

Research: Test Driven Development

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- **Overall question:**
Should we do test-driven development, or not?
- **What are the costs, benefits?**
- **Does it result in better quality?**
- **When is this practice optimal?**
- **What tool support exists/is needed?**

- **Variables:**
 - **Calendar time, effort and other costs (development, maintenance)**
 - **Quality (defects, maintainability: coupling, cohesion)**
 - **Effectiveness (test coverage)**
 - **Context: Domain, Application, Size etc.**

TDD (1)

- **What is the state of the practice in... (HI/LD-MD)**

- Test-driven development
- Test-First, Automated unit/acceptance testing

Examples of questions:

- Where are the costs/benefits?
- How do you manage your test cases when systems scale up?
- How do you test you test-cases?
- How do you maintain your test-cases?
- How do you determine which test-cases to throw away/save?
- Etc.

- Case-studies/workshop/Surveys (web?)

TDD (2)

- **Family of Experiments: TDD vs. Test-Last (unit) (MI/MD)**
 - **Controlled studies – Bowling game**
 - » **Washington College - students**
 - » **NCSU (done) – professionals**
 - » **Italy/Canada**
 - » **Germany**
 - » **USC – students ?**
- **Do you do design before testing or go right to TDD?**
 - **Case studies and controlled experiments**
- **More realistic Experiments: (HI/HD)**
 - **Industry Volunteers**
 - **Make change to larger system**
 - **Other suggestions?**

TDD (3)

- **Adequacy of customer-supplied acceptance test cases? (MI/MD?)**
 - Case studies in industry, Experiments?
- **TDD for web applications – technology development (HI/LD-HD)**
 - Apply technology/tools to Pilot project, evaluate, improve
- **Unit testing vs. integration testing (in general) (MI/LD-HD)**
 - Examine COCOMO/SEL database for data
 - % of effort on unit test vs. % of effort on integration testing (look for correlation)
- **Create TDD interest group (HI/LD)**
 - (Italy, Germany, Fraunhofer, NCSU, USC, others?)