# Understanding the Role of Communication and Hands-On Experience in Work Process Design for All

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**Abstract.** The paper motivates the explicit recognition of communication and hands-on experience when stakeholders design work processes, both, on the individual and on the organization level. As a straightforward implementation Subject-oriented Business Process Management is reviewed. Its constructs for modelling and resulting capabilities for seamless execution when using a corresponding suite are discussed. In particular, it is shown how stakeholders can articulate their way of task accomplishment in terms of communication relationships while producing an executable model. As the behaviour of all participating stakeholders in a specific business process can be expressed in terms of communication acts, adjusting individual and task-relevant flows of communication leads to a complete picture of an organization in operation. Moreover, subject-oriented representations allow executing the resulting workflow without further transformations. They enable interactive experience of business processes which in turn facilitates (collective) reflection and re-design. In this way, stakeholders can trigger and control seamless round-trips in organizational development. It minimizes development costs and social risks, since alternative ways of task accomplishment can be negotiated before becoming operational in daily business.

**Keywords:** Work process modeling, Subject-oriented Business Process Management, Participatory Design, seamless roundtrip engineering, articulation and negotiation.

## 1 Introduction

Today's business success mainly depends on the ability to innovate and change. Organizations have to rearrange their structure, driven by means of information and communication technology (cf. Levine et al., 2000). Increasingly, the driving forces behind the 'right' set of connections are common values of persons, regardless of their functional roles (cf. Tsai et al., 1998). This shift emphasizes the perspective on organizations as social systems. According to Luhmann's understanding such systems are driven by communication (of decisions) (cf. Luhmann, 2006). Persons form the relevant environment of organizations as significant actors, rather than constituting an organization. According to Luhmann an organization is composed of communication

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acts. However, the activities in operation and development of an organization decide upon its success and failure.

The latter, functional perspective on organizations is addressed by and handled through traditional techniques in Business Process Management (BPM). They structure organizational behavior and arrange the organization of work according to sequences of functions for task accomplishment (cf. Laudon et al., 2005). In the course of modeling a chain of activities (functions) is defined according to temporal and/or causal relationships when handling work tasks. Communication can be represented in this kind of models by overlaying communication relationships, e.g., defining communication flows (cf. Scheer, 2001). Following this approach, organizations are primarily described through functional decomposition rather than adjustment of communication acts.

As social systems organizations are living systems, they behave 'non-trivial' - their behavior cannot be (pre-) determined externally, and described by specifying causal relationships (Varela et al., 1974, von Foerster, 2003): A certain input is processed according to the inner state and the activity patterns of an organization. Situational context influences individual behavior and trigger work activities. In accordance with that business process models should reflect stakeholder-specific situational context of functions focusing on communication acts (cf. Wiesenfeld et al., 1998).

Such a shift requires rethinking management in general: Scientific management techniques as proposed by Taylor still dominate in leading organizations, and center on control and efficiency (Hamel, 2007). They consider organizations as 'trivial' machines, and strive for deterministic behavior patterns. In a world where adaptability and creativity drive business success (cf. Hamel, 2007) they need to be adapted to if not replaced by mechanisms of co-ordination and guidance (cf. Böhle et al., 2004). Such a shift allows sharing not only ideas and expertise, but also values, interests and objectives (cf. Back et al., 2004, www.vernaallee.com), coming back to the initially mentioned observation of values as drivers of change.

Today's change management and organizational development processes rely on the use of information and communication technologies. They link communities by providing the technical infrastructure for collaboration and knowledge representation, processing, and sharing (cf. Van den Hooff et al., 2004). Organizations having implemented environments recognizing the nature of social systems report significant benefits in terms of knowledge transfer efficiency, response time and innovation (Deloitte, 2002).

In this paper we discuss the baseline of socio-technical work (re-)design, namely subject-oriented business-process management of organizations. As it actively supports describing work processes from a stakeholder perspective and their immediate execution, scientific management of development processes can be replaced by self-control when handling change requests and ideas (cf. Bieber et al., 2002; Hill et al., 2009). It allows breaking through the (vicious) cycle of re-inventing organizations by identical means, which might lead to self-referential results and cause more economic damage than benefits, as Kotter argues metaphorically: 'The (penguin) colony ensured that changes would not be overcome by stubborn, hard-to-die traditions'. (Kotter, 2008).

## 2 Organizational Key Asset Communication

In this section the essential role of communication is shown, as S-BPM strives for complete and coherent descriptions of business processes. The perspective of individuals is tackled in section 2.1, enabling the flow of communication between stakeholders elaborated in section 2.2.

