Improving the Cognitive Effectiveness of Business Process Modelling Languages

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CONTEXT: Diagrams in Software Engineering

Diagram
A visual representation of (a part of) a model

- assumed simpler to use for novices
- more appealing than text-based representation
- diagram size increases quickly
- naive diagramming does not make models more understandable

FOCUS: Business Process Modelling (BPM)

RESEARCH QUESTIONS
- How cognitively effective are these BPM languages?
- How to address their deficiencies?

Cognitive Effectiveness
the speed, ease and accuracy with which a representation can be processed by the human mind

[Leikin & Simon]

APPROACH

Are the symbols easily discriminable from each other?

<table>
<thead>
<tr>
<th>YAWL</th>
<th>BPMN</th>
</tr>
</thead>
<tbody>
<tr>
<td>AND-split</td>
<td></td>
</tr>
<tr>
<td>XOR-split</td>
<td></td>
</tr>
</tbody>
</table>

Is the meaning of the language symbols immediately understandable?

<table>
<thead>
<tr>
<th>BPMN</th>
<th>YAWL</th>
<th>Activity Diagram</th>
<th>EPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Stop</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

The "Physics" of Notations

[Moody]

Perceptual Discriminability
Cognitive Fit
Semantic Transparency

Graphic Economy
Manageable Clarity
Visual Expressiveness

Dual Coding

Does the language have built-in complexity management mechanisms?

[Moody]

Does the language use the visual variables optimally?

PLANAR VARIABLES
 RETINAL VARIABLES

<table>
<thead>
<tr>
<th>Horizontal Position</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Position</td>
<td>Size</td>
</tr>
</tbody>
</table>

[Moody]