



Presentation

## A Different Focus on Software Engineering

*Luis Fernández-Sanz, Juan-José Cuadrado-Gallego, and Maya Daneva*

Software Engineering (SE) has been driving the evolution of software development since the late sixties. So much has already been said about this discipline that we tend to think that yet another collection of contributions about topics so frequently addressed in journals or conferences is unlikely to offer readers a different perspective on the major challenges facing this discipline. Although every software developer has at least once wanted to see him or herself as somebody who performs development as a sound and genuine engineering process, a great many factors play a role in the success of the actual implementation of software engineering philosophy in daily practice.

We need to pay attention to a large number of issues if we want to experience the much vaunted benefits of an SE approach: software as a truly engineered product, the general improvement of software quality and user satisfaction, fewer delays and budget overruns, etc. Clearly software engineering is the way to achieve these objectives, but not all the concomitant problems stem from traditional issues involving technical matters or methodologies.

In this joint monograph of **UPGRADE** and **Novática** we have decided to focus on those topics which do not form

part of the traditional core of typical SE books but are perhaps fundamental to the real success of SE both now and in the future.

This issue includes an interesting set of papers covering various key areas related to topics such as the application of SE principles to software development and maintenance in areas like education for an engineering discipline based on the SWEBOK (Software Engineering Body of Knowledge) framework; the efficient use of methodologies and notation (UML, Unified Modeling Language); quality assurance in specific areas such as open source components or quality data availability and conformance to standards of important project repository data such as ISBSG (International Software Benchmarking Standards Group); the human factor in SE projects from the viewpoint of standards and methods; the social and qualitative side of SE; and, last but not least, how to achieve an effective application of SE principles to web engineering. We have selected these topics because we believe them to be potential hot spots that are already influencing the future of SE.

"*Analysis of Software Engineering from An Engineering Perspective*", by **Alain Abran** and **Kenza Meridji** (*École*

### *The Guest Editors*

**Luis Fernández-Sanz** received a degree in Informatics Engineering from the *Universidad Politécnica de Madrid*, Spain, in 1989 and a PhD in Computer Science from the *Universidad del País Vasco*, Spain, in 1997 (receiving a special mention for his doctoral thesis). Since 2000 he has been the head of the Computer Systems Dept. at the *Universidad Europea de Madrid*, Spain. Since 1992, he has been editor of the Software Engineering section of *Novática*, and co-editor and founder of REICIS (Spanish Journal of Software Quality, Engineering and Innovation, <<http://www.ati.es/reicis>>) both published by the Spanish CEPIS society ATI (*Asociación de Técnicos de Informática*). He has guest-edited several monographs for *Novática* and *UPGRADE*, and has authored or co-authored several books about Software Engineering and software measurement, as well as a number of papers in international journals and conferences. He leads the Software Quality Special Interest Group of ATI in which capacity he has acted as chair of the Spanish Conference on Software Quality and Innovation organized by ATI. <[luis.fernandez@uem.es](mailto:luis.fernandez@uem.es)>

**Juan-José Cuadrado-Gallego** is Full Professor at the Computer Science Dept. of the *Universidad de Alcalá*, Spain. Previously he was teaching in different universities in Spain and other European countries. He earned his PhD in Computer Science Engineering in 2001. His research activity is centered in the Software Engineering area, especially in software measurement and he is authoring of more than fifty scientific publications in journals, conferences and books. He is co-editor and founder of REICIS

(Spanish Journal of Software Quality, Engineering and Innovation, <<http://www.ati.es/reicis>>) published by the Spanish CEPIS society ATI (*Asociación de Técnicos de Informática*). Nowadays he belongs to the Information Engineering Research Unit at the *Universidad de Alcalá*, where he is the leader of the Software Engineering and Software Measurement research line, and also belongs to the Software Engineering Research Laboratory of the *Université de Québec*, Canada. <[jjcg@uah.es](mailto:jjcg@uah.es)>

**Maya Daneva** has been a Senior Research Scientist with the Information Systems Group, Department of Computer Science, University of Twente, The Netherlands, since November 2004. Prior to this, she collected 9 years of Enterprise Resource Planning implementation practice as an SAP process analyst at TELUS Mobility, the second largest wireless telecommunication company in Canada, where she was consulting on SAP reference architecture models, requirement engineering processes and requirements reuse metrics. Before 1996, Dr. Daneva was a Research Associate in the Institute for Information Systems, at the University of the Saarlandes, Saarbruecken, Germany, where she headed research projects with consulting companies on software process and product improvement and benchmarking. She has authored more than 50 papers published by IEEE Computer Society, ACM Press and Springer. She was nominated twice for best industry paper award at the International Conference on Requirements Engineering, 2003 and 2005. <[m.daneva@utwente.nl](mailto:m.daneva@utwente.nl)>

de Technologie Supérieure – Université du Québec, Montréal, Canada), is a keen analysis of the implications of the concept of engineering (mainly as described in a famous book by Walter G. Vincenti) in the accepted SWEBOK framework, showing how the field of design knowledge is broader than that covered by SWEBOK but is on a par in terms of quality assurance. These results are the first in a series of research efforts dealing with the comparison of the above two reference documents.

