The Shared Language of Crowds:
A Crowd-Sourced Approach to Mapping RSE and SER Terminology

Timo Kehrer
University of Bern

Robert Haines
University of Manchester

Guido Juckeland
Helmholtz-Zentrum Dresden

Shurui Zhou
University of Toronto

David E. Bernholdt
Oak Ridge National Laboratory

The Origin: Dagstuhl Seminar 24161

Research Software Engineering: Bridging Knowledge Gaps

(Apr 14 - Apr 19, 2024)

Organizers:

- **Stephan Druskat** (German Aerospace Center (DLR), Berlin)
- **Lars Grunske** (HU Berlin)
- **Caroline Jay** (University of Manchester)
- **Daniel S. Katz** (University of Illinois Urbana-Champaign)

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Working Group: Developing a Common Language

Members:

- **David E. Bernholdt** (Oak Ridge National Laboratory)
- **Robert Haines** (University of Manchester),
- **Guido Juckeland** (Helmholtz-Zentrum Dresden-Rossendorf),
- **Timo Kehrer** (Universität Bern)
- **Shurui Zhou** (University of Toronto)

Motivation and Goals

Software Engineering Research (SER)

Systematic investigation of SE methods, tools, processes, practices

SE Fundamentals

Research Software Engineering (RSE)

Informal understanding of SE fundamentals through practical experience of creating research software

RSE Practices

Motivation and Goals

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RSE Practices

- Addressing inconsistent terminology for shared concepts.
- Establishing a shared understanding of SE fundamentals.
- Improving awareness and knowledge transfer across communities.

Emerging Questions from Initial Discussions

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Scope & Boundaries

- What is the scope, where to draw boundaries?

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Fundamentals & Core Concepts

- What counts as fundamental?

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Abstraction & Granularity

- What level of granularity is appropriate?

Emerging Questions from Initial Discussions

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- What is the scope, where to draw boundaries?

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- What counts as fundamental?

Abstraction & Granularity

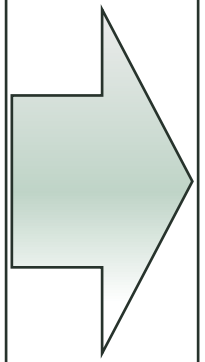
- What level of granularity is appropriate?

Consensus & Alignment

- How to reach consensus?

Approach

- Fundamentals & Core Concepts?
- Scope & Boundaries?
- Abstraction & Granularity?
- Consensus & Alignment?



- ➢ Systematic mapping based on SWEBOK as reference
- ➢ Crowdsourced collection across RSE and SER
- ➢ Web-based platform for community contributions
- ➢ Interactive discussion forum for qualitative insights

Starting Point: SWEBOK 4.0

Section	Heading	Page	Mapping
01	**Software Requirements**	**1-1**	
01.01	Software Requirements Fundamentals	1-2	
01.01.01	Definition of a Software Requirement	1-2	
01.01.02	Categories of Software Requirements	1-3	

Section	Heading	Page	Mapping
05.02	Test Levels	5-6	
05.02.01	The Target of the Test	5-6	
05.02.01.01	Unit Testing	5-6	mapping
05.02.01.02	Integration Testing	5-7	mapping
05.02.01.03	System Testing	5-7	mapping
05.02.01.04	Acceptance Testing	5-7	mapping
05.02.02	Objectives of Testing	5-7	
05.02.02.01	Conformance Testing	5-7	
05.02.02.02	Compliance Testing	5-8	
05.02.02.03	Installation Testing	5-8	mapping
05.02.02.04	Alpha and Beta Testing	5-8	mapping
05.02.02.05	Regression Testing	5-8	mapping

Term Mapping Schema

```yaml
# array of synonyms or adjacent concepts
se_fundamental:

# Short (1 sentence) description of the SE fundamental
fundamental_description:

# array of section identifiers
swebok_section:

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# Reasons/opportunities for the SE research
ser_opportunities:

# References (external links, papers, etc., that may provide useful connections)
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# Date of last review by the editorial board (YYYY-MM-DD)
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```

Term: The oracle problem

Source: SWEBOK section 05.01.02.07

SE Fundamental	RSE Equivalent
• The oracle problem	• Checking with the science lead • Checking prior papers • Gold result

Fundamental description	RSE practice
An oracle can be any human or mechanical agent that decides whether the system under test behaved correctly. If the oracle cannot decide, the test output is classified as inconclusive.	RSEs are not generally aware of the the SER terminology, but do practice the oracle concept. Often through an appeal to expert knowledge or prior results.

SER potential (source) and opportunities	RSE awareness (source) and usage (sources)
3 (expert judgement)	1 (expert judgement)
RSEs *should* know the term 'the oracle problem' and should be thinking about it more specifically as they work. The oracle problem will be increasingly important/challenging in AI-related settings, for example. Strategies for dealing with inconclusive outcomes are also of increasing importance.	3 (expert judgement)

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Definition vs. typical realization

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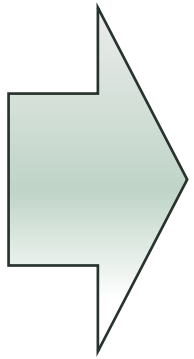
Initial Experience

- Pilot crowdsourcing sessions with mixed RSEs and SERs
- Participant-driven term selection and open discussions
- Insights on terminology granularity and SWEBOK structure
- Identification of shared, differing, and overlapping concepts

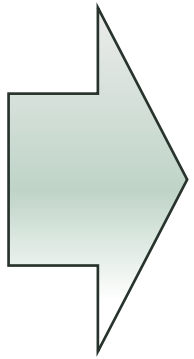
Envisioned Outcome

SE fundamentals unfamiliar to the RSE community



opportunities for education, training, and outreach to promote adoption by the RSE community;

SE fundamentals perceived as less useful by the RSE community



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- What is the scope, where to draw boundaries?

Fundamentals & Core Concepts

- What counts as fundamental?

Abstraction & Granularity

Call for Contribution and Collaboration

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  Concepts?
- Scope & Boundaries?
- Abstraction & Granularity?
- Consensus & Alignment?

on SWEBOK as reference

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