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## Interactive workflow mining—requirements, concepts and implementation

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### Abstract

Many information systems log event data about executed tasks. Workflow mining is concerned with the derivation of a graphical workflow model out of this data. Experience from applying our workflow mining system InWoLvE in experiments and practical applications has shown that workflow mining is a highly interactive process. The mining expert iteratively approaches the result by varying the parameters of the mining tool and verifying the mined models. Our tool InWoLvE was not designed for intensive interactive usage. In this paper, we report about a rigorous requirements analysis and about possible solutions related with the support of such interactivity. Two selected solution concepts are explained in more detail. First, a special layout algorithm that is stable against small changes of the model thus allowing the workflow mining expert to maintain a mental map of the workflow. Second, a validation procedure that helps the expert to check event sequences against the (preliminary) mined model. These and other important concepts have been implemented in a prototype called ProTo.

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## 1. Introduction

### 1.1. The role of workflow mining in workflow design

Today, business process (re-)design is usually followed by an implementation of the redesigned process in an information system (IS). Such software systems are also called process-aware information systems (*p-IS*). The main focus of traditional IS is to support the execution of single tasks, for example, transaction management, context dependent information and decision support. In contrast, one of the main goals of the introduction of a *p-IS* is to help to drive the business *process*, that is, to steer the process participants way of working. One of the most critical tasks in *p-IS* development is the design of the related workflow. The term workflow thereby refers to the part of the business process explicitly supported by the software system.

Every single member of an organization has good knowledge about how to get his work done. To design the business process and workflow, respectively, a more global view is needed: the knowledge of the single process participants has to be compiled into one global process. In literature, the effort to acquire and adapt the business process and workflow is estimated to need about 60% of total *p-IS* development time [15,34,21].

Hence, business process and workflow design support is needed. Over the last decade, research related to workflow management was mainly concerned with workflow modelling, simulation and implementation (e.g., workflow management systems) [3]. More recent work concentrates on workflow diagnosis and performance analysis, that is, the support of activities that monitor and analyze the execution of workflow *enactment*. Studying the workflow design process from an organization sciences perspective shows the importance of this workflow lifecycle phase [18,19]. With respect to Fig. 1, this is a shift in focus from “a priori” process/workflow modelling and design to “a posteriori” process/workflow enactment diagnosis.

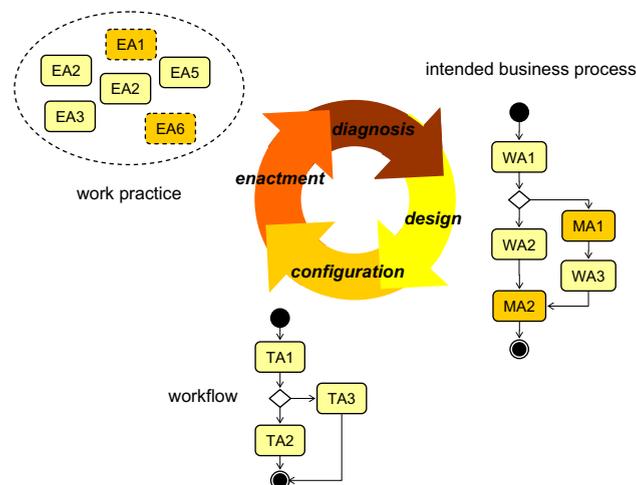


Fig. 1. Workflow lifecycle products.

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