

Group Consensus in Business Process Modeling: A Measure and Its Application

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ABSTRACT

Consensus is an important measure for the success of any business process modeling effort. Although intensively studied in the general literature on group processes, consensus has hardly been considered in business process modeling and never seriously measured. The author defines consensus as the level of agreement of group members' views on the process and introduce business process similarity as a proxy. The author validates the measure by comparing it to an existing self-reported measure of consensus. The author then uses this measure to inform and guide the process of modeling.

Keywords: Behavioral Science, Business Process Re-Engineering, Cognitive Science, Decision Theory, Group Processes, Organizational Design, Organizational Dynamics

INTRODUCTION

The literature on business process modeling is vast and the importance of measuring the success of process modeling projects and sessions has been widely recognized (Dennis, Carte, & Kelly, 2003; Lu & Sadiq, 2007; Luo & Tung, 1999; Recker, Rosemann, Indulska, & Green, 2009; Rosemann, 2006; Sedera, Gable, Rosemann, & Smyth, 2004). But prevalent success measures for individual modeling sessions primarily involve some form of model quality measure (Dean, Orwig, Lee, & Vogel, 1994; Mendling & Recker, 2007; Moody, Sindre, Brasethvik, & Sølvsberg, 2003; Sánchez-González, García, Mendling, Ruiz, & Piattini, 2010). While it is undisputed that the quality of a business process model is relevant to modeling success it

is not the only and perhaps not even the most important success factor.

The reason for this is twofold: the process model itself is a social construction, and its purpose is again to support some social process, e.g. a change project or system development project. In other words: the model documents the results of one social process (modeling) and serves as a point of departure for another one.

If the model were to be processed by a computer its quality would be of prime importance to ensure correct interpretation by the machine. But the results that are documented in the model are primarily the mutual knowledge that has been developed in the modeling session, the conflicts that had to be solved on the way, and the consensus that has been achieved among the group members as a result.

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It is precisely this consensus that is a prerequisite for people's commitment to the ensuing change project, for example. Often a poor model with high consensus goes further than a good model with little consensus. Hence consensus is a major result that needs to be achieved in business process modeling sessions much like in many other forms of group work.

But while there is considerable research on consensus in other areas (DeStephen & Hirokawa, 1988; Priem, 1990; Yoo & Alavi, 2001) the topic received little attention in business process modeling with researchers barely mentioning the issue (Clegg, 2007; Decker et al., 2005; Kumarapeli, De Lusignan, Ellis, & Jones, 2007; Rittgen, 2010b) and, to the best of our knowledge, not researching it in a systematic way, let alone measuring consensus.

The purpose of this paper is to develop such a measure. To do so we first define the concept of consensus in the next section, "Group consensus in process modeling". For this purpose we rely on cognitive theories of modeling.

Based on the cognitive concept of a view and the model as its externalization we can interpret consensus as "view agreement" and hence as "model similarity". The section "Business process model similarity" therefore introduces a measure for the latter.

To evaluate the new measure we resort to validity by comparison to an existing measure of the same concept. The section "Other group consensus measures" introduces established measures for group consensus and argues for the choice of the most suitable one. Validation of the new measure was done in field experiments. The set-up of these experiments is described in the section "Comparing model similarity and consensus in field experiments".

The section "Data analysis and discussion" reports on the analysis of the data that we collected in the experiments and discusses the respective results and implications. We then proceed by extending the dyadic measure to a group measure in the section "From individual consensus to group consensus".

The next section, "Applying the measure in collaborative modeling", discusses the potential

uses of this measure in the area of collaborative modeling where external representations of views are abundant as intermediate results.

The paper concludes with a summary of the findings and an outlook on future work.

GROUP CONSENSUS IN PROCESS MODELING

Group modeling is a cognitive as well as a group process. We therefore define group consensus in business process modeling as the extent to which the group members' views on the process agree with each other. The problem with this definition is that the views that are entertained by the group members are not directly accessible so the measure of consensus needs to be based on some external representation of these views.

For this purpose we need to resort to the cognitive theory on the modeling process. The foundations for our understanding of model cognition were laid by Johnson-Laird (Johnson-Laird, 1983, 1988) who introduced the idea of so-called mental models that the mind constructs when it imagines a situation. A mental model consists of a mental system of relations that has a structure similar to the system that is imagined.

When the mind engages in the process of deduction it performs the following three steps: comprehension, description, and validation. Waisel, Wallace, and Willemain (1999) found that the individual part of the modeling process can be described well in terms of Johnson-Laird's deduction. For our purposes the relevant step is that of description, which proceeds as follows:

1. Build *mental model*
2. Extract *view* from mental model
3. Transcribe view to *visualization*
4. Conduct within-model testing
5. If any test fails, go back to step 2 or 3, possibly modifying the mental model

In short: *mental models* are stored in long-term memory but not directly accessible;

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