Managing, Measuring, and Improving the Testing Process

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SYSTEM ACQUISITION & DEVELOPMENT

QUALITY/TESTING

PRODUCTIVITY

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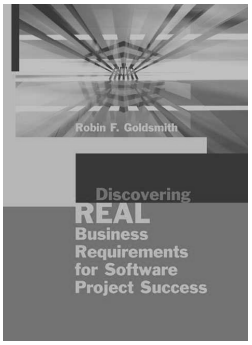

Objectives

- Explain the importance of the testing *process*—**and managing it** --in both conventional and Agile development
- Reveal why mistaken common views of processes can impede test process effectiveness and efficiency
- Describe meaningfully measuring the testing process to maintain and improve testing value

Vendors/Consultants Often Say

**"A test tool [or technique]
is only as effective as
the testing process
in which it is used"**

But….

Organizations Generally Don't

Think very consciously about
their Testing Process and
especially about managing it

Distinguish managing the Testing Process
from managing/conducting the testing itself

Is there a difference? What is it?

Agile Generally Integrates Testing

- Subsumed within development
- May think relatively little about managing the conduct of testing
- Even less likely to think about
  - The testing *process*, let alone
  - *Managing* the testing process

What Is a Process? Why Do We Care?

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Common Definition:
A process is a set of steps or actions that should be taken to achieve a desired result

A Process is a set of steps/actions, beliefs, customs/ practices, methods, skills, knowledge, and competencies that produce a result, *whether or not they are recognized, intended, or even desirable*

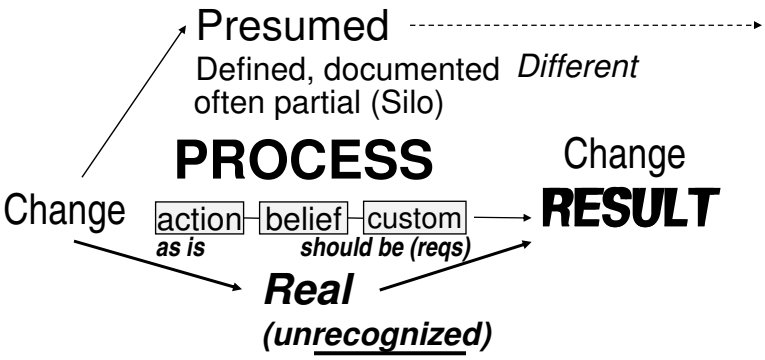
Knowing your process enables predicting your results

Your Testing Process

- Determines how you test, which in turn
- Determines how effective and efficient your testing is, which in turn
- Contributes greatly to how effective and efficient your development is

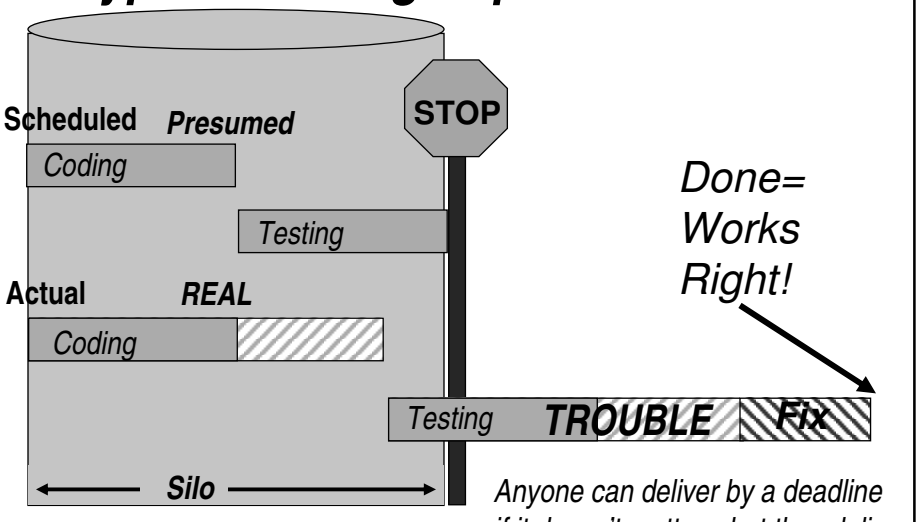
Managing the testing process is essential for delivering, maintaining, and improving testing and development value

To Change Results, Change Process



To see the need for and effects of changes, we need to measure at key process points from the beginning to the full end result.

