

The QDAcity-RE Method for Structural Domain Modeling Using Qualitative Data Analysis

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Abstract: The creation of domain models from qualitative input relies heavily on experience. An uncoded ad-hoc modeling process is still common and leads to poor documentation of the analysis. In this article we present a new method for domain analysis based on qualitative data analysis (QDA). The method helps identify inconsistencies, ensures a high degree of completeness, and inherently provides traceability from analysis results back to stakeholder input. These traces do not have to be documented after the fact. We evaluate our approach using four exploratory studies.

Keywords: domain modeling; domain model; requirements engineering; requirements elicitation; qualitative data analysis

The full paper of this extended Abstract has been published in [KR17]

1 Motivation

The quality of a requirements specification mainly depends on the experience of the analyst and his or her understanding of the problem domain. To establish a good understanding of the problem domain, the analyst may create a domain model as part of his or her analysis.

Domain models must correctly represent the reality of the domain and be easy to understand from the stakeholder's perspective.

Qualitative exploratory research faces similar challenges. The area under study is often highly complex and the gathered data is frequently unstructured, inconsistent, and incomplete. In scientific research, these challenges are addressed by using methods for *qualitative data analysis (QDA)*. QDA methods focus on extracting the relevant information from qualitative data, interpreting the data, and abstracting from it. QDA is employed in theory building research to study a wide range of phenomena through the gathering and interpretation of qualitative data. The process ensures thorough documentation of the analysis process.

We equate the process of theory building to the domain analysis process, and propose a method for domain modeling, called QDAcity-RE, based on principles of QDA.

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2 Method

In our method, requirements engineers sample stakeholders, interview them, correlate other materials, and perform QDA of the materials to derive a so-called *code system*. The code system is then extended to derive the relevant requirements engineering results.

A model of our method is outlined in figure 1.

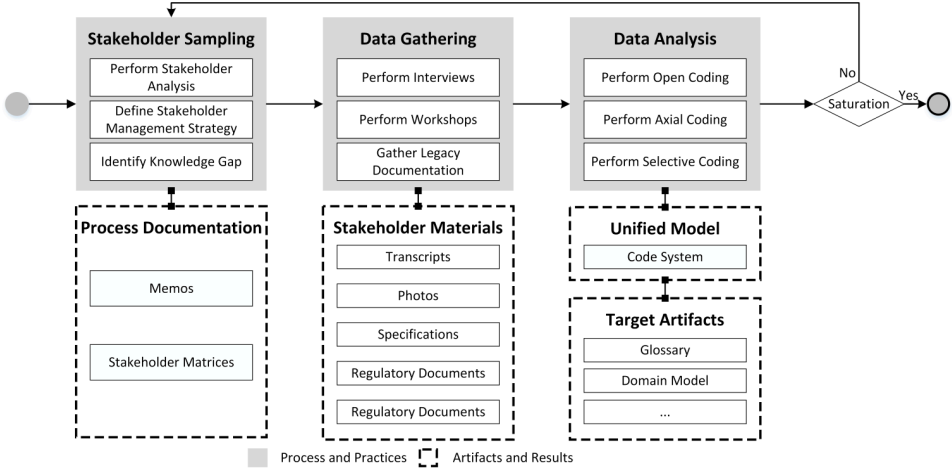


Fig. 1: The QDAcity-RE Process for Structural Domain Modeling

3 Evaluation

We evaluated our method in four studies in the fields of human resource development, medical imaging diagnostics, railway systems and qualitative research.

As data gathering technique we relied mostly on expert interviews, which we triangulated with existing documentation, workshop artifacts and norms and regulations.

We also evaluated the derivation of different artifact types such as feature models, conceptual models, domain specific languages and software requirements specifications from our unified model, the code system.

References

- [KR17] Kaufmann, A.; Riehle, D.: The QDAcity-RE method for structural domain modeling using qualitative data analysis. Requirements Engineering/, Nov. 2017, ISSN: 1432-010X, URL: <https://doi.org/10.1007/s00766-017-0284-8>.