Are Domain-Specific Models Easier to Maintain Than UML Models?

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Objectives

• Proponents claim that a key driver of DSM is easier comprehension of system structure and behavior, which should make evaluating and maintaining the models easier.

• But, DSM haven’t yet gained wide acceptance in practice, because the claims of increased productivity and ease of understanding haven’t yet been verified by independent studies.

• We investigate this through the following research question: Does DSM improve the maintenance performance of designers, compared to general-purpose modeling using UML?
  – How each type of modeling language affects model comprehension
    • Syntax & Semantic
  – The correctness of changes
  – The degree of changes made during a maintenance task
Research Design

- 64 senior undergraduates IT students
  - Advanced UML training
  - EMADSM (Enterprise Mobile Application DSM) training
  - Time: UML >> EMADSM

- The experimental task involved designing a mobile-phone application for conference registration.
  - Symbian S60-based mobile-phone application framework

- Randomly split the participants into DSM and UML groups.
  - Gave them a high-level textual description of the system objectives and requirements.
  - Asked them to perform the maintenance task, which involved modifying the models to satisfy a new requirement for the application.
  - After performing the task, the participants answered questions evaluating their syntactic and semantic comprehension and the models’ changeability.
Discussion

Table 1
A comparison of UML and domain-specific modeling in maintenance performance

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Unit</th>
<th>UML</th>
<th>DSM</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntactic accuracy</td>
<td>The percentage of correct answers</td>
<td>65.4</td>
<td>70.3</td>
<td>0.03</td>
</tr>
<tr>
<td>Semantic accuracy</td>
<td>The percentage of correct answers</td>
<td>68.8</td>
<td>76.4</td>
<td>0.03</td>
</tr>
<tr>
<td>Correctness of change</td>
<td>The score on a 100-point scale for the changes’ correctness</td>
<td>68.5</td>
<td>83.2</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Degree of change</td>
<td>The number of “steps” involved in incorporating the change, weighted by each step’s size</td>
<td>8.7</td>
<td>4.6</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

Figure 1. A comparison of comprehension and changeability (the ease of modifying a model) between UML and domain-specific modeling (DSM). DSM is better in both model comprehension and model changeability.