Evaluating the Comprehensibility of Graphical Business Process Models: An Eye Tracking Study

Michael Zimoch[1], Rüdiger Pryss[1], Thomas Probst[3], Winfried Schlee[3], Georg Layher[2], Heiko Neumann[2] and Manfred Reichert[1]

[1] Institute of Databases and Information Systems, Ulm University, Germany
[2] Institute of Neural Information Processing, Ulm University, Germany
[3] Department of Psychiatry and Psychotherapy, Regensburg University, Germany
{michael.zimoch, ruediger.pryss, georg.layher, heiko.neumann,
manfred.reichert}@uni-ulm.de, thomas.probst@psychologie.uni-regensburg.de,
winfried.schlee@googlemail.com

Problem. Process models provide detailed information about tasks, decisions, and actors involved in various business processes. Graphical representations provide tangible benefits regarding process model comprehension compared to textual documentations. Many unresolved issues regarding the factors thwarting the understanding of process models, e.g., process model quality, exist. Here, we use eye tracking to monitor selective attention shifts and serial groupings of semantically meaningful chunks in process model comprehension.

Method. 36 subjects (23 male) had to study 12 different process models expressed in BPMN, eGantt, EPC, and Petri Net by conducting a reading comprehension task. Further, subjects answered a questionnaire with questions related to the process described in the models. Subjects' scanning saccade patterns and relative fixation durations were recorded with SMI iView X Hi-Speed system at 240 Hz.

Results and Conclusion. We observed specific eye-movement patterns (e.g., targeted search, back-and-forth saccade jumps) as well as unique strategies for reading different process model representations. Additionally, scan path pattern and fixation time variabilities indicate different levels of cognitive load and reveal potential stumbling blocks in the context of graphical business process model comprehension. The results, in turn, enrich the development of a conceptual framework, targeting at the comprehension of business process models.
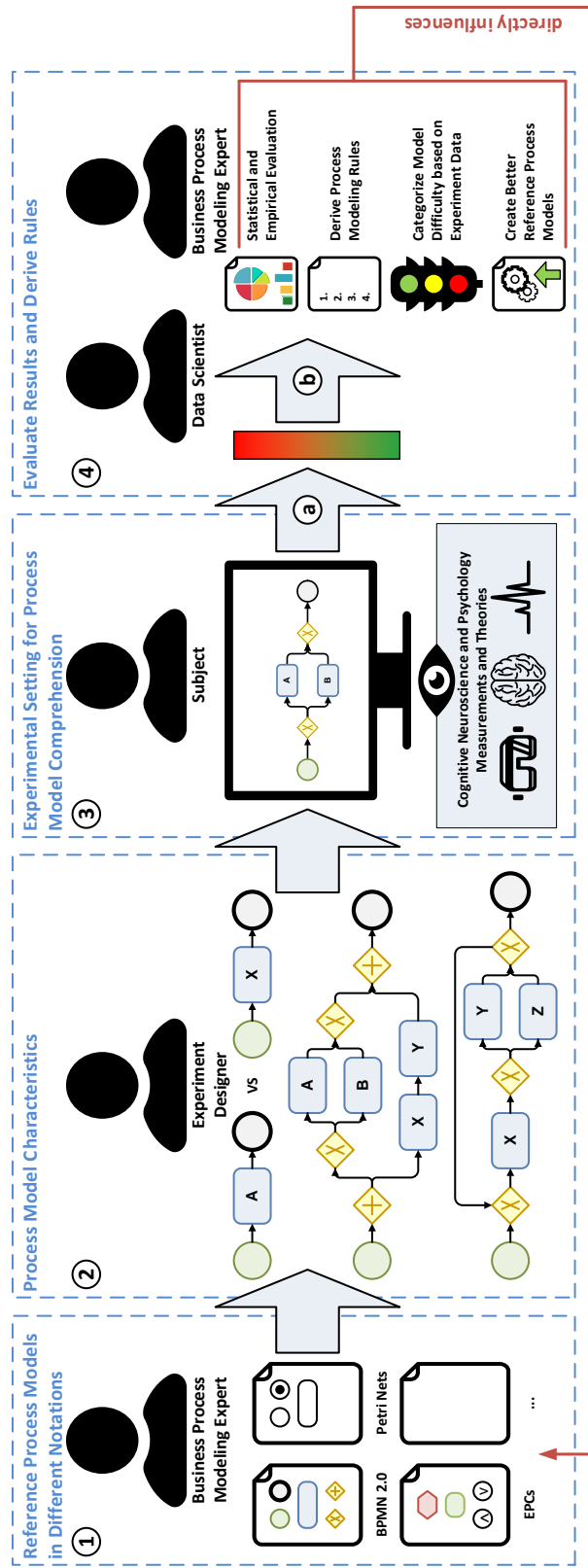
Fig. 1: Conceptual Framework for Process Model Comprehension