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Undergraduate Software Engineering Laboratories:
A Progress Report from Two Universities*

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Abstract

Recently, both Miami University of Ohio and the Rochester Institute of Technology received NSF grants to develop undergraduate software engineering laboratories. While the general goals of the labs are similar, specific hardware and software selections were driven by differing curricular emphases and educational environments at the two institutions. This paper presents the distinctive characteristics of each school's program, discusses the influence of these features on the selection process, and describes our experiences to date with the resulting labs. The goal is to provide useful information and guidance to others considering the creation of such facilities.

1. Introduction

Given the rapid pace of technological innovation, it is difficult to incorporate experience with emerging concepts and contemporary tools in undergraduate curricula. While this is a problem in all areas of science, engineering, and technology, it is especially so for computer science. Though the field is over 40 years old, we continue to experience rapid changes in our hardware environments and an explosive proliferation of software support tools. One mechanism by which undergraduate programs can keep pace with these changes is the National Science Foundation's Instrumentation and Laboratory Improvement (ILI) program.

In our cases, ILI grants are supporting the development of software engineering laboratories at Miami University (MU) and the Rochester Institute of Technology (RIT). However, whereas MU emphasizes the development of commercial, business-oriented software, RIT's strength is in systems software and embedded applications. Our goal is to compare and contrast software engineering developments in these two different environments.

We have only used our labs since the summer of 1990, thus our results are preliminary. Nevertheless, we believe our experiences will be useful to others considering the creation of such facilities.

2. Educational Context

2.1. Miami University

MU's Systems Analysis Department has a relatively long history of preparing software engineers for business and industry. From its establishment in 1963, this department has maintained close ties with business and industry in a cooperative manner which has served the department, its graduates, and industry well. Traditionally, the focus of the department's curriculum has been upon the analysis and development of information systems and operations research. More recently, the department has begun to emphasize software engineering approaches to commercial applications.

Over 100 companies actively recruit our graduating seniors, and most of our graduates begin work as programmers or entry-level systems analysts. Our belief that graduates are well prepared is attested to by the strong, continuing recruitment of our graduating seniors and the loyalty of our alumni.

Our general education requirement provides a strong