### 2.1 Individual Work and Process Completion

Subject-oriented Business Process Modeling (S-BPM) is based on the conceptual understanding of processes as functionally interacting subjects, i.e. actors, agents or services, such as accountants, sales persons, information systems, or knowledge management systems (see also Fleischmann et al., 2011). Subjects cannot only be persons or software applications. They can also be a combination of both, meaning that data is being entered to a software application.

A process is considered as the structured interaction of subjects involved in a business or work transaction. Subjects transfer information and coordinate their work

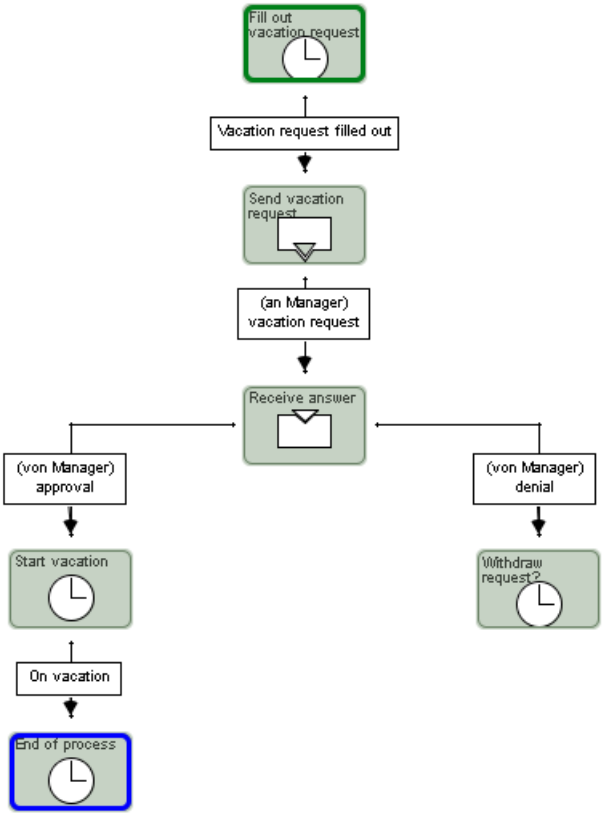


**Fig. 1.** An employee's communication perspective when specifying a vacation request process

by exchanging messages. Messages can be exchanged synchronously, asynchronously, or in a combined form. The synchronization type can be specified depending on the message type and the sending subject. Each subject has an input pool as a mail box for incoming messages. The synchronization type is defined using attributes of the input pool.

In figure 1 the behavior of the subject Employee in terms of exchanging messages along a simple vacation application process is shown, starting with filling in a vacation request form to be sent to the subject Manager. In the same, however complementary way the interaction between Manager and Employee can be specified (see figure 3). In general, each subject involved in a business process, sends and receives messages, and accomplishes some tasks without interaction. The definition and the behavior of a subject depend on the order of sent and received messages, the tasks being accomplished, and the way it influences the behavior.

If a subject sends a message the information transferred with that message is derived from user inputs or computed by some applications. These send functions are executed before a message is sent. Vice versa, if a subject accepts a message a corresponding function is executed. The information received through the message is used as an input to that function. This type of receive and send functions represent so-called refinements of a subject. They constitute the interface of a subject to the applications used by the subject.

Once all participating subjects in a specific process can be identified, each of the subjects can be specified in terms of its communication behavior in the above explained way (cf. Fleischmann et al., 2011). To complete a description of a process in terms of communication lines the interfaces have to be adjusted, as exemplified for the vacation application in figure 2 and 3.

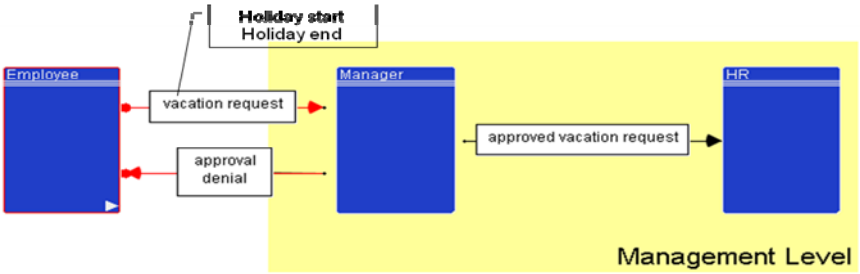


**Fig. 2.** Organizational perspective as set of communication interactions

## 2.2 Subject as Drivers of Processes

The flow of communication in a networked subject-driven process environment can be best illustrated proceeding with the vacation process example. The behavior of the manager is complementary to the Employee's. The messages sent by Employee are received by the subject Manager and vice versa. Figure 3 shows the behavior of the subject Manager. The Manager is on hold for the holiday application of Employee. Upon receipt the holiday application is checked (state). This check can either result in an approval or a rejection, leading to either state. The subject