Typical Testing Experience



Anyone can deliver by a deadline if it doesn't matter what they deliver

"Managing the Test Process" Means

1. Defining how to appropriately determine
   a. What must be demonstrated to be confident it works
   b. How to demonstrate it
   c. How to capture, report, and address testing's results
2. Making it the REAL Process that is actually used
3. Measuring each test project's results and causes
4. Identifying variances from desired results
5. Re-evaluating and adjusting the defined process' actions/beliefs/customs to improve practices, enhance strengths, and overcome weaknesses
6. Repeating 2-6

To Define a Desired Testing Process

- Identify key concepts the Testing Process should address
  - Possibly implicitly-recognized or even taken for granted
  - Concepts we want to be sure are explicit
  - Issues it needs to overcome
- Incorporate helpful relevant ideas and approaches from methodologies, maturity models, and standards
- Adapt other "good practices" as appropriate

Some Key Concepts

- Testing confirms, not assumes, the system:
  - Does what it's supposed to do
  - Doesn't do what it's not supposed to do
- Testing mainly means comparing actual results to independently- (and preferably previously-) defined expected results
- It's not impossible to test everything, only to *know* for sure that you have tested everything

Is exploratory "finding out how it works" experimentation or testing?

Test Methodology

- Types of tests you do, and when
  - Static reviews of requirements and designs
  - Dynamic test planning (large and medium risks)
  - Dynamic test design (small risks)
- How you do the tests—techniques and skills
  - Execution
  - Environments, data, tools
- How you manage the tests
  - Reports, metrics, learning
  - Evaluating/improving test adequacy and efficiency

Some Ways to Measure Your Software/Testing Process

- ***Indirectly***, inferring from some other indicators, such as experts' assessments and model-fitting, typically based on level of using certain practices as identified by surveys, questionnaires, internal people's perceptions, and external observations
- ***Directly*** based on the process's actions/steps, often by accumulating measures across projects (**but, must identify the full REAL process and appropriate key cause and effect measures and measurement points**)

Most Common Indirect Process Improvement Method

Informal, imprecise assessment

Gut feel

Particular problem

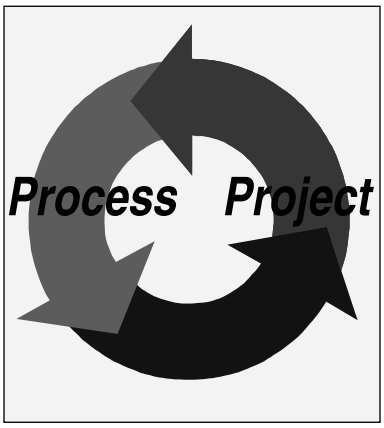
Implement presumed good practices

Same informal, imprecise assessment

By the one choosing the practices

***Direct*: Process Determines Projects, Projects Demonstrate Process**

- The way we really do things, our REAL Process, determines how we carry out project after project
- Measure the REAL Process across projects
  - Results
  - Actions, beliefs, customs, and (including management and people) practices causing results
  - In full-project context



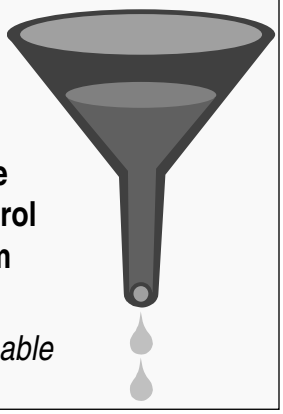
Measuring Results *vs.* ***Controlling Performance and Guiding Improvement***

- Process output
  - Products and services
  - Capability and variation, quantity
  - Functionality
  - Quality (is it the same as lack of defects?)
  - Performance
  -

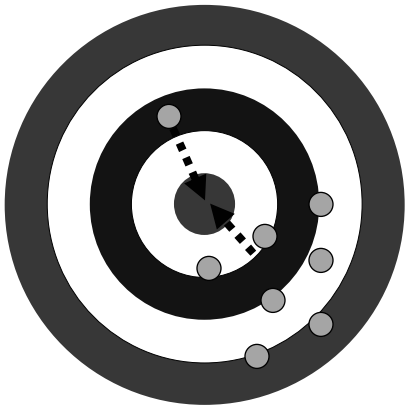
- Process causes
  - Steps/actions, beliefs, customs
  - Inputs resources and materials characteristics, quantities, costs, time
  - Methods
  - Skills, knowledge
  -

Process Measures Improve Outputs' Absolute Value and Variation

- Determine *process capability*--what/how much it can produce **when stable** (*in statistical control*)
- Identify normal variation due to *common causes* inherent in the process--**outputs predictably will occur within this range (control chart shows upper/lower control limits = +3, -3 standard deviations from mean)**--then adjustments are meaningful
- To stabilize, identify/remove other *assignable (special) causes* of variation



Must Appreciate Normal Variation to Reliably Improve Process Outputs



If we adjust our aim based on the first shot without knowing our actual pattern, what is likely to happen to our actual accuracy? What should the adjustment be?

In Fact, Main Cause of Failures...

