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Editorial

## Eighth International Workshop on Requirements Engineering—Foundation for Software Quality (REFSQ'02)

### 1. Introduction

Requirements engineering (RE) is continuing to be a focus of both critical industrial improvement efforts and vital academic research activities. Much has happened since RE became a recognized discipline of its own in the early 1990s, but it is still one of the most crucial parts of software development today. The research community is continuing to grow and the set of practitioners with special competence in RE is enlarging. University education in RE is represented in Information Systems Engineering and Software Engineering curricula around the globe and the inherent cross-disciplinary nature of RE provides many exciting opportunities of combining existing knowledge with new challenges in order to solve industrially relevant problems.

This special issue includes five extended, revised and re-reviewed papers selected from the Eighth international workshop on 'Requirements Engineering—Foundation for Software Quality' (REFSQ'02) held in Essen, September 9th and 10th, 2002 [1], in connection with the 10th International Requirements Engineering Conference (RE'02). The REFSQ workshop series provides an annual, highly interactive forum for groundbreaking research in RE. The selected best papers cover topics including: RE as a decision process, controlled experimentation on the understandability of specification styles, policies and frameworks for security and privacy requirements, and consistency and completeness checking in evolving specifications. A wide range of interesting results and important directions of further research are provided.

The REFSQ workshop series is an important event in the RE community that promotes the investigation and discussion of the relations between requirements engineering and software quality. More precisely, REFSQ invites publication and dialog regarding new solutions to known RE issues, ideas that are likely to initiate new threads in RE research, industrial problem statements, and generalisations from industrial experiences. The workshop also aims at intensive interaction between its participants and provokes discussion by guiding presentations, individual paper

discussions, as well as topic discussions at the end of each session.

The REFSQ'2002 Call for Papers invited general submissions addressing a wide range of issues such as the understanding and improvement of known RE processes, new methods and method engineering approaches to RE, empirical evaluations of RE methods and tools, studies of industrial RE practice, and trans-disciplinary theories of and paradigms for RE. Besides, new ideas and groundbreaking on-going research at the service of software quality were especially welcomed this year.

### 2. The articles

The selection of best papers was based on the ranking by the REFSQ Program Committee, as well as reviewers' comments, and discussions during the workshop. The authors were asked to re-submit their papers in a revised and extended version suitable for journal publication. Three reviewers were appointed for an additional cycle of review on each paper. After this second review cycle, five excellent papers were accepted, some of them with minor revisions, others on the condition of specific improvements. These papers provide an interesting sample of the current RE research frontier.

The first paper '*The Fundamental Nature of Requirements Engineering Activities as a Decision-Making Process*', by Aybuke Aurum, and Claes Wohlin investigates the applicability of two classical decision-making models to the requirements engineering process in order to better understand and improve decision-making in RE activities. There is indeed a great need to find out what may be learned from research that has been conducted in other areas, such as organization theory, in order to improve the RE process. The paper makes a useful contribution in suggesting the comparison with decision-making activities. The authors review a number of existing RE process models and investigate one in depth with respect to the decisions involved, and in the light of the two classical

decision-making models. The results of this analysis indicate how the stakeholders are involved in decision making during the RE process. Such an approach greatly improves our understanding of the decisional nature of RE processes, in particular with respect to the distinction between macro and micro decisions. More can be done in the area; for instance to better understand other aspect of RE processes such as responsibility, politics, fear to take decisions, etc.

The second paper, *'A Controlled Experiment to Evaluate How Styles Affect the Understandability of Requirements Specifications'* by Erik Kamsties, Antje von Knethen, and Ralf Reussner, reports on an experiment seeking to test the impact of the requirements specification style on reading performance and measure the understandability of different requirements specification styles from the customer's viewpoint. In particular, the paper provides a comparison between an object oriented specification style using SCR (called black box) and a white box specification style of requirements specification using UML. Black box specification is focused on externally visible behavior, and internal details are omitted from the requirements as much as possible. White-box specification is focused on the behavior of its constituent entities such as objects, blocks, and modules. The results of the experiment confirm the common belief that black-box requirements specifications are easier to understand from a customer point of view than white-box specifications. Questions about particular functions and behavior of the specified system were answered faster and more correctly by the participants. This result suggests that using a black-box specification style when communicating with customers is beneficial. We need more controlled experimentation in RE, and this work represents a significant contribution in the on-going development of a family of scientific experiments in requirements engineering that can corroborate or refute common beliefs and unsubstantiated conjectures.