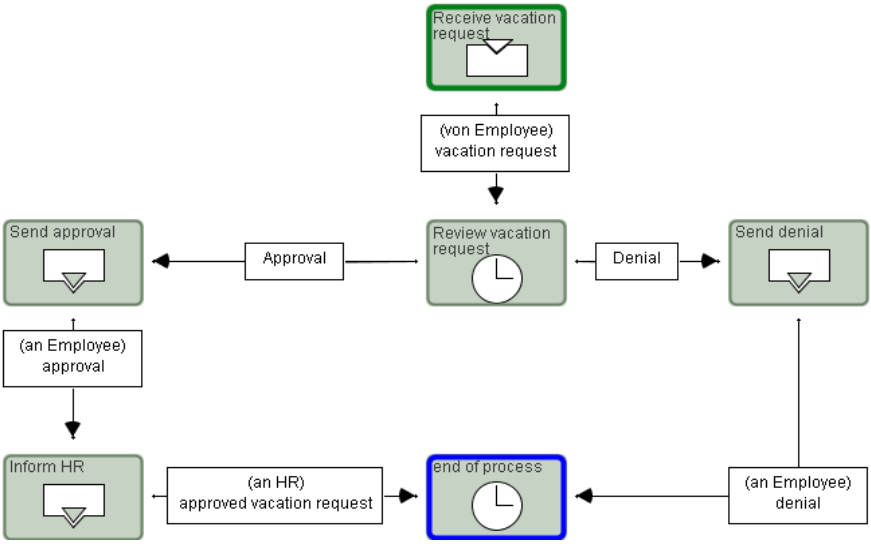


**Fig. 3** Adjusted behavior of subject Manager

Employee receives the result (i.e. decision). In case the holiday application is approved, the subject Human Resource Department is informed about the successful application. In terms of S-BPM the subject HR receives the approved holiday application, and puts it to Employee's days-off record, without further activities (process completion).

The description of a subject defines the sequence of sending and receiving messages, or the processing of internal functions, respectively. In this way, a subject specification contains the pushing sequence of functions, so-called services (as an abstraction from implementation). These services can be the standard ones for communication like send, or predicates dealing with specific objects, such as required when an employee files a holiday application form (vacation request in figure 1). Consequently, each node (state) and transition has to be assigned to an operation. The implementation of that operation does not matter at that design stage, since it can be handled by (business) object specifications.

A service is assigned to an internal functional node. If this state is reached, the assigned service is triggered and processed. The end conditions correspond to links leaving the internal functional node. Each result link of a sending node (state) is assigned to a named service. Before sending this service is triggered to identify the content or parameter of a message. The service determines the values of the message parameters transferred by the message. Analogously, each output link of a receiving node (state) is also assigned to a named service. When accepting a message in this state that service is triggered to identify the parameters of the received message. The service determines the values of the parameters transferred by the message and provides them for further processing.

These services are used to assign a certain meaning to each step in a subject behavior. Services allow defining the functions used in a subject. All of those are triggered in a

synchronous way, i.e. a subject only reaches its subsequent state once all triggered services have been completed. The functions of a subject are defined by means of objects. In this way, a process specification can be completed for automated execution.

## 3 Development Key Asset Self-directed Interactive Experience

After completing subject behavior specifications and their mutual adjustments stakeholders can execute syntactically valid models. In section 3.1 the procedure is exemplified. Such interactive experiences can be shared by reflecting the model, as shown in section 3.2 using a semantic content management approach.

### 3.1 Seamless Interactive Workflow Execution

In S-BPM, in order to enable direct process experience, stakeholders are empowered to execute what they have modeled without further transformation (seamless processing). For instance, an employee entitled to apply for vacations is able to create a new instance of a process specification (see also www.metasonic.de). After creating the process instance the stakeholder is guided through the process. He/she is asked by the BPM suite which transition he/she wants to follow. For instance, once the stakeholder knows that he/she has to fill in the business message form with the corresponding data, and that form has to be sent to the manager, he/she follows the transition "send". In the state "Prepare Message and select Receiver" following the transition "send" he/she fills in the business object with the data required for an application for vacation. In the following figure elements of the user interface created by the S-BPM suite is shown.

