On the Usage of Labels and Icons in Business Process Modeling

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ABSTRACT

The value of business process models is dependent on the choice of graphical elements in the model and their annotation with additional textual and graphical information. This research discusses the use of text and icons for labeling the graphical constructs in a process model. The authors use two established verb classification schemes to examine the choice of activity labels in process modeling practice. Based on the author’s findings, this paper synthesizes a set of twenty-five activity label categories. Proposed is a systematic approach for graphically representing these label categories through the use of graphical icons, such that the resulting process models are easier and more readily understandable by end users. The author’s findings contribute to an ongoing stream of research investigating the practice of process modeling and thereby contribute to the body of knowledge about conceptual modeling quality overall.

Keywords: Icons, Labeling, Process Modeling, SAP Reference Model, Word Classification

INTRODUCTION

Process modeling has emerged as a primary reason to engage in conceptual modeling (Davies, Green, Rosemann, Indulska, & Gallo, 2006) and is sought to provide benefits of process documentation, organizational transparency, and others (Indulska, Green, Recker, & Rosemann, 2009). Similar to other forms of conceptual modeling, process models are first and foremost required to be intuitive and easily understandable, especially in IS project phases concerned with requirements documentation and communication (Dehnert & van der Aalst, 2004). But even though process modeling has been around for some thirty years, surprisingly little is known about the practice of process modeling, and how process modeling can be of value to an organization (Indulska, Recker, Rosemann, & Green, 2009). Research has investigated, for instance, the graphical constructs and their meaning in process models (Rosemann, Recker, Indulska, & Green, 2006), or the expressiveness and validity of workflow...
aspects in process models (van der Aalst, ter Hofstede, Kiepuszewski, & Barros, 2003). Also work on quality frameworks for conceptual models in general is also available, such as the Guidelines of Modeling (GoM) (Schütte & Rotthowe, 1998) or the SEQUAL framework (Krogstie, Sindre, & Jørgensen, 2006). These and other frameworks provide sets of guidelines on how to conduct process modeling. However, the specific factors that contribute to building a “good” process model, for example one that results in human understanding, has received little attention up until now (Mendling, Reijers, & Cardoso, 2007).

Recent research has started to examine process model comprehension. For instance, the impact of structural properties of the graphical model elements on model understanding is clearly identified (Mendling, Neumann, & van der Aalst, 2007). However, it has also been shown that the choice of the graphical language used for process modeling has only insignificant effects on process model understanding (Recker & Dreiling, 2007). This situation raises the question of which aspects – other than the choice of graphical constructs and their structural layout – influence the way a process model is understood by end users.

In our work we continue along this line of work towards more understandable process models. In particular, we assert that, to date, little attention has been devoted to a very essential task in process modeling: the labeling of the graphical constructs, in particular of the constructs standing for “activities” (or “tasks”, or “operations” – in other words, work to be performed) in a process model. This is surprising given that, clearly, the true meaning of any construct in a process model is only revealed when model users read – and intuitively understand – the labels assigned to a construct. Current practice indicates that the labeling of activity constructs is a rather arbitrary task in modeling initiatives and one that is sometimes done without a great deal of thought (Storey, 2005). This can undermine the understanding of the resulting models in cases where the meaning of the labels is unclear, not readily understandable or simply counter-intuitive to the reader. In prior work (Mendling, Reijers, & Recker, 2009), for instance, we found that the choice of the right convention for labeling activity constructs (e.g., a “verb-object”-convention versus an “action-noun”-convention) has a significant impact on the perceived ambiguity and perceived usefulness of the labels.

This situation indicates a demand for more sophisticated methodical support in the act of labeling activity constructs in process models. We identify two challenges in particular. First, we argue in line with other studies (e.g., Born, Dörr, & Weber, 2007; Greco, Guzzo, Pontieri, & Sacca, 2004; Mendling et al., 2009) that more support is needed to select adequate terms in the labeling of constructs. Second, research in cognitive science suggests that incorporating graphical icons in textual messages improves reader understanding (Mayer, 1989; Paivio, 1991). This work suggests that – in addition to improving the choice of textual labels, a second, complementary contribution can be made by examining the use of additional graphical icons to assist model users in understanding the (textual) labels in process models. And indeed, several modeling tools already provide mechanisms to assign an icon to an activity construct such that its meaning can be grasped faster and more intuitively, yet none of the tools that we are aware of deals with icons in a systematic way.

Accordingly, we address two research objectives in this paper. First, we examine the use of terms in activity labels in process models, so as to arrive at a set of meaningful terms that can be used to guide process modelers in their labeling efforts. Second, we provide a systematic approach to extend textual labels in process models with a set of graphical icons. We proceed as follows. In the next section we discuss the background to our work. We review work in cognitive science that forms the theoretical basis for our elaborations on process model understanding. We also review existing approaches to labeling as implemented in process modeling tools and the way they support the assignment of icons to activities. Next, we perform a linguistic analysis of textual
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