Teaching SRE in A Diverse Graduate Student Context

Carol Smidts
csmidts@glue.umd.edu

Abstract

Software reliability has progressively become critical issues due to the number and the nature of the fields invaded. Software development companies need to be provided with the capability to improve their software development process and decrease its related costs. The Software Reliability Engineering Curriculum and in particular a graduate level software reliability modeling course at the University of Maryland was created to respond to this need. In this paper, the contents of the course in the context of a particularly diverse environment are discussed.

1. The Software Reliability Engineering Curriculum

The Reliability Engineering (RE) Program at the University of Maryland is one of few graduate degree programs that teach reliability engineering as a discipline. The software reliability engineering (SRE) curriculum is one of the five concentration areas of the RE Program. The curriculum delivers certificates in SRE or Masters and PhDs in RE with SRE specialty but is also open to any of our graduate students who may elect to take one or more courses.

The RE program is by definition an interdisciplinary program since reliability is a common and pervasive problem in all areas of engineering. As such, our graduate students possess extremely diverse backgrounds which mimic the possible application areas of reliability engineering science and techniques. As a consequence some of the students who choose to take some of the SRE courses may have no prior software engineering knowledge.

To ensure a wider coverage of the potential graduate student population, the RE program has since its inception been offering courses remotely through the Instructional Television System at first and through internet delivery today. In addition, the RE program counts part time and full time students. A part time student will typically be faced with many different constraints such as project deadlines, unscheduled trips or need to attend work related conferences.

Students may have either pure academic background or may be more practically oriented. Part-time students and the organizations that sponsor them will expect that the knowledge gained can be used in practice on the organization’s products. Some students will pursue SRE as their major research area whereas others will consider it as a minor.

3. Resulting Teaching Requirements and Course Content

To address the different difficulties pointed out, a two course series may be recommended where the first course would be a software engineering or software quality assurance course and the second course a software reliability modeling course. If this is not feasible, the software reliability modeling course will require extensive review of basic software engineering fundamentals.

The course will need to be developed for Web delivery leading to development of detailed slides, video taping of the class, and weekly email or phone chats with distance students necessary to avoid the feeling of being disconnected which arises from the perception of a preferential treatment of on site students. To satisfy part-time students requirements for immediate value of the course, instructors should create class projects which allow off-site students to interact with other off-site students and are practically oriented and do not require the usage of software tools.

Graduate students (especially whose research focuses on SRE) want to know the theoretical underpinnings of software reliability modeling. They will want to understand the diversity of existing approaches, when to apply which approach or model and the likelihood of success of a particular approach. They will need to know what are the open research areas and open questions. There is however an equal necessity to provide some hands-on experience through a real-life project.