1. refers to the name of the current state: "Prepare Message and select Receiver"
2. gives the title of that process instance: "Request for vacation"
3. shows the creation date of that process instance
4. is the form for filling in the business object data

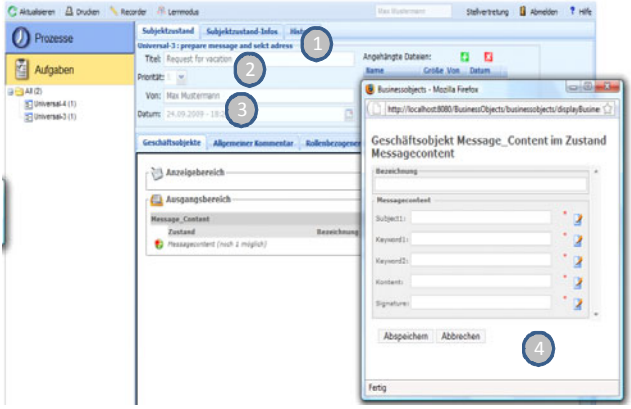


**Fig. 4.** User interface of the execution engine (workflow system) in state "prepare message and select the person(s) to be addressed"

The stakeholder (in this case, subject 1 'Employee') can add all the required data for a vacation request to the business object and send it to his/her manager who is the owner of another subject (subject 2 'Manager'). Since S-BPM focuses on individual work perspective, stakeholders need only to know communication interfaces when participating in organizational development: The behavior description of the subject Employee allows sending the vacation request to other subjects, such as the Manager or the Human Resource Department. S-BPM utilizes the metaphor of exchanging e-mails, however, focused on certain task accomplishments involving certain business objects (i.e. the content of the mail).

The workflow execution allowing interactive process experience follows a simple protocol. A stakeholder (subject 1, e.g., Employee) starts with the select activity and selects the send transition. After that the action "prepare message and select address" is executed and in another state the message is sent to another stakeholder (subject 2, e.g., Manager). Now subject 1 reaches again the state "select". In state Start subject 2 receives the message. In the following state "follow up action" the content of the received message is read and the corresponding action is executed by a certain person (or system) who is the owner of subject 2.

In the case of the vacation application this follow up action is the manager´s decision whether the vacation application is accepted or denied. This decision must be sent to subject 1 (Employee). In the state select subject 2 (Manager) decides to follow the send transition, prepares the message with the result of the decision and sends it to subject 1 (Employee). In general, when a subject sends a message the sending state is connected with the corresponding receive state in the receiving subject. Subject 1 sends a message to subject 2 in state 2. Subject 2 receives that message in state "start". Following this line of interaction, a complete business process can be executed in an interactive way.

### 3.2 Self-directed Roundtrip Engineering

Creating new knowledge in the course of organizational development requires members of a knowledge building network collaboratively posing questions and commenting, and intentionally seeking for alternative solutions in order to expand the social system's capabilities (Hakkarainen et al., 2004). Supporting such mutual learning scenarios, a subject-oriented workflow system is capable to provide operational evidence for each stakeholder involved in a certain process. A behavior proposal of one of the involved stakeholders in a process can be studied also by others immediately after completing and validating a subject-oriented model. However, posing questions and commenting requires more than execution. It requires social media, such as chat, forum, blogs, or process portfolios, and a proper content management to preserve contextual findings. Otherwise, the process of organizational development cannot be traced. Figure 5 shows such an approach: The subject-oriented behavior specification of the subject Manager when handling vacation requests is embedded into a semantic content management system.

From the content perspective, each model can be enriched with meta data, such as documents assigned to a process, and role bindings, such as the behavior of the subject Manager. They also allow for navigation (left side in figure 5 with main categories ‚behavior' and ‚documents'). Business process specifications handled as

