In: Nolte, A., Prilla, M., Rittgen, P. and Oppl, S.: Proceedings of the International Workshop
on Models and their Role in Collaboration at the ECSCW 2013 (MoRoCo 2013)

Facilitating and Prompting of Collaborative Reflection of Process Models

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Abstract. Systematical collaborative modeling usually needs a facilitator. We suggest that a large part of revising existing drafts of a process model requires facilitated reflection of what has already been achieved in the light of the experiences of the collaborating participants. This reflection can be awkward and inefficient if it takes place in a whole group of 8 to 12 stakeholders. Therefore delegating the reflection to breakout groups is reasonable but requires technically based ways of facilitation support to avoid the need to employ several facilitators. This technical support is mainly feasible for identifying reasonable segments on which a step-by-step consideration can be based, and for prompting the participants to ensure a systematic reflection.

Introduction

Collaborative modeling of business processes pursues the goal to discuss different perspectives and integrate various competences on the one hand and to make the completion of a process model more efficient. Since both goals can be conflicting, coordination is necessary as it is usually provided by a facilitator (Renger, Kolfschoten, & De Vreede, 2008; Rittgen, 2010). The facilitator provides support so that different experiences and opinions with respect to the process being modeled are taken into consideration. During the course of collaborative modeling the emerging model has to be repeatedly inspected. The inspection is a type of validation which is closely intertwined with additional elicitation of information and ongoing modeling activities. Due to the complexity of a two dimensional representation, logical dependencies, various types of relationships etc. the parts and

elements have to be deliberately reconsidered several times. A first draft of a business process model should be carefully reflected by combining the competence and experience of several stakeholders which represent various perspectives being relevant for the model under construction. This combination of several perspectives in the course of collaborative reflection leads to comparisons of diverging opinions and to negotiations of the process model, and therefore is time consuming. Consequently, it may easily happen that important issues are neglected.

These difficulties can be viewed upon from the perspective of cognitive theory: By their research on knowledge integration, Stasser and colleagues found that test persons who were required to collaboratively solve complex problems did not value relevant information which was explicitly exchanged during their discussion (Stasser & Stewart, 1992). The reasons for this behavior are not completely clarified; it is obvious that the knowledge integration of various parties requires extra effort. With respect to creativity of groups, several obstacles were identified (Diehl & Stroebe, 1987) which affect the efficiency and creativity of group work, such as production blocking, free riding, evaluation apprehension etc..

To overcome these problems, a facilitator can prompt the participants to develop new ideas and to refer to the contributions of each other and to integrate them into a shared process model. A core principle of this kind of facilitation is to visualize every participant's comments or contributions. Conklin's dialogue mapping (Conklin, 2005) can be considered as an early example of this kind of visualization.

We have developed the method of the socio-technical walkthrough with which a process model is inspected and discussed step-by step. The walkthrough method (Yourdon, 1989) is employed in many contexts to support design projects with a systematic method to reconsider the already achieved results. The systematization and the deliberate inspection of every design element and their relationships requires a facilitator who has to identify appropriate segments of a model which are inspected within one step, and who has to ensure that every segment is discussed under certain aspects. However, this kind of facilitating all cooperative interactions and visualizing there outcome may prove as very time consuming (Nolte & Prilla, 2012). In larger groups of 8-12 participants, who are usually needed to represent the relevant perspectives, the walkthrough method causes phases where most of the group members have to stay passive in a listening mode. Therefore it is reasonable to alternate the work in the whole group of stakeholders with periods of work in solitude or in breakout groups. Since some functions of a facilitator are inevitable, we propose two strategies to complement the work of a facilitator with technical functionality:

1. Support of participants to define the appropriate clusters into which the process model is segmented and where each segment becomes a subject of deliberate discussion

2. Prompting to support the reflection of selected segments by individuals or by breakout groups

The sociotechnical walkthrough

We briefly describe the basic principles of the socio-technical walkthrough (STWT) to clarify the kind of support which is needed for guiding the work of breakout groups (T. Herrmann, Kunau, Loser, & Menold, 2004; Thomas Herrmann, 2009). As Figure 1 shows the STWT is applied in a series of workshops. They take place as co-located meetings since the negotiation of diverging opinions requires a close contact between the participants. Each meeting can be used to reconsider a collaboratively modeled work or business process under one or two aspects e.g. whether the displayed activities are really necessary, how they can be supported etc. In preparation of a workshop the facilitator creates a diagram which represents the results of previous work. The facilitator develops a plan of how to inspect the complete diagram step by step. A crucial challenge is to define the segments for the single steps. If they are too small, a lot of comments of the participants will refer to aspects which belong to another segment. If the defined segments are too large it might easily happen that important details are neglected.

