidence in Schedules!

Almost guaranteed to miss the 500 days duration 100% of the time!

With 90% confidence, we will be under 817 days duration!
With this approach, you can conclude the remaining test time required (88 days) and latent defects to be delivered to the customer if you delivered today (120 defects).
Interpreting and Documenting Results

Large Settings
- Dedicated users of models author formal reports on the results and conclusions
- White papers and other internal publications may be used
- Reporting templates are used to ensure stability as different people assume the key user role

Small Settings
- Notes are recorded in the journal or notepad of the statistical package
- Callouts on powerpoint slides summarize the conclusion and action
- Meeting minutes document the interpretation, conclusions and actions
- Individual personal notes
Group Exercise #7
(10 minutes)

Within your group, compare notes on how interpretation and documentation of results of model usage would occur in your small organizational/project settings.

Record your notes on your group flip pad

Prepare to share 3-5 notes with the audience at large
Use in CAR Process Area

Large Settings
• Predictions are made and if unacceptable, CAR may be initiated by team
• Prediction intervals are established and serve as early warning indicators; if actual performance is outside of the interval, CAR may be initiated by team

Small Settings
• Individuals view the results of their predictions and act immediately
• Some actions may be communicated to rest of team
• Individuals more readily have insight to what is going on when reacting to model results
Group Exercise #8  
(10 minutes)

Within your group, share ideas on how you would **envision corrective action being initiated based on the results of process performance models** in your small organizational/project settings. Would individuals be able to act immediately in an empowered fashion?

Record your group ideas on your group flip pad

Prepare to share 3-5 ideas with the audience at large
CONTRASTING LARGE VS SMALL ORGANIZATIONAL SETTINGS:

USE IN OID PROCESS AREA
Use in OID Process Area

**Large Settings**
- Enterprise systems established to collect and analyze innovative improvement ideas
- Standard organizational process performance models used to screen ideas
- Models used to generate ideas for improvement

**Small Settings**
- Individuals with complete domain knowledge
- Subjective real-time assertions of innovative improvements
- Models primarily serve to add confidence, or to handle completely new situations
- Dynamic models can predict new performance

Tools Supporting CMMI High Maturity for Small Organizations
Robert W. Stoddard II
September, 2008
© 2008 Carnegie Mellon University
Group Exercise #9
(10 minutes)

Within your group, share ideas on how innovative new process or tool technology ideas are surfaced, analyzed and selected in your small organizational/project setting.

Do you just go by word of mouth recommendation or do you seek some type of analysis before choosing a solution?

Record your group ideas on your group flip pad

Prepare to share 3-5 ideas with the audience at large
CONTRASTING LARGE VS SMALL ORGANIZATIONAL SETTINGS:

IMPORTANCE OF THE DAR PROCESS AREA
Importance of the DAR Criteria

Large Settings
• DAR criteria needed to ensure a large number of model builders, analysts, users of statistical management charts and model results are consistent and to avoid confusion
• DAR needed to guide different org segments in choosing models, etc…

Small Settings
• DAR criteria primarily needed to guide individuals on when to use more formal modeling approaches, and when to inform others of the results
• DAR criteria needed also for segmenting projects as they collectively use each other's data fields
Group Exercise #10
(10 minutes)

Within your group, share ideas on how you would need to segment your projects so that similar groups of projects could share data and modeling results in your small organizational/project setting.

Record your group ideas on your group flip pad.

Prepare to share 3-5 ideas with the audience at large.
NEXT STEPS
Next Steps from a Tools and Method Standpoint

- Identify your business and project goals including key customer drivers
- Decide where the greatest risk and uncertainty is in the business
- Assess the culture and current background of the project members
- Conduct a cost/benefit analysis of which tools addressing which issues
- Start small and let internal success and experience motivate wider adoption
- Empower individuals to assess what tools they need and can afford to use from a time and learning curve standpoint
- Don't let the tools become the end! They are the means to superior performance!
Robert W. Stoddard II  
Senior Member of Technical Staff  
Software Engineering Measurement and Analysis (SEMA)  
SEI, Carnegie Mellon University  
Motorola-Certified Six Sigma Master Black Belt  
ASQ Certified Six Sigma Black Belt  
[Email] rws@sei.cmu.edu  
[Phone] (412) 268-1121