

## 12. Outlook

The research documented in this thesis has drawn on a wide range of modeling language and usability theories to produce a new framework for usability evaluation of graphical modeling languages.

Past and current research highlighted the need to deal with a usability survey focusing on graphical modeling languages. The research presented in this thesis has both practical and theoretical use.

The theoretical use focuses on researchers of the modeling domain and the usability domain. In the modeling domain, the developed FUEML evaluation framework and the findings of this thesis act as a basis for forthcoming usability surveys. In the usability domain the developed causal models including several causal stages connecting usability attributes may be interesting for further research activities. Current usability investigations only set the different usability attributes on one causal level.

The practical use focuses on standardization organizations such as the ISO and enterprises. The results of the empirical findings support standardization organizations developing graphical modeling languages in considering usability aspects for the further development of graphical modeling languages. For example, a possible requirement deduced from the findings of this thesis may be the adaptability of graphical modeling languages suitable to user's experience regarding the complexity and the visual properties of the modeling language. However, this step would require further empirical investigations of how language complexity and visual properties influence users with differing grades of language experiences.

The developed FUEML evaluation framework and the findings of this thesis act as a basis for forthcoming surveys in this domain. For confirming and extending the empirical results of this thesis it is recommended for further research to integrate different modeling languages and practitioner groups in the surveys. This is necessary for showing a general validity of the results presented in this research. The results of further studies cannot be compared directly with the results of this research unless further studies consider similar modeling tools for the development scenarios and student groups.

In summary, it can be said that this thesis forms a solid foundation of usability in the domain of graphical modeling languages and should be seen as a starting point for further continuous usability investigations of graphical modeling languages.