Sharing Methodological Knowledge with REGAL:
“Requirements Engineering Guide for All”

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Abstract

This paper presents a repository-based tool for sharing RE (empirical or theoretical) methodological knowledge, and improving it collaboratively. Methods are documented in our tool with methodological patterns. The originality of our tool is threefold: (i) the structure of methodological patterns can evolve, (ii) it is also possible to adapt the structure of the pattern repository, and (iii) configuration management features are proposed to enrich the content of the repository collaboratively.

1. Introduction

Our experience in the industry showed us that indeed “the need for a better productivity of system engineering teams...motivates the development of solutions to adapt methods to the project situation at hand” [1]. All the existing approaches such as situational method engineering [1] [2], or method assembly [3], exploit a method base [4] [5]. However, we observed that: (i) industrials do not access to such bases, we believe that they feel their particular issues and questions are not well answered by these bases (for instance they do not want all-or-nothing methodologies) (ii) the flexibility of most existing bases available over the internet is very limited as their structure is pre-defined and it is difficult to adapt them from one context to another, and (iii) their content is not managed in the long time; these bases usually do not propose enrichment features. To summarize, there is a problem with flexibility and evolution.

The tool presented here aims at being an easy-accessible, context-driven RE methodological repository, open to every person who has a stake in RE (industrials, experts as well as researchers or students), providing guidance for punctual or more global (process-wide) problems, and being able to evolve both in content and structure. Our goal is to facilitate the sharing of different kinds of knowledge ranging from very formal process descriptions, to informal experience report, tool usage guidance, empirical know-how and best practice.

The tool, initially named DBATER, was developed for general purpose then adapted with the INCOSE RE3WG working group. The INCOSE customization of the tool is called REGAL. It is currently populated with information gathered by the group in a survey on RE best practices in systems engineering.

The next section presents our approach. It shows how methodological knowledge is organized, its evolution managed and structure adapted. Section 3 concludes by showing how our tool was adapted to conform to the requirements of INCOSE.

2. Technical approach

Our approach is based on methodological fragments [1] in the form of patterns. Introduced by C. Alexander [6], patterns can be defined as “expressing a relation between a certain context, a problem, and a solution”. Patterns have been widely adapted in software engineering. Our definition is very basic: a pattern capitalizes experience “by capturing repeatable solutions answering to a recurrent problem, and is usable in a clearly identified context”.

Patterns are often structured with pre-defined templates. In addition to a recipe a pattern template can contain other elements such as costs/benefits/risk analyses, application examples, indications on how to adapt the pattern to a specific context, or experience reports. For the sake of simplicity Figure 1 shows the pattern structure under the form of a single entity. In fact, the basic information (name, force, description, example), is completed with extra elements under the...
form of two additional entities, one defines types of pattern elements, the other carries their values. Users can make comments and evaluations on each pattern element and propose versions. Comments are organized into a hierarchy like in web-based discussion groups. Evaluations are global. They are used to provide an overall benchmark to users. Pattern evolution is supported by versions of pattern elements. Among all versions, one belongs to the current repository release, the others to old releases of the repository or to the release under development.

Figure 1 Overview the tool repository. The complete schema contains 20 entities and 26 relationships.

We believe that links are particularly important. They can organize the repository, provide information on the methodological process, or group methodological patterns that have to do with each others. Figure 1 shows that the links defined in the repository form an adaptable network. Each node in the network has a category and is an entry point for a group of patterns. Links are binary. Different types of links and entry points can be defined, hence creating different kinds of networks, for instance a typology, an AND/OR goal hierarchy, a similarity network, or process models.

To summarize, (i) each pattern can be enriched collaboratively using element versions, releases and structured discussions, (ii) the repository is organized in a network; types of nodes and link can be adapted any time, and (iii) the structure of methodological patterns is not pre-defined either; it can also be adapted on the fly.

3. Application with REGAL

Some adaptations were made on the initial DBATER tool to develop REGAL. Indeed, the INCOSE RW3G had already identified a number of best practices and documented them with Doors. A function was thus needed to transfer these data from Doors to REGAL through XML files. An administrator role was also introduced to control evolutions and deliver releases of the repository. Some elements of the user interface had to be changed. Other feature such as specific presentations of process networks were not needed for REGAL hence removed.

The initial model of the database was structured around techniques needed by actors to answer questions while achieving activities.

As shown in the snapshot of the tool homepage presented in Figure 2, these concepts were introduced in REGAL using its adaptation facilities. Techniques were defined with patterns and questions stored using the problem table. Two categories of entry points were created: one to identify “roles and actors”, the other one to group patterns into “activities”.

Figure 2: Snapshot of REGAL. The tool is available at http://p-ring.net/.

REGAL is still in a test phase. First users and thus feedback are awaited for June 2005. A first in situ evaluation is foreseen in order to demonstrate its usability and efficiency.

References