# Teaching Quality Assurance and Testing at Level 8

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## ABSTRACT

Software testing is important to the software industry, with over 50% of the cost of managing the software lifecycle spent on test and quality assurance, yet it receives little attention in universities and polytechnics. This poster paper, identities the gap between industry demand and technology education and outlines a postgraduate (Level 8) course offering that is exclusively devoted to software quality assurance and testing.

## Categories and Subject Descriptors

K.3.1 [**Computers and Education**]

## General Terms

Reliability, Verification.

## Keywords

Software testing, postgraduate courses.



## 1. INTRODUCTION

Software testing is an important and critical activity in delivering quality software products. It is needed continuously at every stage of development and deployment and costs over 50% of software management cost, yet it receives little attention in universities and polytechnics.

In 2002 a study conducted by the National Institute of Standards and Technology reported that software bugs cost the US economy

an estimated $59.5 billion annually and that more than a third of that cost could have been saved by improved software testing [6].

Recent software-related problems that have caused many social problems and financial losses are largely due to lack of testing. It is expected that software testing will play an even more vital role, as software complexity and related legal complications increase [4].

## 2. STATE OF PRACTICE

Myers [3] identified attitude (psychology) and economics as major obstacles to software testing. Besides attitude, testers must also have superior technical skills. Whittaker [5] also confirms the need for testers to have technical sophistication with good development skills (coding skills) and knowledge of formal languages, algorithms, decision tables and graphics. Harrison [1] has acknowledged that software testing requires two different attitudes – that of a developer as well as a tester. This means that for software engineering students to become good developers or testers, they must acquire the necessary knowledge, skills and attitudes.

According to Osterweil [4], technical approaches to testing have been widely published, yet the gap between research and industry practice show the need for improvement in both development and testing disciplines. Whittaker [5] suggested that software testing research should be less academic and more practical to better satisfy industry demand. Finally, educators should equip students with these skills and attitudes to deal effectively with software quality concerns.
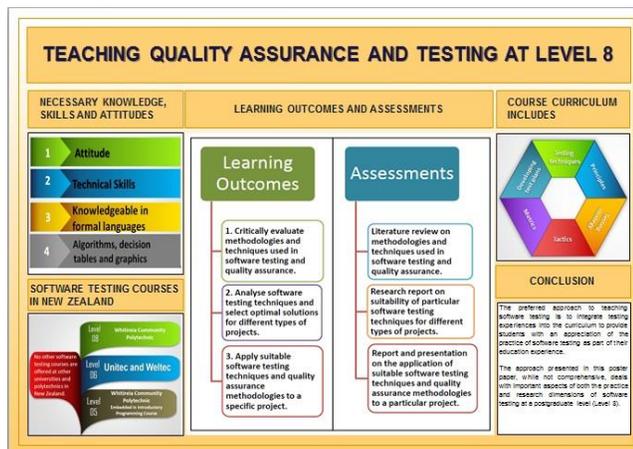
## 3. QUALITY ASSURANCE COURSES

Whitireia Community Polytechnic has a software quality assurance component embedded in a level 5 introductory programming courses. However, there has been no course offered separately at a higher level. The intention is to deliver a software quality assurance course at Level 8 to emphasize software testing in depth.

The need for highly skilled IT personnel has been widely discussed over the past few years. However, a discussion about the need for software testing skills has not been touched on. In fact, the need for software testers and their special skills has been discussed in industry, but very little attempt has been made by the universities and polytechnics to deal with this issue. In New Zealand, level 6 courses are provided by Unitec [2] and by Weltec, and it seems that no other level 8 quality assurance and testing courses are offered at universities and polytechnics.

## 4. THE PROPOSED LEVEL 8 COURSE

The proposed course will focus on providing students with in-depth understanding of the methodologies and techniques used in software testing and quality assurance. The contents will mainly focus on methodologies and techniques of software testing and

quality assurance, software metrics and software quality improvements.

The IT industry needs software testing practitioners, and researchers should lay the foundation for best practice of software testing [6]. Therefore, the contents will focus on covering technical aspects with a research perspective. The assessments will be designed to cover both aspects and teach students two approaches – an industry approach and research approach.

The assessments will be designed to align with the following learning outcomes:

**Table 1: Learning outcomes and associated assessments**.

| Learning Outcome | Assessments |
|---|---|
| 1. Critically evaluate methodologies and techniques used in software testing and quality assurance. | Literature review on methodologies and techniques used in software testing and quality assurance. |
| 2. Analyse software testing techniques and select optimal solutions for different types of projects. | Research report on suitability of particular software testing techniques for different types of projects. |
| 3. Apply suitable software testing techniques and quality assurance methodologies to a specific project. | Report and presentation on the application of suitable software testing techniques and quality assurance methodologies to a particular project. |

The assessments were designed to focus on testing strategy, tactics and metrics for different project environments. The purpose of these assessments is to understand particular software testing techniques and their suitability for different types of project. This involves developing a test plan, executing that plan on the given system, reporting the results of these tests, and recommending the changes needed to correct the errors found in the system.

## 5. CONCLUSION

The preferred approach to teaching software testing is to integrate testing experiences into the curriculum to provide students with an appreciation of the practice of software testing as part of their education experience. The course will also be designed to guide the students (who have acquired a basic set of testing skills from their undergraduate courses) to advance their testing and quality assurance knowledge. The course will focus on methodologies, techniques and principles that can be taught as essential software skills that will serve as a sound basis for expansion over their future career.

The approach presented in this poster paper, while not comprehensive, deals with important aspects of both the practice and research dimensions of software testing at a postgraduate level (Level 8).

## 6. REFERENCES

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