Fitting programming processes into workflows on systems

Is the square peg in a round hole?

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Objective

How to fit a real-world programming process into a system (SCE) as a workflow
Agenda

• What system?
• Workflow concepts
• Fitting a sample workflow
• Conclusion
The Conventional System

Study documents → SAS Programs and data → Interactive SAS
Programming tracker
Conventional Project Tracking

<table>
<thead>
<tr>
<th>Dataset</th>
<th>Main programmer</th>
<th>QC programmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>John</td>
<td>Sue</td>
</tr>
<tr>
<td>DM</td>
<td>Ravi</td>
<td>Vidya</td>
</tr>
<tr>
<td>CM</td>
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</tbody>
</table>

AE dataset
DM dataset
CM dataset
### Enhanced Project Tracking

#### Statistical Computing Environment (SCE)

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- AE dataset
- DM dataset
- CM dataset
- Program Editor
Workflows for Project Tracking

**Step 1**
- DM programming
  - Assigned to John
  - Programming started

**Step 2**
- DM Review
  - Assigned to Ravi
  - Review Not started

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State Diagram – Stage 1

DM programming
Assigned to John

DM Review
Assigned to Ravi

Programming not started

Review Not started

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State Diagram – Stage 2

DM programming
Assigned to John
Programming started

DM Review
Assigned to Ravi
Review Not started
State Diagram – Stage 3

DM programming
Assigned to John

Programming completed

DM Review
Assigned to Ravi

Review Not started
State Diagram – Stage 4

DM programming
Assigned to John

Programming completed

DM Review
Assigned to Ravi

Review Started

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State Diagram – Stage 5

DM programming
Assigned to John

Programming completed

DM Review
Assigned to Ravi

Review Complete

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Work Items for a workflow

Dataset programming workflow template

DS Work Item 1: DM
DS Work Item 2: CM
DS Work Item 3: LB
DS Work Item 4: EX

TLF programming workflow template

TLF Work item 1: Table 14.1.1
TLF Work item 2: Table 14.1.2
TLF Work item 3: Table 14.1.3
The Dataset Programming Process

Main programming → Dataset ready for QC → Main program updated → QC compare generated → QC complete → Stat review of dataset

Done by Programmers → Done by Lead/Statistician

- QC programming
- QC compare generated
- QC complete
- Stat review of dataset

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The Dataset Programming Process

- Main programming
- Dataset ready for QC
- Main program updated
- QC compare generated
- QC complete
- Log check Code review Batch submit
- Stat review of dataset

Done by Programmers
Done by Lead/Statistician

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Assumptions

• Process Assumptions:
  • No code review or log checks
  • Dataset spec is ready (no review step)

• System (SCE) assumptions:
  • Allows customization
  • Only 2 types of steps – sequential and parallel
Workflow Version 1.0

Step 1
Double programming
Assigned to ?

Step 2
Stat review
Assigned to statistician

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Workflow Version 2.0

Step 1
Main programming
Assigned to Programmer 1

Step 2
QC programming
Assigned to Programmer 2

Step 3
Stat review
Assigned to statistician
Workflow Version 3.0

Step 1
- QC programming
  - Assigned to Programmer 2

Step 2
- Stat review
  - Assigned to statistician

Main programming
- Assigned to Programmer 1
Workflow Version 4.0

Step 1
- Main programming
  Assigned to Programmer 1
- QC programming
  Assigned to Programmer 2

Step 2
- QC process
  Assigned to programmer 2

Step 3
- Stat review
  Assigned to statistician
Workflow Version 5.0

Main programming
Assigned to Programmer 1

QC programming
Assigned to Programmer 2

Step 1

Step 2
QC process
Assigned to programmer 2

Step 3
Stat review
Assigned to statistician

Feedback
State Diagram Stage 1

- **Main programming**
  - Assigned to Programmer 1
  - Programming not started

- **QC programming**
  - Assigned to Programmer 2
  - Programming started

- **QC process**
  - Assigned to Programmer 2
  - QC not started

- **Stat review**
  - Assigned to statistician
  - Review not started

*Feedback*
State Diagram Stage 3

Main programming
Assigned to Programmer 1

QC programming
Assigned to Programmer 2

QC process
Assigned to programmer 2

Stat review
Assigned to statistician

Main Program ready

QC program ready

QC in progress

Review not started

Feedback

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State Diagram Stage 4

Main programming
Assigned to Programmer 1

QC programming
Assigned to Programmer 2

QC process
Assigned to programmer 2

Stat review
Assigned to statistician

Main Program updates

QC comments given

Review not started

Feedback
State Diagram Stage 5

Main programming
Assigned to Programmer 1

QC programming
Assigned to Programmer 2

QC process
Assigned to programmer 2

Stat review
Assigned to statistician

Main Program ready

QC program ready

QC complete

Review in progress

Feedback
Conclusion

• Workflows in SCEs for traceability and audit trails
• Customization is possible but delicate
• Stopping at the right level of detail is crucial
• Keep it simple
Thank you