Collaborative Subject-oriented Workplace Re-design*

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Abstract. The demo paper introduces *SURF*, a tool for supporting the subject-oriented redesign of workplaces in production companies. The collaborative tool, inspired by the wiki and the subject-oriented philosophy, allows workers to raise issues and suggest solutions to be exposed to managers for workplace re-design purposes. The advantage of the tool is twofold. On the one hand it empowers workers, making them aware and actively involved in the workplace re-design. On the other hand, the tool makes management aware of actual problems occurring at the shopfloor and of the suggestions proposed by workers, thus supporting them in the effective re-design.

1 Introduction

Production companies are usually exposed to a variety of challenges that have often been understood mostly in economic and technological terms by neglecting a critical factor for sustainable organisational success: the human being. The result is a misalignment between business goals and human factors, that can be attributed to a lack of support and encouragement for human participation, learning and personal development within organisations [1].

The aim of the *SO-PC-Pro* (Subject-Orientation for People-Centred Production) project is *developing methods and tools for holistic design and management of workplaces in production companies, thereby aligning business goals and human needs*. Specifically, in this context, a "workplace" is defined as a physically or conceptually distinguishable set of interactions between people, machines and processes within their contexts (e.g., the interactions of individual in their physical surroundings, or of teams of workers distributed across departments). The core of the project is the notion of *people-centredness*, a particular characteristic or quality of a production workplace, describing a state in which the physical, socio-cultural, operational and economic workplace environment is closely aligned with the needs of the people working in that environment. Striving for such a state is the goal of any production company concerned about the well-being of its workers. The technologies developed within *SO-PC-Pro* aim at supporting this quest based on a view of people-centredness as a process rather than

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a state of affairs, a view that takes into account the dynamics of both the production environment and the workers. This paper presents the tool *SURF*[4] (Subject-oriented sUggestions for Re-design of Factory workplaces) that aims at empowering people in production companies, by making (i) workers active participants (or "subjects" in the Subject-oriented business process management - S-BPM - methodology [2]) in the workplace redesign process; (ii) managers aware of problems and supported by workers in the workplace improvement. To this aim, *SURF* provides a collaborative, user-friendly environment enabling workers to report and discuss issues and possible solutions, a workflow engine making the suggestion process transparent to workers and managers, and a process editor able to support designers and decision makers (i.e, the company management) with workers' suggestions, when a re-design effort is required.

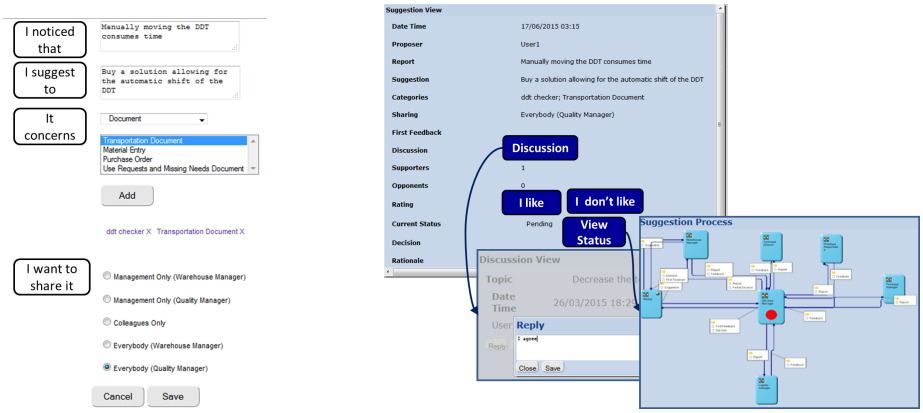
2 Tool and Architecture

At the core of *SURF* are the S-BPM and the wiki philosophy. Subject-oriented business process management [2] has been developed to empower the people involved in a process, by providing them with tools for designing and improving their own workflows. The methodology is inspired by natural language structure that consists of three components: (i) *subjects* representing human workers; (ii) *predicates* representing activities including sending and receiving messages, and performing tasks; (iii) *objects* representing the artefacts or data produced and exchanged between subjects. The idea is that applying this modelling approach to interactions in the production domain will affect psychological and social factors of human work [4]. Relying on the assumption that workers have the deepest insights of the issues and opportunities related to their workplaces, and can most effectively decide what changes are needed to improve their work, it assigns a dual role to people in organisations: one as process participants and one as workplace re-designers. Workers are hence encouraged to collaborate towards the workplace re-design. Supporting such a collaborative effort requires making workers aware of the evolution of the modelled workplace, favouring the coordination within the team, as well as fostering the communication of issues and ideas among the workers and with the managers. These different collaborative (re-)design aspects may benefit from the availability of wiki-inspired tools. Indeed, wikis typically offer easily customizable interfaces for different types of users and some collaborative features (e.g., functionalities for sharing, tracking and discussing ideas) which can be exploited to favour the kind of collaboration needed for collecting knowledge for re-design purposes.

