The Requirements Engineering Body of Knowledge (REBoK)

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***Abstract*—A body of knowledge is a term used to represent the complete set of concepts, terms and activities that make up a professional domain. It encompasses the core teachings, skills and research in a field or industry. So far, the discipline of RE is lacking an official Requirements Engineering Body of Knowledge (REBoK).**

This working session brings together researchers and practitioners to elaborate the goals, requirements and constraints for a REBoK that shall serve as commonly agreed basis for developing a draft over the following months.

***Index Terms*—Requirements Engineering; Body of Knowledge; REBoK; RE Interactive; Requirements Engineering Education;**

I. Motivation

As first-year PhD student we would have loved to have a Body of Knowledge (BoK) to get a better overview of the field of Requirements Engineering. As postdocs we would like to have a BoK to quickly review potential related works and crosscutting topics. As lecturers we would like to have a BoK to refer our students to and send them exploring. As practitioners we would like a BoK to be able to get a quick start into a new (sub-)topic that we might need for our work but are not yet an expert in. Why would *you* want to have a REBoK?

The purpose of this working session is to discuss what a common vision for a requirements engineering body of knowledge should be and what our major requirements for such a body of knowledge are. This provides the basis for future efforts to establish such a body of knowledge. Such a body of knowledge could facilitate research, practice, and education alike. We do not expect BoKs to be as contentious a topic as certification, but we might have some lively discussion on their role and value as we are sure there are different opinions on these in the RE community. Therefore, it is important to base any work on a BoK on an agreed set of requirements and this session shall be the first step.

Contribution: This working session brings together researchers and practitioners to elaborate objectives, requirements and constraints for a REBoK to serve as commonly agreed basis for developing a draft over the upcoming months.

II. Previous Work

There are five major sources of information in form of bodies of knowledge and other previous works that will provide input for an official REBoK.

The most well known body of knowledge is the Software Engineering Body Of Knowledge (SWEBOK) that also includes a section on requirements engineering [4]. One of the authors of the requirements engineering section, Pete Sawyer, also provides an input vision for the REBoK in the working session according to his statement in Sec. III.

The Japanese REBoK [7], [2] by has been developed in 2008/09 by Mikio Aoyama et al. for the Japan Information Technology Services Association, which was presented and discussed at the Intl. Conf. on Requirements Engineering in 2010 [1]. The Japanese REBoK has not been translated to English, but it serves as a central input for our common effort as Mikio Aoyama also provides an input vision for the REBoK session, see Sec. III.

The Business Analysis Body of Knowledge [5] is the other important body of knowledge that serves as input for the REBoK. Business Analysis and Requirements Engineering overlap and have to go hand-in-hand, so the RE community can benefit from their practices as well as their guide to a BoK.

The syllabus for the IREB Certified Professional for Requirements Engineering [6] encompasses the contents that have to be mastered for a certification by IREB. Martin Glinz, who authored the IREB Glossary of RE Terminology presents another input vision for the REBoK session, see Sec. III.

Finally, the Requirements Bibliography [3] by Al Davis provides a bibliography of 6000 requirements-related papers and books. Although the bibliography is no longer maintained and updated, it may still serve as a source of information.

With this knowledge base of previous work, the RE community is now well prepared to define an official body of knowledge for their different educational purposes.

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III. REBoK Visionaries

The REBoK visionaries are five requirements engineering educators from academia and practice who, inter alia, work or have worked on various body-of-knowledge efforts around the world. Each of them presents their vision of a REBoK to kickstart discussion and inspire the session participants.

A. Mikio Aoyama (Nanzan University, JISA REBOK [7])

"During the development of a REBOK in JISA (Japan Information technology Services industry Association), we envisioned that REBOK should be a common language for all the stakeholders to share the knowledge and practices on requirements engineering ranging from business requirements, to systems and software requirements."
http://www.seto.nanzan-u.ac.jp/~amikio/NISE/eng/index.html

B. Oliver Creighton (Requirements Engineering Expert at Siemens AG)

"We need a REBoK as a consolidated foundation for education and training of practitioners to ensure that (1) commonly established, basic practices can be quickly and appropriately adopted by anyone, (2) feedback on requirements engineering practices from daily business in industry can be systematically brought to the attention of researchers, and (3) new insights from research are transferred to practice in an easily accessible knowledge source."

C. Sarah Gregory (Sr. Methodologist, Systems and Requirements Engineering, Intel Emergent Systems & Coaching)

"Knowledge alone is mere data; the REBoK must coexist with a REBoP a 'body of principles' that enables practitioners to have a shared understanding of RE taxonomies and practices, and to successfully apply RE knowledge in a vast variety of circumstances, use the most effective techniques at any given time, and refactor as needed to address the evolving needs of the product, project, program, or team."

