

Participative Process Introduction: A Case Study in the indiGo Project

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Abstract: In software engineering, the quality of development and business processes and their models is of utmost importance for (a) the quality of the software products developed and (b) the operational success of the organization. Nevertheless, many organizations neglect these processes and leave the knowledge about them in the heads of their experts. In this paper, we present the indiGo method and platform for eParticipative Process Learning. Furthermore, we present first results of a long-term case study for the evaluation of these methods. The results indicate that processes introduced and modeled with process user participation result in process models with higher acceptance and better perceived quality.

Keywords: Distributed participative process evolution, process introduction, process improvement, process inspection, eParticipative Process Learning

1 Introduction

Process models of organizations operating in the software industry are considered major assets for these, and range from business to software development process models. Especially in the innovative software market, they are constantly subject to changes caused by changing business, new technology and scientific advances. To survive these changes, process models need to be constantly inspected, evaluated, revised, and improved. Furthermore, they need to be enriched with lessons learned about their application in practice.

The approach of the BMBF-funded project indiGo (grant number 01 AK 915 A <http://indigo.fhg.de/>) is to increase their applicability as well as support their inspection and improvement. indiGo offers members of an organization to engage in moderated discussions about the structure, content or execution of a process model. The results of these discourses are process-related improvement suggestions and lessons learned. In particular, indiGo allows Communities of Practice (CoP) to establish themselves based on business processes, to provide their opinion about the process to other CoPs, and to solve problems during execution of the processes. This general approach is called eParticipative Process Learning, according to process learning as defined by Argyris and Schoen [ArSc78]. This paper presents the results of a case study where eParticipative Process Learning was used to introduce two processes into an organization.

As depicted in Figure 1, the eParticipative Process Learning cycle in indiGo starts with a plain process model. This process model is annotated, discussed, and enriched with lessons learned by the members of an organization. Lessons Learned are then extracted from the discussions with the support of text-mining methods. Finally, the experience enriched process model is revised into the applicable process model based on corporate goals. To support the evolution of process models in an organization, indiGo offers an integrated, comprehensive set of methods and a technical infrastructure as a joint effort of two German Fraunhofer institutes: Fraunhofer IESE (Institute for Experimental Software Engineering) in Kaiserslautern and Fraunhofer AiS (Autonomous Intelligent Systems) in Sankt Augustin.

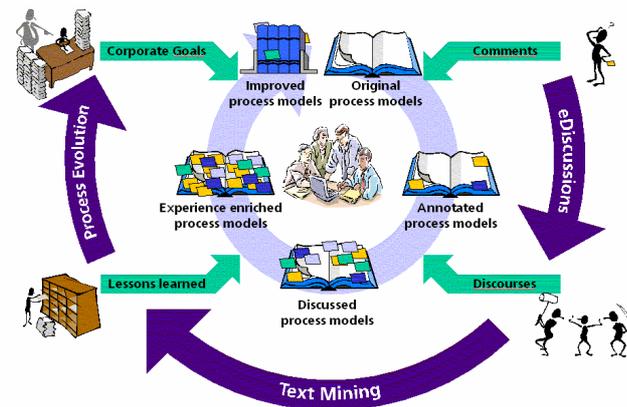


Figure 1: The eParticipative Process Lifecycle in indiGo

Both the developed methods and the indiGo architecture were evaluated in mid-2002 through a case study with various business processes carried out at IESE. In the next section, the indiGo methodology and the technical infrastructure are described. The third section presents the related case study and its results. The last section gives an outlook to future work.

2 The indiGo Methodology and Technical Infrastructure

The objective of the indiGo project is to provide a methodology and technical infrastructure for eParticipative Process Learning as an integrated social-technical system. To provide the context for the case study, a short overview of the methodology and technical infrastructure is given in the following. (For a more detailed description, please refer to [Deck03].)

The objective of the *methodology* is the implementation and coordination of eParticipative Process Learning within an organization. The main part of the methodology is a reference process model about process learning that is adapted to the needs of the organization as a pilot run. Part of the methodology is a method for eModeration that explains how to prepare, conduct, and finalize discussions.

To an organization's member using the process models, the indiGo *technical infrastructure* provides functions (a) to view, annotate and discuss process models and (b) to access and rate Lessons Learned matching their current project and process context. Discussions as well as annotations are implemented using Zeno by AIS [Voss+02][GoKa97]. The context-related retrieval of lessons learned is implemented using the CBR-based [Kolo93] Experience Management environment INTERESTS [Alth+01] by IESE. The organization members responsible for Process and Knowledge Management create and publish their process descriptions using the process model editor SPEARMINT [Kell+98] [Deck+01]. The summarization of discussions and extraction of lessons learned is supported by tools for text mining from AIS [Alth+01]. (A comparison of the indiGo technical infrastructure to the state-of-the-art concerning process modeling, publication tools, and discussion tools can be found in [Alth+01].)

3 The Case Study on eParticipative Process Introduction

The methodology and technical system developed for indiGo were evaluated through a case study, which was performed at Fraunhofer Institute for Experimental Software Engineering (IESE) starting in the summer of 2002. The main objective of this case study was to evaluate whether discussing process models in the introduction phase would increase their acceptance and perceived quality. Another objective was to gather practical experience with the use of the technical infrastructure and (parts of) the methodology. (A more detailed description of the results – in particular, how the data was processed - is available via Internet in [Deck03].)