In the third paper, *'Precluding Incongruous Behavior by Aligning Software Requirements with Security and Privacy Policies'*, Annie I. Anton, Julia B. Earp, and Ryan A. Carter provide research results on the cross-checking of requirements compliance with security and privacy policies. The early identification of conflicts between security and privacy policies are particularly relevant when developing web-based applications. This paper proposes the EPRAM framework (Evolutionary Prototyping with Risk Analysis and Mitigation) to identify such conflicts in the RE process, thus enabling analysts to solve them in the early phases of software projects. Several industrial software development projects are presented as a way to validate the approach. The authors are automating the heuristics that they have already formalized and are looking for a way to formally specify security and privacy policies. The use of an ontology for reducing conflicts was already explored, but experience showed that a standard terminology is very seldom employed. A taxonomy of privacy goals and security goals

was developed (and presented at the RE'02 conference) and is proposed as an additional tool to elicit and validate security and privacy requirements. The discussion is concluded by pointing out the need for comparing and generalizing the results found in the context of e-commerce and web system development to the broader software development processes.

The fourth paper, *'Modelling Access Policies using Roles in Requirements Engineering'* by Robert Crook, Darel Ince, and Bashar Nuseibeh, looks at using roles as a basis for assigning access rights to software system facilities with respect to security and specific concern on confidentiality, integrity and availability. The paper analyses work from organizational theory to identify modeling primitives for describing roles and relationships between roles. The findings from that analysis are then incorporated into a framework that is intended to be useful in the context of expressing security requirements. The framework is illustrated using a health care example with a new graphical notation developed for representing security policy definitions. The paper provides a novel and very interesting step towards a more systematic approach to the analysis of security requirements.

The fifth paper *'On the Interplay between Consistency, Completeness, and Correctness in Requirements Evolution'* by Didar Zowghi and Vincenzo Gervasi suggests a new formal definition of correctness by the notion of completeness and consistency of an evolving collection of requirements. Based on a framework for requirements evolution, a technique is proposed to check consistency and completeness while enriching a collection of requirements in combination with a growing domain base. A complete example is given that illustrates how the approach can be used to detect errors and ensure evolutionary correctness. Finally, the practical usage of the approach is discussed in relation to the pragmatics of reality, process issues, and implications to education and training. The improved understanding of quality properties is a very important quest for research, and this paper provides a notable foundation for many interesting paths forward in the pragmatic use of mathematics in requirements engineering practice.

The five selected papers provide a sample of REFSQ papers that expose the variety of the topics dealt with, ranging from informal to formal, from conceptual to empirical, and from maturing to mature research. A general objective of REFSQ is to bridge borders and promote cross-disciplinary dialogue in both Information Systems and Software Engineering. We hope that this special issue will give you interesting insights into the challenging area of Requirements Engineering.

We look forward to carry on the highly interactive and novelty-promoting workshop tradition when REFSQ'03 takes place in Klagenfurt/Velden, Austria, in conjunction with the CAiSE'03 Conference. More information is available here: <http://www.refsq.org>

We would like to thank all the anonymous reviewers for their careful consideration of the papers invited to this

special issue. Special thanks to the attendants of the eighth previous REFSQ workshops, researchers and practitioners from various disciplines who have contributed to improve the definition and implementation of quality requirements. We also thank the invaluable support of the REFSQ Advisory Board with Eric Dubois, Andreas Opdahl and Klaus Pohl.

## References

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3-922602-86-X, 2002. The REFSQ proceedings from this and previous years can be ordered from Klaus Pohl (pohl@sse.uni-essen.de)

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