REFACTORING SYSTEMS FROM KDM INSTANCES

This briefing reports scientific evidence on the effectiveness of applying refactorings to KDM instances of software systems via KDM-RE tool.

FINDINGS

Our findings suggest that the KDM-RE tool can help software engineers to apply refactorings that improve the quality of software systems.

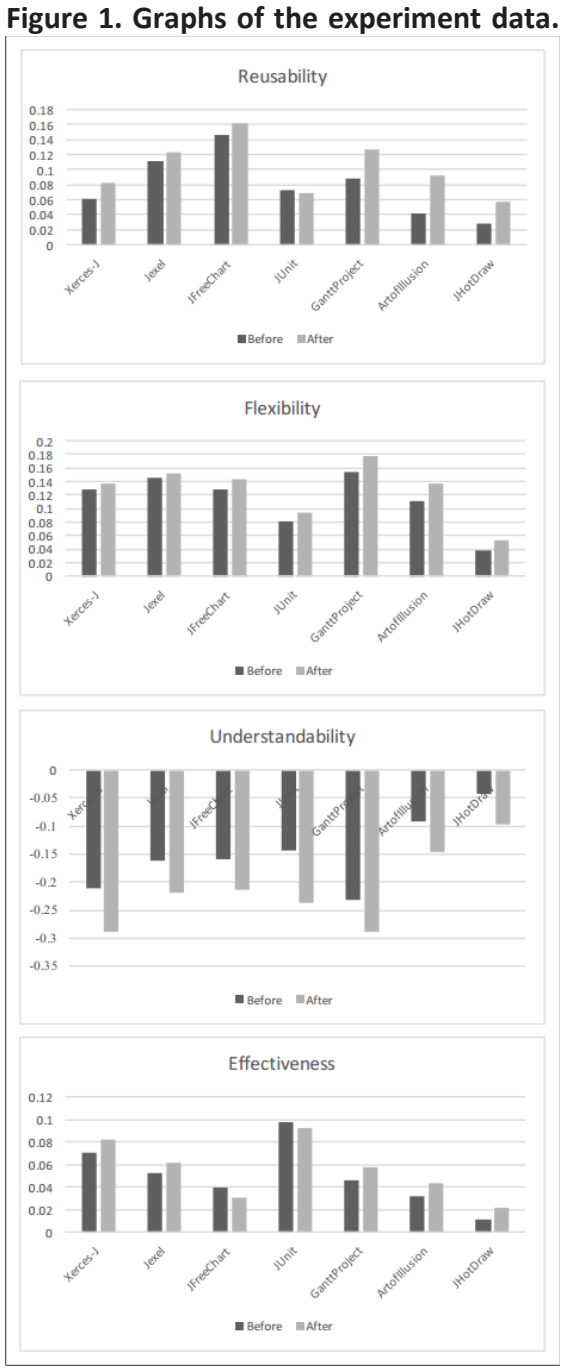
KDM-RE facilitates the creation of Knowledge Discovery Metamodel (KDM) instances of systems by providing a mechanism that reads the system source code and generates its KDM version.

The tool help software engineers to analyze and identify bad-smells by providing a graphical visualization of the KDM instances, which illustrates the systems classes and their attributes and methods. The main advantage is that the refactorings can be performed on this graphical model and then are automatically reflected to all levels of the KDM instance.

We carried out an experiment to evaluate the advantages of using KDM-RE to refactor seven real-world systems through their KDM instances. This experiment showed that, after applying several refactorings, covering eleven different types, all seven systems had an improvement on the quality attributes of reusability (12.77%), flexibility (6.37%), understandability (17.79%), and effectiveness (5.29%).

According to the results of the statistical tests we performed, the refactorings applied with the support of KDM-RE increased significantly three quality attributes (reusability, flexibility, and understandability).

Figure 1. Graphs of the experiment data.



Although there was also an increase in effectiveness, the statistical tests indicated that it was not significant. It happened because understandability and effectiveness are opposite attributes, i.e., when one improves, the other tends to get worse. In our experiment, understandability was the quality attribute with the highest increase (17.79\%), while effectiveness was the one with the lowest increase (5.29\%). We emphasize that this sort of trade-off has to be analyzed by the developers, who have to keep in mind the priorities of their systems when a quality attribute improve to the detriment of another one.

Who is this briefing for?

Software engineering practitioners who want to make decisions applying refactorings on KDM instances based on scientific evidence.

Where the findings come from?

All findings of this briefing were extracted from the experiment conducted by Durelli et al.

What is included in this briefing?

The main findings of the experiment, and brief contextual information about the context of the findings.

What is not included in this briefing?

Additional information not supported by the findings of the original research as well as descriptions about the research method or details about the experiment and the KDM-RE tool.

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ORIGINAL RESEARCH REFERENCE

Durelli et al. ***Improving the structure of KDM instances via refactorings: an experimental study using KDM-RE***. Brazilian Symposium on Software Engineering (SBES), 2017.