SURF is based on three main modules: the *Suggestion Management and Discussion*, the *S-BPM Workflow engine* and the *Re-design* module. While the first two modules aim at involving workers in the active report of issues and suggestions for the workplace improvement, the latter focuses on supporting managers and designers in the actual workplace re-design.

Suggestion Management Module. This module is concerned with enabling users with no IT background to report issues and suggestions, as well as to discuss and share opinions about proposed suggestions or other topics, through simple interfaces. It provides workers with the possibility to: (i) create and update issue and suggestion reports (see

[4] A screencast showing the tool functionalities is available at `https://www.dropbox.com/s/c2gz9gbi9vmwbji/SOPCPro_SURF.zip?dl=0`



(a) Creation of a new suggestion (b) Suggestion Visualization and related functionalities

Fig. 1: Suggestion creation and visualization

Fig. 1a[5]), choosing whether and when to share them with colleagues and/or managers; (ii) visualize the current state of their suggestion (*pending*, *approved* or *rejected*) and the current stage in the process of suggestion handling (e.g., the current manager in charge of handling it), by making the suggestion handling process transparent to workers and managers (see Fig. 1b); (iii) discuss and share with colleagues opinions about proposed suggestions but also about other topics of interest; (iv) visualize issues and suggestions shared by colleagues and express their opinion about them (see Fig. 1b).

Fig. 1a for instance shows the interface for reporting a suggestion. Workers can add a description of the issue they have observed (e.g., in the procedure for the inspection of the incoming goods manually moving the transportation document - DDT - is time consuming) or (and) the suggestion proposed to solve the problem (e.g., buying a new solution allowing for the automatic transfer of the DDT). Fig. 1b shows the view on an existing suggestion. Besides the data added by workers, users can visualize the current status of the report (*pending*, *accepted* or *rejected*), the management's feedback (*first feedback*, *final decision* and *rationale* of the decision) and the number of colleagues supporting/non-supporting the report. For instance, in the example of Fig. 1b, the suggestion has just been shared with the management. Indeed, no feedback has been provided so far and the status is still *pending*. More details about the status of the current suggestion is also available through the *View Status* button (Fig. 1b): A red circle indicates the subject who is currently handling the suggestion, i.e., the stage of the suggestion handling process for the considered suggestion (in the example the suggestion has to be processed by the Quality Manager). Finally, colleagues of the proposer can express their opinion about the suggestion through the *I like*/ *I don't like* buttons and discuss about it (the *Discussion* button opens a popup as in Fig. 1b to start or continue a discussion on the topic).

S-BPM Workflow engine Module. This module is in charge of executing the suggestion handling process. While running a S-BPM *suggestion handling process* specific for the company's needs, it enables managers and decision makers to process workers' suggestions. Whenever a manager is in charge of giving feedback about a given issue or

[5] A more readable version of the pictures in the paper can be downloaded at `https://www.dropbox.com/s/nvi1xypzkl72bhe/SOPCPro_SURF_figures.zip?dl=0`

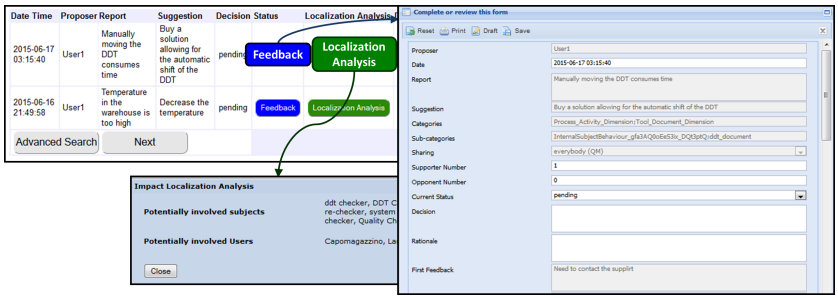


Fig. 2: Suggestion Approval

suggestion, according to the suggestion handling process, he/she is provided with the *Feedback* button, which, in turn, will provide her with an input form. According to the suggestion handling process indeed, it can happen that one or more managers are asked to process a suggestion before ending up with the final decision. For instance, in the example of the DDT document, the Warehouse, Quality and Purchase Manager can be involved in the decision. Fig. 2 shows the input form for the Quality Manager (QM). The Quality manager can provide her feedback about positive and negative aspects of the suggestion as well as report the report the final decision taken, i.e., the status of the suggestion (e.g., *approved*), a textual description of the decision (e.g., "The suggestion is accepted as it is.") and the motivation (*rationale*) for the decision taken (e.g., "there exist reasonably cheap solutions."). The same feedback is then also reported to workers in their suggestion view. Besides the *Feedback* button, decision makers are also provided with the *Localization Analysis* button (green button in Fig.2). By reasoning on suggestion categories and on the available domain knowledge, the functionality associated to the button retrieves and shows to users the workers potentially affected by the suggestion, thus supporting them in taking decisions.