3.1 Objects, Design, and Execution of the Case Study

To fulfill these objectives, two process models were discussed that are of high relevance to the work at IESE: Industrial Project Acquisition - which describes the creation of project contracts - and Conference Participation Planning. Both process models had to undergo fundamental changes due to recent restructuring at IESE.

The initial starting points of the discussions were (a) generic statements like “I would improve the following ...” and (b) open topics from the process modeling phase like “When should the Project Manager be involved in offer creation?” The discussions were moderated by a dedicated eModerator who was a member of the process definition team. Potential participants were identified based on the impact of the process description. In the case of the two processes that were the objects of the study, the potential participants were all regular IESE members. From this group, 16%-25% participated in the actions of the case study. In addition, the participation of experts on this process (e.g., decision makers) was assured explicitly before the discussion started.

At the start of the discussion, (voluntary) participants completed a questionnaire where they evaluated acceptance and perceived quality for each process model. A second questionnaire with the same questions was distributed after the accepted improvement suggestions were worked into the process. Both questionnaires also contained questions to capture practical experience with indiGo (e.g., satisfaction with the eModeration).

During the case study, discussion participants could label their contribution as lesson learned and state the project it was coming from. Afterwards, the lessons learned were extracted manually from the discussions. In this extraction, contributions from both case study processes, but also from further processes models, were included. Responsible for the processing of the lessons learned were the eModerator or the KM Team, which also made an initial quality check. After this quality check, lessons learned were rated further through explicit evaluation via the indiGo platform.

3.2 Results of the Case Study

For measuring acceptance and perceived quality, two major findings hold for both processes: When the results of the pre-phase (1st questionnaire) are compared to the ones in the post-phase (2nd questionnaire), the median of all measurements improves. The only exception is the median of acceptance for Conference Participation Planning, which remains stable. Furthermore, the bandwidth of results decreases, i.e., participants evaluate the process in the pre-phase more differently than in the post-phase. In other words – assuming that these effects are caused by the process discussion – the resulting processes are evaluated better and more consistently with respect to acceptance and perceived quality. Figure 2 exemplarily shows these effects for the perceived quality for Industrial project Acquisition.

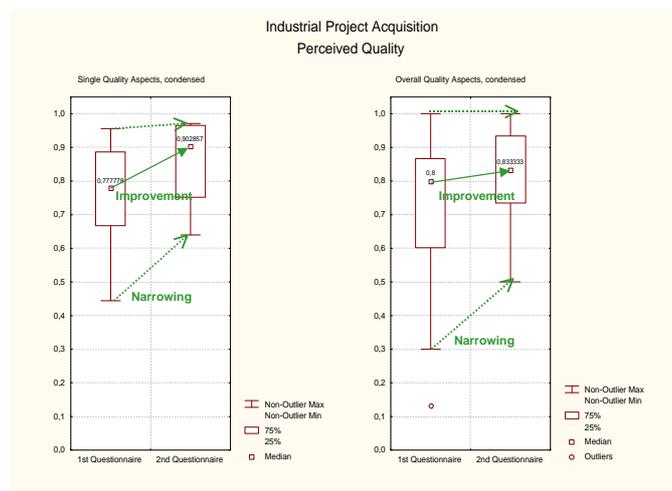


Figure 2: Example for process evaluation

The practical experiences gathered regarding the indiGo technical infrastructure, eParticipative Process Learning in general, and the eModeration method in particular, add to the above findings:

For the *indiGo technical infrastructure*, discussion groups about indiGo itself were the most important source of improvement suggestions. From 36 contributions, 26 improvement suggestions could be deduced, which are currently under development.

Concerning *eParticipative Process Learning*, 25 improvement suggestions could be deduced from 120 contributions in four weeks. 15 of them were implemented. The first questionnaire revealed a generally positive attitude towards process discussions and experience sharing. The most important factor for future participation is relevance of the topics and processes discussed. From the viewpoint of the process modeling team, the possibility to delegate open questions to the discussion accelerated modeling.

The *eModeration method* was improved by several lessons learned from the case study. For example, the same person should not perform the role of the eModerator and Process Author as it was done during the case study. The reasons for this separation are potential and assumed conflicts of interests between these roles. Furthermore, most of the participants in the 2nd questionnaire were satisfied with the relevance, results and moderation of the discussions.

Simplified, the case study showed the following: acceptance and perceived quality increase with process discussion. indiGo supports this discussion well. Due to the (potential) involvement of all organizational members, improvement suggestions concerning the processes could be collected that would not have been (practically) collected in classical, workshop-based process modeling.

4 Outlook

The case study mentioned above is the starting point for the further evaluation of the indiGo method. Experiences and data will be collected during the next applications of indiGo at IESE and industrial customers. By using the infrastructure set up by the case study, further introductions of processes via indiGo will be evaluated and the evaluation will be extended to the operational phase. Of particular interest in the operational phase will be collaborative problem solving during process execution.

The future work within the scope of the indiGo project is the improvement of the methodology and platform based on the results of the case study. The focus will be on text-mining techniques - using the contributions from the case study - to support the eModerator and participants in process learning. This includes creating suggestions of summaries and lessons learned, which are currently done manually.

Acknowledgements

indiGo (Integrative Software Engineering using Discourse-Supporting Groupware) is funded by the German Ministry for Education and Research (BMBF) under grant number 01 AK 915 A [see <http://indigo.fhg.de/>].

Thanks go to Astrid Haas for her work on eModeration and Torsten Willrich as well as Markus Nick for their help in the development of indiGo. We also thank our students for their work on the first prototypes of the indiGo technical architecture and process model processing framework.

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