

Literature Survey: Experiments

This document specifies the literature survey of primary studies presenting (controlled) experiments using requirements as input. The task of these experiments represents a requirements-affected activity, and the dependent variables by which they are evaluated are eligible attributes.

Database Search

We conduct a modified database search similar to the method employed by Sjöberg et al. [1]. The process looks as follows:

1. Elicit relevant software engineering venues (i.e., journals and conferences likely to contain primary studies of interest)
2. For each venue, check whether they are indexed by [Scopus](#):
 - a. If yes, perform a database search in Scopus where the parameter SRCTITLE limits the results to the current venue.
 - b. If not, check the publisher of the venue and perform the search in their respective search engine.

This approach constrains the results to primary studies relevant to software engineering, effectively eliminating “software engineering” from the search terms (which could be limiting as not all SE authors explicitly mention SE in their manuscript).

Software-engineering relevant Venues

We select the venues that are relevant to software engineering as follows:

1. Elicit rank A* and A [conferences](#) and [journals](#) from the CORE ranking
2. Add explicitly relevant rank B conferences and journals (e.g., REJ and REFSQ)
3. Remove all conferences and journals that are more related to computer science, computer architecture, programming languages, and other topics than software engineering.

The resulting list of relevant software engineering venues can be found [here](#).

Search Term

The search terms need to identify software engineering experiments that use requirements specifications as their input.

Term	Synonyms	Location
(venue title)		Source Title
requirement*	srs, specification	Title, Abstract, Keywords
experiment*		Title, Abstract, Keywords

This produces the following search strings for the two databases:

- **Scopus:** SRCTITLE(<venue term>) AND TITLE-ABS-KEY (requirement* OR srs OR specification) AND TITLE-ABS-KEY (experiment*)
- **ACM Digital Library:** ContentGroupTitle("<venue>") AND (Title:(experiment) OR Abstract:(experiment) OR Keyword:(experiment)) AND (Title:(requirement OR specification OR srs) OR Abstract:(requirement OR specification OR srs) OR Keyword:(requirement OR specification OR srs))

We export the results as CSV files. Since the ACM Digital Library only produces BibTeX files, they must first be converted via a [bibtex-to-csv](#) converter.

Inclusion & Exclusion Criteria

Primary studies are included when they meet all inclusion criteria (IX) and do not meet any exclusion criteria (EX).

Overview

ID	Criterion
I1	The primary study presents an experiment with human subjects as one of its core contributions.
I2	The experimental task uses a requirements specification as an input.
E1	The experimental task is a requirements review.
E2	The study is not written in English.
E3	The publication is not available via BTH's access program.
E4	The study is a duplicate or extension of an already included study.

Criteria

The following sections explain and justify the criteria in detail.

Experiment

Inclusion Criterion 1

Criterion: The study presents an experiment with human subjects as one of its core contributions.

Rationale: We limit the results to experiments (controlled or quasi) where human subjects perform a specific task since we are interested in the (human) activities in which requirements specifications are used.

Notes:

- The title, abstract, and/or keywords need to instill confidence that the paper actually describes an experiment, i.e., an empirical study where one independent variable was manipulated, and the change of another dependent variable was measured. The commonly reported “experimental evaluation” is insufficient as it seems to be misused for empirical studies in general.
- The title, abstract, and/or keywords need to hint at the involvement of human subjects or justify that the human subjects were replaced by some algorithm or system.

Input: Requirement Specification

Inclusion Criterion 2

Criterion: The experimental task uses a requirements specification as an input.

Rationale: We are interested in activities (represented by experimental tasks) that use a requirements specification as an input. These are the requirements-dependent activities of interest.

Notes:

- The title, abstract, and/or keywords need to make clear that the input is a specification of requirements, i.e., an artifact from the problem space, not the solution space (like a system specification or code documentation).
- There is no constraint on the form of the input requirements specification, i.e., NL requirements specifications are as valid as models as long as the previous property is given.

Task: no Requirements Review

Exclusion Criterion 1

Criterion: The experimental task is a requirements review.¹

Rationale: We are interested in how attributes of requirements affect subsequent activities for the purpose of controlling the requirements to optimize the activities. The process of controlling the requirements is literally requirements review, i.e., defect detection and removal. Controlling requirements to optimize requirements review is circular and, hence, irrelevant.

Notes:

- Experimental tasks that add information to a requirement (i.e., a trace link or a priority value) are valid. They do not change the input requirement but rather append it.

¹ This exclusion criterion was originally formulated like an inclusion criterion (I3), but given its formulation, we changed it.

Language

Exclusion Criterion 2

Criterion: The study is not written in English.

Rationale: A study not written in English is not aimed at an international audience. Relevant literature conforms to the requirement of being accessible to all members of the international, English-speaking community.

Availability

Exclusion Criterion 3

Criterion: The publication is not available via BTH's access program.

Rationale: An inaccessible study cannot be processed further.

Duplicate

Exclusion Criterion 4

Criterion: The study is a duplicate or extension of an already included study.

Rationale: Extensions or duplicate reports of one study will influence the statistics of reported activities.

References

[1] Sjøberg, D. I., Hannay, J. E., Hansen, O., Kampenes, V. B., Karahasanovic, A., Liborg, N. K., & Rekdal, A. C. (2005). A survey of controlled experiments in software engineering. *IEEE transactions on software engineering*, 31(9), 733-753.