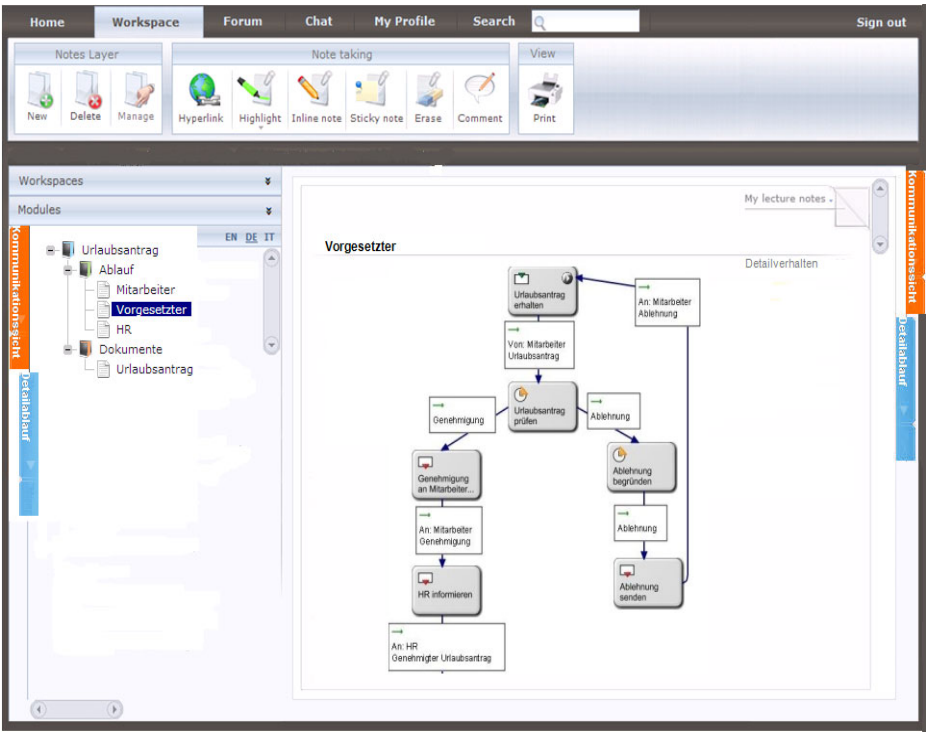


**Fig. 5.** Knowledge sharing support – content perspective

content elements cannot only be tagged with meta data, they also can be annotated (i.e. enriched with link, comments, text, videos etc.), and become part of specific views that can be exchanged among members of an organization in the course of reflection and sharing. Any meta data, such as 'behavior' for diagrammatic content, lays ground for focused interactions sharing experience. Coupling meta data and annotations with topic-specific forum entries, role-specific blogs, or chats allows co- and re-constructing information spaces for organizational development and mutual understanding.

In the course of generating process models other domain-specific content might either be created from scratch or added to existing content. Embedding links to forum entries, blogs, or chats into annotations, stakeholder-specific perspectives can be created and kept in user views. They structure the space for sharing information and interacting, as social interaction is based on exchanging (stakeholder-specific) views.

A view is generated like an empty overhead slide, and put on top of content elements (see right side of the screen a view termed 'My lecture notes' for annotating a diagram to indicate idealized subject behavior). The selection of content is supported by structured navigation (as shown on left side of the screen in figure 5) and filters directing the search for specific categories of information, such as behavior diagrams.

In a semantic content management system all annotations of a development process are stored, equal to original content elements, in user-specific views, including the links to communication entries. Users can manage their views, including deletion and transfer to other members of the organization. The transfer of views is essential, as collaboration in virtual communities can be enabled through sharing views. Views having set public by users can be taken by other users. They might import them to their list of individual views, and study them on top of the concerned content elements. Stakeholders taking existing views might continue working this way, i.e. setting views public after supplementing existing annotations. Such back-and-forth transfers lead to cascaded views and in this way, to traceable processes in organizational development, both, on the content, and interaction level (cf. Stary, 2011).

## 4 Conclusive Summary

For the first time since the dawning of the industrial age, the only way to build a company that's fit for the future is to build one that's fit for human beings as well.' (Hamel, 2007). Following this finding indicating the need for new ways in management we need to revisit organizations as social systems. From such a perspective stakeholders are driven by communication acts when accomplishing their tasks and when moving forward to novel structures of work.

Traditional techniques of Business Process Management arrange process-specific information around functional activities that are linked by causal and/or temporal relationships. They do not support modeling organizations from a communication perspective in the first run. The discussed Subject-oriented Business Process Management technique supports stakeholders articulating their way of task accomplishment in terms of communication relationships while producing an executable model. The latter allows for interactive experience of specific business processes, according to individual and task-relevant flows of communication.

The immediate execution of subject-oriented models facilitates (collective) reflection and re-design of individual proposals. In combination with semantic content management stakeholders can discuss alternative ways of task accomplishment along seamless roundtrips before incorporating them into daily business.

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