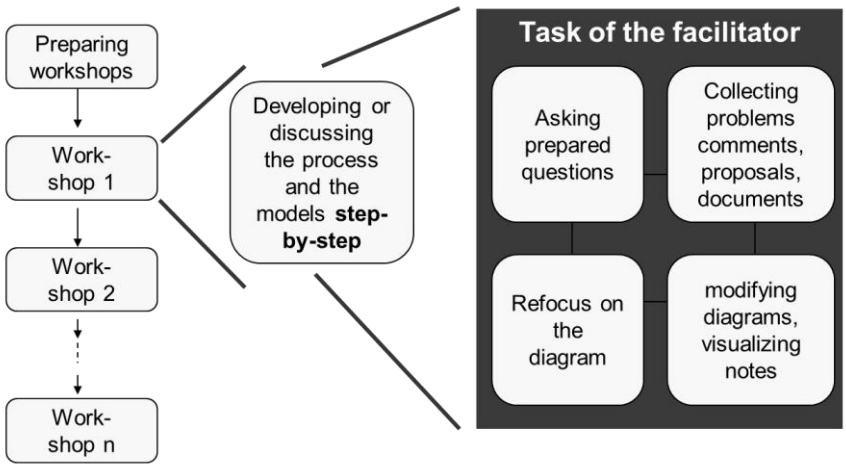

Figure 1: Process overview of STWT's

STWT-workshops are characterized by the following facilitation activities (cf. Figure 1):

- Asking prepared questions: The facilitator discloses some parts of the diagram e.g. by using hide-and-show mechanisms. Each phase of such a disclosure is one step (of about 7-15 per workshop) which is accompanied by one or two prepared questions such as: “What is the next sensible activity?”, “Which information support is needed for this activity?”.

- Collecting contributions such as answers, hints, proposals, comments, references to further documents etc. It is important that the stakeholders comment from their various viewpoints and that these contributions leave immediate traces in the process model diagram. By modifying the model, the results of the discussion are simultaneously documented.
- Focusing on the diagram: The diagram – especially the segment under discussion – serves as a focus which integrates the various experiences and perspectives of the participants into a larger picture.

In summary, the goals of the STWT are:

- Combining various perspectives, when considering the segments under several aspects (represented by questions)
- Relating every element to its context
- Reflecting the characteristics of a segment in relation to the experience of the participating experts and stakeholders.

Research on the STWT revealed that it has to be extended by means of creativity support. The linearity of the STWT is not feasible to support associative thinking and brainstorming (Thomas Herrmann, Nolte, & Prilla, 2013).

In the following we want to discuss and propose how the STWT-oriented collaboration can become more efficient, if the walkthroughs are delegated to breakout groups. For instance, with three breakout groups a model could be discussed and modified under three different aspects. In such a constellation it is not reasonable to engage three facilitators but to technically support the groups themselves to run a systematic walkthrough.

Support of segmentation

A first measure is to support the groups to define the segments – under which they intend to walk through the model – by themselves. This can happen by asking the members of the whole group to identify for every element of a process model which other two or three elements of the model are most closely related to them – from a semantic point of view.

To demonstrate this we ran a first small explorative study. We asked eight people to identify relations between the sub-elements shown in Figure 2: “The elements of this diagram are labeled with differently colored points. Please add points of the same color to two other elements which you consider as closely related to the element with the same color”. However we did not show them the nested structure of the model to avoid a pre-orientation on certain clusters. The results of eight people’s proposals for defining relationships between the elements were manually entered into the model by establishing directed relations and annotating their cardinality depending on how many participants have indicated the relationship. At

the first glance, nearly every element was connected with more than 5 other elements.