Re-design module. The module offers a S-BPM editor enhanced with design functionalities (Fig. 3). Depending on which element in the S-BPM diagram is selected, the module provides designers in the *Worker Issues* tab with a list of issues and suggestions relevant for the element selected in the editor. For instance, if the subject *DDT Checker*, i.e., the responsible of checking the transportation document, is selected in the process model describing the procedure for the inspection of incoming goods, the suggestions related to this subject, such as the one about the DDT document, are provided to the designer. Specifically the editor:

- displays the suggestions made by workers (e.g., "buying an automatic solution for moving the DDT"). Being provided with a display of the workers' issues and suggestions side by side, the business designer has immediate access to possible solution alternatives.
- shows the rationale for previous decisions regarding workplace improvement. By representing both current and previous issues, the editor also provides access to the knowledge gained from previous improvement ideas and captured as the rationale associated with previous decisions (i.e., *Rationale* field in Fig. 3);
- enables the ad-hoc ordering of workers' issues to support the designer in identifying connections among individual issues.

The *SURF* is built on top of two existing base technologies, the *MoKi* tool [3] and the *Metasonic* suite[6], mirroring the philosophies at the base of the tool, the wiki-

[6] https://www.metasonic.de/en

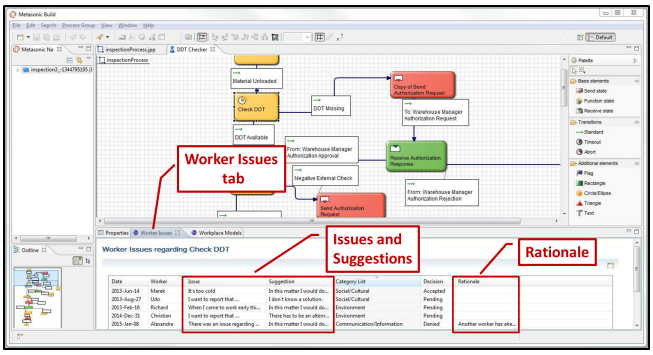


Fig. 3: S-BPM Editor

based collaborative environment and subject-orientation. The shared repository storing issues and suggestions is used for the communication between the tool modules. Both the *Suggestion Management* (MoKi-based) and *S-BPM Workflow* (Metasonic Flow) modules read and write information from/to the shared suggestion repository, while the *S-BPM Editor* (Metasonic Build) module only reads suggestions for providing them, once filtered, to the designers.

3 Maturity and Relevance

The importance of humans in the BPM community is going to grow (BPM also hosts workshops on social and human aspects and user-centric aspects are listed among the fields of the *emerging area* topic in BPM 2015). *SURF*, by adopting the subject-oriented notation for describing processes and actively involving workers in the (re)design of workplaces, makes people-centredness one of its core concepts.

The *SURF* tool has been applied to the *SO-PC-Pro* use case for the empowered workplace improvement in an Italian production company with an international market. Users of the tool are workers with no IT experience at the shopfloor of the company, as well as company managers. *SURF* requirements have been acquired, besides those extracted from the use case goals and objectives, by means of user stories and interviews collected during workshops and meetings with the company real users. Moreover they have been validated and refined through developer workshops, focus groups and user tests. In the latter the interaction of a selection of 7 users (both workers and managers) with the tool has been observed in doing small tasks. *SURF* is currently used by workers at the shopfloor of this company to propose and discuss ideas and suggestions to improve and refine the workplace.

References

1. van Aken, J.E.: Design Science and Organization Development Interventions: Aligning Business and Humanistic Values. Journal of Applied Behavioral Science 43(1), 67–88 (Mar 2007)
2. Fleischmann, A., Schmidt, W., Stary, C., Obermeier, S., Brger, E.: Subject-Oriented Business Process Management. Springer Publishing Company, Incorporated (2012)
3. Ghidini, C., Rospocher, M., Serafini, L.: Modeling in a wiki with moki: Reference architecture, implementation, and usages. Int. J. On Advances in Life Sciences 4(3), 111–124 (2012)
4. Kannengiesser, U., Müller, H.: Subject-orientation for human-centred production: A research agenda. In: Fischer, H., Schneeberger, J. (eds.) S-BPM ONE - Running Processes, Communications in Computer and Information Science, vol. 360, pp. 235–244. Springer (2013)