"*Researching The Social Side of Software Engineering*" is a paper covering an emerging view of SE that has not attracted much attention in traditional SE events. The social side of software engineering is still an under-researched area and the challenge is to ensure that research follows appropriate qualitative social science methods and approaches. The author, **Yvonne Dittrich** (Software Development Group, IT University of Copenhagen), provides an overall view of the state-of-the-art in this developing field, identifying the central challenges and proposing ways to address them: e.g. how to make software development visible, how to combine methods borrowed from social sciences with software process and method improvement, and how to handle the political side of this kind of research.

"*Using UML™ 2.0 to Solve Systems Engineering Problems*" by **Ian Barnard** (Telelogic) is based on a previous paper by the author and is focused on the benefits that version 2.0 of UML can offer to software development throughout all its phases. This approach obviously needs the support of tools, but it highlights the interesting relationship between models in UML 2.0 and the verification of artefacts and generation of test cases. In fact, it is actually guided through models (not a new idea) but the paper considers the problems for a truly practical application. The influence of the new version of UML on this process is also analysed. We included this contribution as a means of covering the role of UML and other methodological considerations in the present status of software engineering.

A group of researchers from the University of Magdeburg, Germany, under the leadership of **Reiner R. Dumke**, present a lightweight and on-demand composition of software measurement services to derive quality indicators specially customized for Open Source components. Free open source components have usually been viewed with suspicion by industry as being defect-prone. In fact it is not unusual for there to be no structured or well-defined way to check the quality of such code in daily practice, so its use seems to be based on emotional confidence. The paper "*Applying Service-Oriented Software Measurement to Derive Quality Indicators of Open Source Components*" (written by **René Braungarten**, **Ayaz Farooq**, **Martin Kunz**, **Andreas Schmietendorf** and the abovementioned **Dr. Dumke**) is based on sound measurement principles of Object Oriented metrics with an easy to use approach for tool support.

But quality control is not just limited to defect detection in project deliverables. Quality models such as ISO 9126 provide a complete framework in which software quality

can be analysed. In many cases, software effort estimation tends to forget the major role played by quality as one of the three main factors for project management (time, effort, quality). The paper "*ISBSG Software Project Repository & ISO 9126: An Opportunity for Quality Benchmarking*", by **Laila Cheikhi**, **Alain Abran** and **Luigi Buglione** (École de Technologie Supérieure – Université du Québec, Montréal, Canada), provides an interesting analysis of the well-known ISBSG project data repository to check whether the principal quality characteristics covered by ISO 9126 are actually present in this data collection. This type of study focusing on the validity and usefulness of collected data is vital if we are to avoid something that is all too frequent in SE: the lack of reliable information on which to base decisions.

Web applications underwent an almost exponential growth in the late nineties in terms of volume, number, and importance, and now the term web engineering is firmly established as a reality for software practitioners. However, the special nature of web applications call for the customization and adaptation of analysis and elicitation processes. **Stephanos Mavromoustakos** and **Katerina Papanikolaou** (School of Computer Science and Engineering, Cyprus College) offer a new vision of needs analysis for web software projects as well as a number of important ideas to bear in mind when dealing with user requirements in this type of projects. In fact the paper "*Requirements Elicitation in Web Engineering*" is not so very far away from the social side of SE described by Dr. Dittrich in this issue.

Finally, "*The Human Factor in Software Engineering*", by **Luis Fernández-Sanz** and **María-José García-García**, (Universidad Europea de Madrid, Spain) is aimed at presenting an overview on how job profiles and positions for software development are covered by standards, methodologies and international job classifications. The paper presents the importance of this topic in the context of the influence that human resources have on software development productivity and quality. By way of a conclusion, the paper highlights the need to continue working on the clarification and unification of professional and educational frameworks, curriculum proposals, code of ethics and professional behaviour, job profiles, certification, etc.

We hope these contributions can be considered as a representative selection of the emerging issues in the extremely broad field of software engineering. Obviously, despite their importance many areas have necessarily been omitted from this issue, but we believe that the quality of the authors and the interest of the content will be more than enough to satisfy the needs of our readers.

We will finish this presentation expressing our recognition to the authors by their valuable contribution, and to the editors of **UPGRADE** and **Novática** for the opportunity given of publishing this collective work.