2007

Helping End-User Programmers "Engineer" Software: an Opportunity for Empirical Researchers

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Abstract

While much of the software that people depend on is written by professional software engineers, increasingly, important applications are being created by non-professional (end-user) programmers. Using tools such as spreadsheet environments and web authoring tools, these programmers are creating software that is being used to support significant activities and inform decisions. Such software needs to work dependably and increase user productivity, but evidence shows that it frequently does not. For example, studies have shown that a large percentage of the spreadsheets created by end-users contain faults, and data suggests that time spent maintaining web macros may actually impede their users' overall efforts.

In recent years researchers have begun to address this problem, considering various approaches to adapting software engineering techniques to the realm of end-user programming. For example, researchers have sought ways to help end users test and debug spreadsheets, and to increase productivity in web macros by combining them with various software engineering devices. To make progress in this area, researchers are turning to empirical studies, in order to investigate new approaches, understand the factors that influence them, and better understand issues related to end user programmers themselves.

In this talk I will present recent work being done in end-user software engineering, with a particular focus on the state of the art of empirical research in the area. I will show that there is a pressing need for further empirical work in this context, and that there are interesting questions that researchers from the ESEM community could help to answer. For example, how are end-users different from programmers, and how does that affect how we conduct the research? (Are there assumptions we make when doing studies with programmers that do not hold with end-users? What are the threats to validity when, say, we use CS students as subjects in end-user studies?) As another example, how are end-users different from each other and how does that affect study results? (The end-user community is much more diverse than the professional programmer community. What are the important context variables one needs to capture when studying them?) A concerted effort by the ESEM community on such issues could result in a substantial impact on society as a whole, and on the everyday lives of many people.

Biography

Gregg Rothermel's research interests include software engineering and program analysis, with emphases on the application of program analysis techniques to problems in software maintenance and testing, end-user software engineering, and empirical studies.

Dr. Rothermel recently served as Program Co-Chair for the 2007 International Conference on Software Engineering, and is a member of the Editorial Boards of the *Empirical Software Engineering Journal* and Software Quality Journal. Previous positions include Associate Editor in Chief for *IEEE Transactions on Software Engineering,* Program Chair for the 2004 ACM International Symposium on Software Testing and Analysis, and Chair of the Steering Committee for the International Conference on Software Maintenance. He has served on the program committees for numerous software engineering conferences including the IEEE International Conference on Software Engineering, the ACM International Symposium on Foundations of Software Engineering, and the ACM International Symposium on Software Testing and Analysis.

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Dr. Rothermel received a B.A. in Philosophy from Reed College, an M.S. in Computer Science from SUNY Albany, and a Ph.D. in Computer Science from Clemson University. Prior to returning to academia, Dr. Rothermel was employed as a software engineer, and as Vice President, Quality Assurance and Quality Control for Palette Systems, Inc., a manufacturer of CAD/CAM software. He is a co-founder of the EUSES (End-Users Shaping Effective Software) Consortium, a group of researchers who, with National Science Foundation support, are leading end-user software engineering research. Since 2004, he has been a Professor and Jensen Chair of Software Engineering in the Computer Science and Engineering Department at University of Nebraska - Lincoln, where he is a founding member of the Laboratory for Empirically-based Software Quality Research and Development (ESQuaReD).