A First Step Towards the Web Engineering Body of Knowledge

Antonio Navarro, José Luis Sierra,
Alfredo Fernández-Valmayor, and Baltasar Fernández-Manjón

Dpto. Sistemas Informáticos y Programación, Universidad Complutense de Madrid, C/
Profesor José García Santesmases s/n, 28040, Madrid, Spain
{anavarro, jlsierra, alfredo, balta}@sip.ucm.es

Abstract. The *Software Engineering Body of Knowledge* (SWEBOK) is an IEEE-led project that provides an explicit characterization of the boundaries of software engineering. Inspired by SWEBOK, this paper proposes the formulation of a *Web Engineering Body of Knowledge* (WEBOK), an effort similar to SWEBOK for the Web engineering domain. The main goal of WEBOK development will be the explicit characterization of the boundaries of Web engineering. In addition, WEBOK will identify the areas of Web engineering more closely related to software engineering, and others that have evolved from software engineering principles. Finally, WEBOK will identify some areas of Web engineering where further research is necessary. Due to the great effort represented by WEBOK development, this paper presents a limited version of this with two purposes: (i) to serve as a first step towards WEBOK; and (ii) to promote the total development of WEBOK by the Web engineering community.

1 Introduction

The *Software Engineering Body of Knowledge* (SWEBOK) is an IEEE-led project that provides an explicit characterization of the boundaries of software engineering [8]. The body of knowledge is subdivided into ten software engineering *Knowledge Areas* (KAs): software requirements, software design, software construction, software testing, software maintenance, software configuration management, software engineering management, software engineering process, software engineering tools and methods and software quality. The descriptions of KAs are designed to discriminate among the various important concepts, thereby permitting readers to find their way to subjects of interest quickly [8].

The objectives of SWEBOK are: (i) to promote a consistent view of software engineering worldwide; (ii) to clarify the place (and set the boundary) of software engineering with respect to other disciplines; (iii) to characterize the contents of the software engineering discipline; and (iv) to provide a foundation for curriculum development and for individual certification and licensing material.

According to Murugesan et al. [6] *Web engineering* can be defined as the application of a systematic, disciplined, quantifiable approach to development, operation, and maintenance of Web-based applications or the application of engineering to Web-based software. In spite of the similarity between this definition and the IEEE definition of software engineering [3], Ginige, Murugesan and Pressman [2][7] consider Web engineering to be a new emerging discipline in its own right, rather than sub-

sumed into software engineering. Therefore, we think¹ it is necessary to develop a *Web Engineering Body of Knowledge* (WEBOK), inspired by SWEBOK, but taking into account the special characteristics of Web engineering [1].

The Guide to the SWEBOK² [8] has been developed by hundreds of reviewers worldwide. In the same manner, we think that the Guide to the WEBOK should also be developed by a sufficient amount of reviewers in the Web engineering community to assure a body of knowledge agreed upon by consensus. Therefore, this paper is not so much a characterization of a body of knowledge as a seed for such a characterization. In addition, the WEBOK proposed in this paper resembles the KAs identified by the Guide to SWEBOK. We think that these KAs are consistent with the Web engineering domain and do not need to be changed, at least in this first step. Moreover, in SWEBOK, every KA is divided into several *sub-areas*, which are divided into *topics*. Due to the lack of space, in this paper we will focus mainly on these knowledge areas.

2 Conclusions and Future Work

We agree with Ginige, Murugesan and Pressman that Web engineering and software engineering are different disciplines. The great amount of specific literature about Web engineering, and our own experience designing and developing the *Virtual Campus* of the Universidad Complutense de Madrid [9], seems to support this claim. Therefore, we defend the interest of an explicit formulation of the WEBOK as the result of a shared effort by the Web engineering community.

Regarding KAs, software design and software engineering process are the ones that have received more attention from the Web engineering community. In our opinion, this success is due to: (i) the inherent need to organize the development process; and (ii) the need for design notations to characterize the design of a Web application. These *reality-driven* constraints have promoted the rise of these two KAs.

Pushed by software design KA, tools and methods areas have also had a significant impact, providing CASE support to the design notations presented in Web engineering. In our opinion, more feedback is needed about the use of these tools and the design notations that inspire them.

Finally the important KA of software requirements has found less impact in Web engineering than design KA. Work done in this direction is very important, and, in our opinion, more feedback is needed from the industry and the academy. For example, is the IEEE Std. 830 [4] a suitable way of characterizing the requirements of a hypermedia application? We think that this question is well worth further analysis.

The rest of KAs of SWEBOK are tightly related to Web engineering, but, again, we think that more feedback is necessary from industry and academy. In particular, software testing and related disciplines should be explored.

¹ We were not aware of the Kappel's proposal [5] when we proposed the development of the WEBOK, but we agree with her

² For the sake of conciseness, in this paper we do not differentiate between a body of knowledge with its guide, although in practice, they are different things

Future work with WEBOK must involve the participation of the overall Web engineering community and should be aimed in two directions. Firstly, to expand and to complete the ideas presented in this paper Secondly, to explore in depth the KAs in order to determine the differences between software engineering and Web engineering. As a main result of this exploration, new KAs could emerge, and existing KAs could be changed or removed.

Acknowledgements

The Spanish Committee of Science and Technology (TIC2001-1462, TIC2002-04067-C03-02 and TIN2004-08367-C02-02) has supported this work.

References

1. Deshpande, Y., Hansen, S. Web Engineering: Creating a Discipline among Disciplines. IEEE Multimedia. 2 (2001) 82-87
2. Ginige, A., Murugesan, S.: The Essence of Web Engineering-Managing the Diversity and Complexity of Web Application Development. IEEE Multimedia. 2 (2001) 22-25
3. IEEE Std. 610.12-1990 IEEE standard glossary of software engineering terminology
4. IEEE Std. 830-1998 IEEE recommended practice for software requirements specification
5. Kappel, G. Web Engineering, Old Wine in New Bottles? International Conference on Web Engineering 2004. Invited Talk. http://www.icwe2004.org/download/ICWE_Kappel.pdf
6. Murugesan, S., Deshpande Y., Hansen, S., Ginige, A.: Web Engineering: A New Discipline for Development of Web-Based Systems. Web Engineering, Software Engineering and Web Application Development. LNCS Vol. 2016 (2001) 3-13.
7. Pressman, R.S.: Software Engineering: A Practitioner's Approach. 5th edition. McGraw-
8. SWEBOK Project Website. Guide to the Software Engineering Book of Knowledge. <http://www.swebok.org>
9. UCM Virtual Campus. <https://campusvirtual1.ucm.es/cv/>