D. Martin Glinz (University of Zurich, author of the IREB Glossary of RE Terminology [6])

"The REBoK project is a great opportunity for creating a compact and comprehensive description of current as well as emerging RE knowledge and practices. Having worked on RE terminology, I highly appreciate the value that a well-crafted REBoK will contribute to our field."
http://www.ifi.uzh.ch/~glinz

E. Pete Sawyer (Univ. of Lancaster, SWEBOK [4])

"In the SWEBoK section on requirements we were constrained to address only software requirements - naturally enough. A REBoK should take a very much more systems-wide view, with a greater focus on requirements discovery and modelling. It's main purpose should be to advance the state-of-the-practice; not merely reinforcing existing practice, nor pushing emergent research results prematurely. It thus needs to be a living, curated entity that can (slowly) evolve."
http://www.comp.lancs.ac.uk/~sawyer/

IV. Setting and Format

Since the format of a working session has not been a fixed format at RE throughout the past years, we explain our idea of the setting and format of the session.

a) Size: In order to be a real working session, the audience is limited, probably around 20-30 people. Most likely, having a session slot on Friday morning will do the job already — only motivated contributors make their way.

b) Audience: All interested, active stakeholders (wanting to contribute) are welcome. It is a mix with a representative part of 'knowledge pools', for example, experienced researchers, lecturers, and practitioners, and a representative part of 'knowledge seekers', for example, potential users, young researchers, and early-stage practitioners, to include all viewpoints.

c) Time: This first working session is 90 minutes, to allow for sufficient discussion and group working time, and follow up with a half day workshop next year.

d) Idea: The session is moderated by the first author and includes position statements by five invited "visionaries" from academia and industry followed by group discussions on specific aspects to be considered for a REBoK.

e) Supplies / Room: For discussion points and requirements there are big white posters all over the walls, plus lots of post-its and markers. On these white posters, we write the statement summaries and topics (see Fig 1) and let people add their thoughts. In addition, one researcher writes an online protocol, so that the notes are available to all participants directly after the session.

Fig. 1. Sketch of the setting

V. Outline & Interaction

This section explains the outline of the session and the included forms of interaction as well as the set plan for follow-up work on the body of knowledge in order to ensure the efforts lead to continued elaboration of a body of knowledge.

A. Kickoff

After a short introduction to the session that also explains the outline, each of the five visionaries get exactly 3 minutes to present their vision and we prepare criteria for rating them, e.g. ease of use, costs, and some more that might help us prioritize requirements for the BoK.

B. Requirements Gathering

After the kickoff with the statements by the visionaries, people cluster themselves into small groups discussing one of the REBoK subtopics below for 20 minutes, where they contribute with their thoughts via post-its onto the posters stuck to the wall, see Fig 1. Then one representative presents the thoughts of the group to the other groups (10 min). Subsequently, there will be another round of small group discussions in which participants add their thoughts to the posters for 20 minutes. Here participants can decide whether they want to switch topics or stick to the same topic and detail their previous work. The potential group discussion topics are:

- *Statements:*
  - Thoughts on the statements
  - Differing visions of the BoK
- *Requirements elicitation:*
  - Format: Publication? Website? Wiki?
  - What should the size be? Extensive / reductionist?
  - Gathering usage scenarios and stakeholders for the BoK.
  - Gathering a prioritized (if possible) list of requirements and potential constraints for the BoK.
- *Process:*
  - What should the evolution process look like?
  - What should the elaboration process be?
  - Who decides what goes in and what doesn't?

The expectation is not to develop full sets of requirements for all of these categories but to explore a range of them and continue the work online after the conference.

C. Outcome

The envisioned result is a common vision of and prioritized set of requirements for a REBoK. A short summary of the session is reported back at a plenary session of the conference.

D. Further Development

We set up a dedicated email address (rebok@reqeng.org) and an email list that will be used for participants to sign up for follow-up and future involvement in the further development of the REBoK, whether as authors or as reviewers.

The online protocol will be available for additional feedback and comments for a month and then a team of participants who want to contribute and we develop a first draft of the BoK. The plan is to have a half-day workshop on the REBoK at RE'14 to review the BoK, to improve it, and to work on the evolution process.

The work in progress will be made available online at www.requirementsengineering.org [8].

VI. CVs of Organizers

The organizers are requirements engineering researchers, practitioners, and educators with a strong interest in developing a body of knowledge that serves as educational means for academia and industry alike.

Birgit Penzenstadler currently works as postdoc at the University of California, Irvine, on her project "Environmental Sustainability in Software Engineering". She completed her dissertation on the decomposition of requirements at Technische Universität München, Germany, in 2011. She gives courses on RE and sustainability in software engineering, has authored over 30 peer-reviewed publications and has collaborated with BMW, Siemens, Daimler, Lufthansa, and others. More at www.ics.uci.edu/~bpenzens.

Daniel Méndez Fernández is a postdoc at Technische Universität München where he received his doctoral degree in 2011 on the artefact-based customization of requirements engineering. He has authored over 15 peer-reviewed publications, has collaborated in research projects with, inter alia, Cap Gemini sd&m, Wacker, Siemens, and Lufthansa, and investigates the improvement of RE by artefact orientation. More at www4.in.tum.de/~mendezfe.

Debra Richardson is a Professor of Informatics in the Bren School of ICS at UCIrvine. Her current research interests are in exploring how software engineering — requirements engineering and quality assurance, in particular — can be made to address socially relevant problems such as sustainability. More at www.ics.uci.edu/~djr.

David Callele is President of Experience First Design, a consultancy specializing in the needs of high-tech startups particularly in the mobile application market. He is also an Adjunct professor at the University of Saskatchewan with research interests in the application of RE techniques to problems in all domains. More at experiencefirstdesign.com.

Krzysztof Wnuk is a postdoctoral researcher at the Department of Computer Science, Lund University, Sweden. He is currently working on in the SYNERGIES project; a framework program for strategic research in ICT, funded by the Swedish National Science foundation 2013-2016. He received his Ph.D. in 2012 in visualizing, analyzing and supporting decision making in large-scale requirements management contexts.

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