Dissertationen

Oliver Laitenberger: **Cost-effective Detection of Software Defects through Perspective-based Inspections**

Promotion: Universität Kaiserslautern
Erstgutachter: Prof. Dr. H. Dieter Rombach (Universtität Kaiserslautern)
Zweitgutachter: Prof. Dr. Victor R. Basili, University of Maryland, USA
Datum der Prüfung: 16.05.2000
Veröffentlichung: Stuttgart: Fraunhofer IRB Verlag, 2000 (PhD Theses in Experimental Software Engineering 1). Zugl.: Kaiserslautern, Univ., Diss., 2000; ISBN 3-8167-5583-6

Kurzfassung:

Software organizations must deliver high quality products on time and within budget to remain competitive in the marketplace. However, the reliable and predictable development of high quality software continues to be a major problem, largely due to the inadequate and late removal of defects.

One of the proposed solutions for early detection and removal of defects is software inspection. However, despite the large body of inspection experience accumulated over the last 20 years, there is still a need for further work on the question of how managers can organize a software inspection with respect to the examined documentation and, once it has been organized, how developers can perform the defect detection activity in a systematic manner.

This thesis presents a new approach to inspection organization. It argues for organizing inspections around logical entities from the software architecture rather than around particular (types of) documents. Although this approach, dubbed architecture-centric inspection organization, is generally applicable, we consider it particularly valuable for inspections in object-oriented development projects.

To provide systematic support for detecting defects in the documentation of any logical entity, this thesis introduces the Perspective-based Reading (PBR) technique. The basic idea underlying PBR is to focus each inspector on a specific viewpoint and to provide active guidelines for scrutinizing the documentation of one or several logical entities for defects. To elaborate this idea into a generally applicable technique, the thesis provides an in-depth description of PBR. Moreover, it explains how to tailor PBR to various inspection situations.

To quantify the potential benefits of PBR in conjunction with the architecture-centric inspection organization, this thesis describes three empirical studies. The primary goal of these studies was the evaluation of PBR in comparison with more traditional reading techniques, that is, ad-hoc or checklist-based reading. The study results suggest that PBR increases the defect detection effectiveness as well as the cost-effectiveness of inspections.

By providing a detailed explanation of PBR, we expect that researchers will be able to extend the scope of the technique, perform replications of our empirical studies, and set up new ones. The reported experiences gathered in the design, execution, and analysis of our studies may be helpful for these purposes. However, we strongly believe that the lessons learned in those studies are beneficial for the empirical software engineering field in general. Practitioners not only receive concrete advice about how to apply the architecture-centric approach for inspection organization and how to utilize PBR for their specific inspection implementation, but also how to evaluate software inspections in their projects and their organizations.