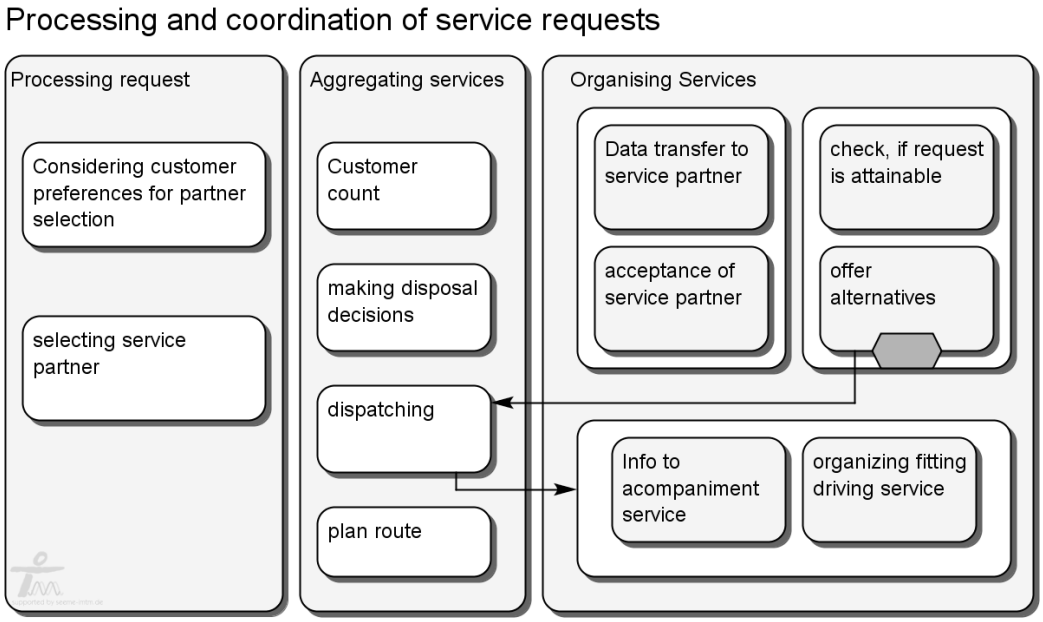

Figure 2: Part of a diagram for which reasonable segments had to be identified

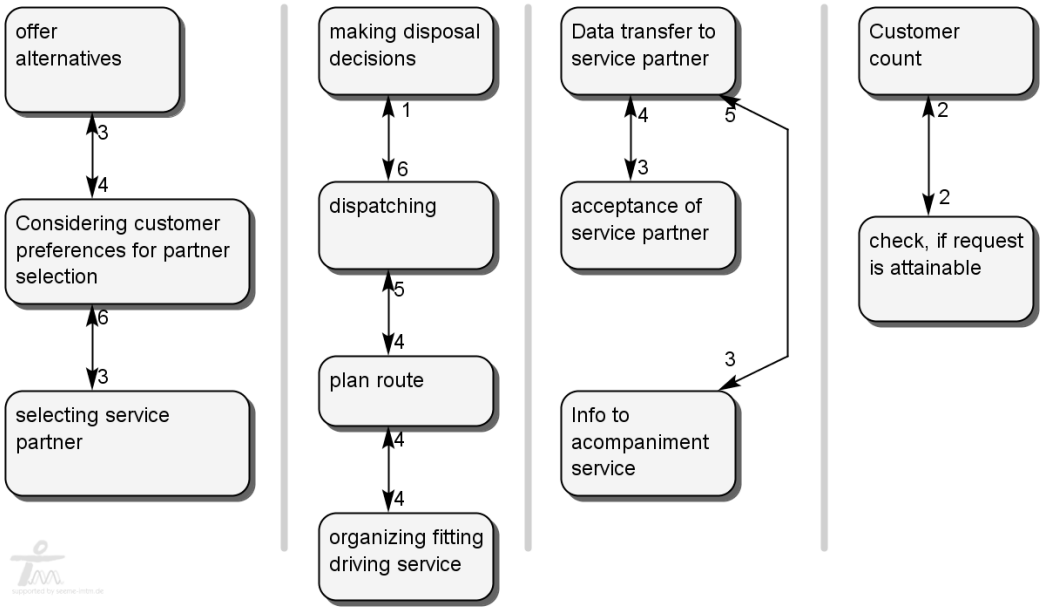

Figure 3: Results of collaborative identification of segments of a part of a process diagram

To make a structure of segmentation visible we carried out the following operations:

1. All relations are weighted by the number of their occurrence (see Figure 3). For this purpose, the counts of the two directions of a relation are added.
2. All relations of a weight of N are deleted, starting with N=1,
3. The deletion of a relation is not conducted if this deletion causes that an element remains without any relation to the others.
4. N is increased until no deletion can be carried out.

