how novices model business processes

Jan Recker  |  Niz Safrudin  |  Michael Rosemann

Business Process Management Group
Information Systems Discipline
Faculty of Science and Technology

Queensland University of Technology
Brisbane Australia
A picture replaces 1,000 words, or do I need 1,000 words to explain a picture?

the standard
BPMN 2.0

Voelzer (2009)
Our interpretation of the problem

We tend to force users to think like process modelers, when process modelers should think like users.
AGENDA TODAY

THE RESEARCH QUESTIONS
THE RESEARCH MODEL
METHOD & FINDINGS
DISCUSSION OF RESULTS
Research Questions

RQ1  How do novice analysts carry out business process modeling when uninformed of formal modeling method(s)?

RQ2  How ‘good’ are the different types of process designs in representing important business elements of a particular process scenario?
Our Research Model

Prior Experience
- F: Method Knowledge
  - O: Process Modeling Experience
  - O: Data Modeling Experience
  - O: Object-Oriented Modeling Experience

- F: Domain Knowledge
  - O: Experience with Airport Domain

- F: Artistic Competency
  - O: Drawing skill Assessment

Process Design Work
- F: Process Design Representation Type
  - O: Diagram Classification

- F: Process Design Representation Quality
  - O: Semantic Correctness Assessment

KEY
- F: Theoretical Factor
- O: Operationalisation of Factor
Data Collection

QUASI-EXPERIMENT

Part 1: Demographics Survey

- **Method Knowledge**
  - Object Modeling
  - Data Modeling
  - Process Modeling

- **Domain Knowledge**
  - Airport Experience
Data Collection

QUASI-EXPERIMENT

Part 2: Drawing Skills
Data Collection

QUASI-EXPERIMENT

Part 3: Solving a modeling problem

Mark is going on a trip to Sydney. He decides to call a taxi from home to the airport. The taxi arrives after 10 minutes, and takes half an hour for the 20 kilometers to the airport. At the airport, Mark uses the online check-in counter and receives his boarding pass. Of course, he could have also used the ticket counter. He does not have to check-in any luggage, and so he proceeds straight to the security check, which is 100 meters down the hall on the right. The queue here is short and after 5 minutes he walks up to the level with the departure gates. Mark decides not to go to the Frequent Flyer lounge and instead walks up and down the shops for 15 minutes and buys a newspaper before he returns to the gate. After ten minutes waiting, he boards the plane.
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HOW NOVICES MODEL BUSINESS PROCESSES

... for instance
Coding and Analysis

Process Design Type [DT]

- Iterative multi-coder approach
- Classifying diagrams per:
  - Graphical constructs
  - Textual information
  - Control flow
Research Findings

The 5 Types of Design

**TYPE I**
- Textual Design
  - Full use of text
  - No use of abstract/concrete graphics
  - No graphics
  All text

**TYPE II**
- Flowchart Design
  - Text & abstract graphics
  - No/negligible use of concrete graphics
  - Negligible graphics
  Lots of text

**TYPE III**
- Hybrid Design
  - Text & abstract graphics
  - Some concrete graphics
  - Some graphics
  Lots of text

**TYPE IV**
- Storyboard Design
  - Less text
  - Significantly more abstract & concrete graphics
  - Lots of graphics
  Some text

**TYPE V**
- Canvas Design
  - No/negligible text use
  - Full use of abstract concrete graphics
  - All graphics
  Negligible text
No. of Diagram 54 / 75
Percentage of Students 72%

DT2 Flowchart Design
No. of Diagram: 6 / 75
Percentage of Students: 8%

DT3 Hybrid Design
Research Findings

Predicting the chosen Process Design Type [DT]

• DT2 (Flowchart Design):
  • PDK a significant predictor (Beta = 1.47, p = 0.04)

• DT4 (Storyboard Design):
  • OMK a significant negative predictor (Beta = -3.62, p = 0.01)
Coding and Analysis

Process Design Quality [DQ]

• Multi-coder approach
• Semantic Correctness
  • based on (Yang et al., 2005; Mendling et al., 2009; Nickerson et al., 2008)
• Representation of:
  • Activities
  • States
  • Events
  • Business Rule
  • Temporal Information
  • Geospatial Information
Research Findings

Predicting the Process Design Quality [DQ]

• ANOVA Analysis
  • DT a significant predictor
    \[(F = 12.46, \ p = 0.00)\]
  • PDK a significant predictor
    \[(F = 9.57, \ p = 0.01)\]
Research Findings

Predicting the Process Design Quality [DQ]

<table>
<thead>
<tr>
<th>DT with highest mean results</th>
<th>State</th>
<th>Task</th>
<th>Event</th>
<th>Business Rules</th>
<th>Time</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>DT1</td>
<td>5.00</td>
<td>5.00</td>
<td>1.00</td>
<td>4.00</td>
<td>4.00</td>
<td>5.00</td>
</tr>
<tr>
<td>DT2</td>
<td>2.98*</td>
<td>3.81*</td>
<td>2.81*</td>
<td>4.06</td>
<td>3.15*</td>
<td>3.07</td>
</tr>
<tr>
<td>DT3</td>
<td>2.50</td>
<td>3.00</td>
<td>1.33</td>
<td>3.17</td>
<td>3.00</td>
<td>3.67</td>
</tr>
<tr>
<td>DT4</td>
<td>2.73</td>
<td>2.82</td>
<td>1.27</td>
<td>3.09</td>
<td>2.91</td>
<td>3.73*</td>
</tr>
<tr>
<td>DT5</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Multivariate ANOVA Selected Results
Research Findings

MANOVA Significant Results of Prior Experience
Qualitative Analysis

“Dual Coding Theory”
Paivio (1990)  Effective conveyance of information
• Interdependency – text and graphics
Qualitative Analysis

“Physics of Notation”

Moody (2009)  Theory of effective visual notations

• Monosemuy

independent symbol

has established meaning
Qualitative Analysis

“Spatial Contiguity”
Mayer & Moreno (2003) Inclusion of text and graphics
• Rather than segregation
Qualitative Analysis

“Temporal Information”

Boroditsky (2000) DT2 Flowcharts
- Textual captions within abstract shapes
Qualitative Analysis

“Geospatial Information”

DT4 Storyboards

- Notable: Effective and intuitive representation
Discussion

- **Students** as novice analysts
- **Inter-Subjectivity** in coding
- Drawing, **not designing**, skill assessment
- Explanatory **power** of statistics
- Coding by professional modeler
Conclusions

Implications

✓ ACADEMIC CURRICULUM
  ▪ Introduce Business Process Modeling informally
  ▪ General teaching practice

✓ INDUSTRY PRACTICE
  ▪ Communication amongst uninformed stakeholders
  ▪ Leverage intuitive articulations in process (re-) design initiatives

✓ RESEARCH
  ▪ How can creative problem-solving (for process innovation) be supported through process models?
Contact Us

Jan Recker, Niz Safrudin, Michael Rosemann

Business Process Management Group
Queensland University of Technology
126 Margaret Street
Brisbane QLD 4000 Australia

e {j.recker; niz.safrudin; m.rosemann}@qut.edu.au

t janrecker, nizzsafrudin, ismio

w http://www.bpm.fit.qut.edu.au