COQUALMO and Defect Prevention

Moderator/Scribe: Sunita Chulani (IBM/USC) / Keun Lee (USC)
Participants:
Alex Krenetsky (Lockheed Martin)
Spencer Peterson (Northrum Grumman ESSS)
Dick Stutzke (SAIC)
Nancy Eickelmann (Motorola)
Peter Hantos (Xerox)
Steve Lucks (ACSC - AAA)
George Huling (Consultant)
Floating Participant: Barry Boehm (USC)

Outline

- Brainstorming session
- Identifying issues/research topics
- Prioritizing research topics
Brainstorming

A. COQUALMO + ODC
   A1. Legacy classification
       Translating to ODC causes ramp-up delays => Automate
   A2. Definition and standard of "defect"

B. PSP
   Drive defects out before testing. Difficult to maintain PSP data

C. Peer reviews

D. Defect prevention
   Why wait to remove when we can prevent?
   JAD sessions; IDEF modeling
   Sponsor +User interactions at Reqs gathering
   Paradigm shift to move left
   Get QA involved early (maybe even at Reqs. Gathering?)
   D1. Basili’s data
       80:20 rule: Characteristics/differentiators
       Basili/Selby’s data did some of this?
       CoQUALMO + Risk Mgmt (Madachy) + Basili/Selby work – sensitivity analysis
Brainstorming

E. Add more drivers that impact composite "Quality Cost Driver"
- looping back to COCOMO II definitely
- how above feeding back to CORADMO and COPSEMO?

F. COCOMO Integratable (Harmonized)
Unified SUITE – decoupled

G. Microsoft has BUGS but has CONTROL

Brainstorming

H. DI/P/R Tree
Effectiveness (% removed) v/s efficiency (time, effort)
Which activities remove which defects
Cost v/s activity for DP/R
Rework

I. Late-stage
Problem is getting early stage data
Brainstorming

J. Validate Architecture – centric development has better quality?
What is the distribution of defects?
Can we have a parametric model?

K. Is CoQUALMO – RAD different from CoQUALMO-COCOMO
   is it life cycle dependent?

Brainstorming

Original COCOMO Cost Drivers

<table>
<thead>
<tr>
<th>Quality</th>
<th>Schedule</th>
<th>EFFORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>size</td>
<td>COCOMO</td>
<td>“Quality Cost Drivers”</td>
</tr>
</tbody>
</table>

7
Brainstorming
COQUALMO OUTPUT

<table>
<thead>
<tr>
<th>RECOVERED DEFECT TYPE</th>
<th>LCO</th>
<th>LCA</th>
<th>CDR</th>
<th>IOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algorithm (Reqs.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface (Design)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Initialization (Coding)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE Code Classification Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Identifying Issues/Research Topics

1. Defect Classification (A)
2. Defect Introduction/Prevention/Removal Tree (H)
3. Determine knobs (attributes) that relate to tree (E)
4. Data Collection
5. Parametric Modeling; Distribution of defects =>
   COQUALMO+Risk Mgmt (Madachy)+Basili/
   Selby data analysis+sensitivity analysis (D)
6. Integratable (harmonized) Unified COCOMO
   Suite (F, K)

COQUALMO-COCOMO different from COQUALMO-CORADMO
Prioritizing Research Topics

1. Defect Classification

![Graph showing defect classification with importance and difficulty axes.](image-url)
2. Defect
Introduction/Prevention/Removal Tree

3. Determine knobs (attributes) that relate to tree
4. Data Collection

5. Parametric Modeling; Distribution of defects => COQUALMO+Risk Mgmt (Madachy)+Basili/ Selby
data analysis+sensitivity analysis
6. Integratable (harmonized) Unified COCOMO Suite (F, K)

COQUALMO-COCOMO different from COQUALMO-CORADMO?