Surprisingly, the resulting clusters do not match the clusters being provided by the nesting structure in Figure 2. The super-elements (such as "processing request") are usually proposed by a modeler or the facilitator. Usually the nesting structure is employed to define the segments of the walkthrough. The experimental study revealed that this strategy might not be always appropriate. The tested method of building segments also revealed that the suggested semantic relationships of a drafted model might need to be revised. Further research will have to deal with an extended functionality which helps to handle models with a larger, realistic number of elements and supports the automatic identification of appropriate clusters to define the steps of a walkthrough.

Support of prompting

One important task of the facilitator is to provide prompts which stimulate the participants to reflect the status of a process model and to make contributions. Appropriate prompting is discussed as a method to increase the creativity level of facilitated brainstorming (Santanen, Briggs, & de Vreede, 2004). From a cognitive view, prompting can help to overcome the linearity of thinking and to combine the relevant aspects of a process in unusual ways (T. Herrmann, 2009). Furthermore, prompting has been widely researched in the context of learning and teaching, especially for computer supported collaborative learning (CSCL). Prompting (Thillmann, Künsting, Wirth, & Leutner, 2009) can be seen as a part of scaffolding which mostly consists of a guidance through a procedure which combines several mandatory and optional activities. The STWT is an instance of such a procedure. The prompts remind people to not forget steps which might be helpful in certain situations. CSCL-research pursues the concept to provide those prompts by technical functions during human-computer interaction which help the collaborating participants to conduct important steps in the process of learning.
We have applied the research on prompting in the context of supporting reflection at the workplace (Prilla, Degeling, & Herrmann, 2012); the intention is to guide people to articulate their experience with certain work situations by either describing the situation or noting down the result of their reflection. Subsequently, these articulations can be shared with other people who made similar experiences. The

interaction with others may help to find solutions and to support each other to bring these solutions into reality.

With respect to the socio-technical walkthrough, the following activities could be prompted:

- The leading question can be repeated for each segment;
- Participants can be asked for their opinion;
- "What-if-" or "what-else-"questions can be used to stimulate creativity;
- Participants are reminded to leave tracks of their discussion in the model;
- After each modification the collaborators can be asked to declare whether they agree with it;
- The participants can be asked to see the segment under discussion and its modification in the context of the whole process model;
- The collaborators can be asked whether they agree to proceed with the next segment.

By delegating this prompting to the technical functionality, the participants do not have to care by themselves about the systematization and coordination of the walkthrough but can focus on the content of the collaboratively modeled process in relation to their expertise.

Summary: Reflection support for collaborative modeling

All in all the described concepts for support of collaborative modeling can be related to research which intends the support of reflection at work. Selecting an appropriate unit, to which reflection refers, focusing on it without neglecting the larger context and continuous prompting which avoids the neglecting of important aspects of the participants' perspectives and of documenting the results can be considered as relevant principles which should be technically supported. This helps to conduct systematical reconsideration and negotiation of drafts during collaborative modeling in breakout groups without employing a facilitator for each group. Besides the use for STWTs, it might also be possible to use the support for other types of collaborative work on artefacts. Further research has to prototype solutions for this kind of support and to run experiments to refine these solutions for interactive identification of segments and for appropriate prompting. The main technical challenge with respect to prompting is to make it as unobtrusive as possible and to adapt it to the users' needs for scaffolding. Other aspects for research are to consider the limitations of knowledge integration if work on models is delegated to break out groups which only include a reduced scope of perspectives. Therefore, appropriate means of facilitation methods have to be identified to bring the perspectives of several breakout groups together.

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