Development process sets woefully inadequate budgets and schedules based on

insufficient time and resource estimates

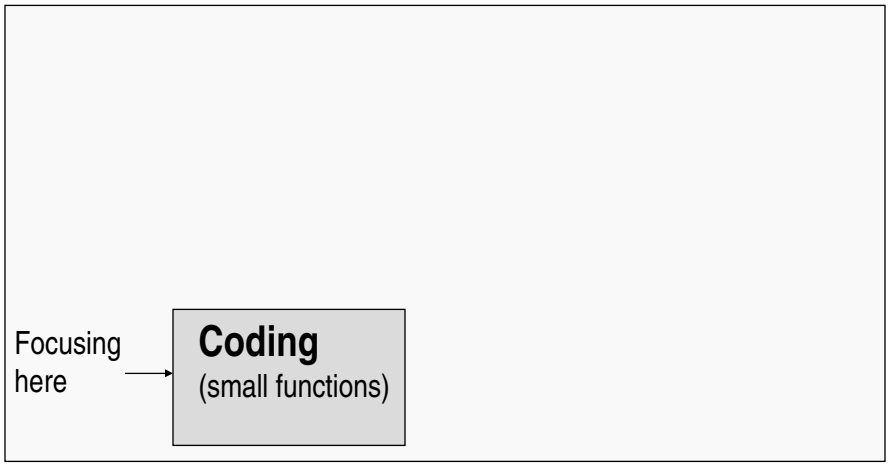
and ***destines projects to failure from start***

in turn mainly due to

inadequately-defined REAL business requirements—top level and detailed

Does your process identify and measure such causes?

Coding Is Smallest Source of Errors



How thorough are developers' test-first tests?

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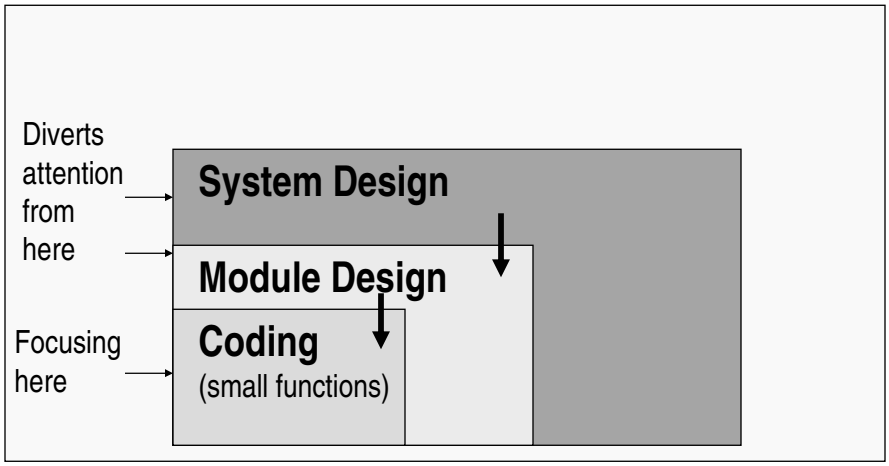

2/3 of errors in delivered code are in the design.

Does essentially having no design increase, decrease, or just mask that?

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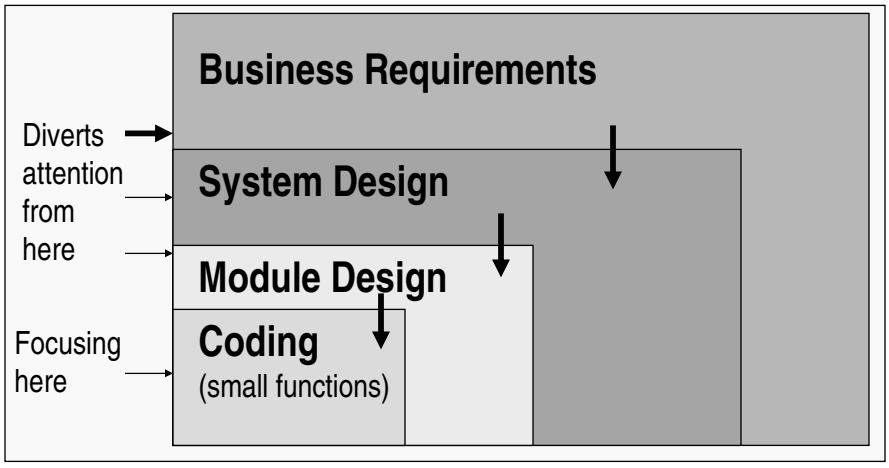

Missed/incorrect/unclear business requirements are biggest source of design problems

An Effective QA/Testing Process

- Detects defects in
  - Requirements and design
  - Code and other deliverables
  - Related project plans
- Early
  - When changes can be made easier and cheaper
  - Before creating work that would have to be redone
- Helps enable achievable budgets/schedules

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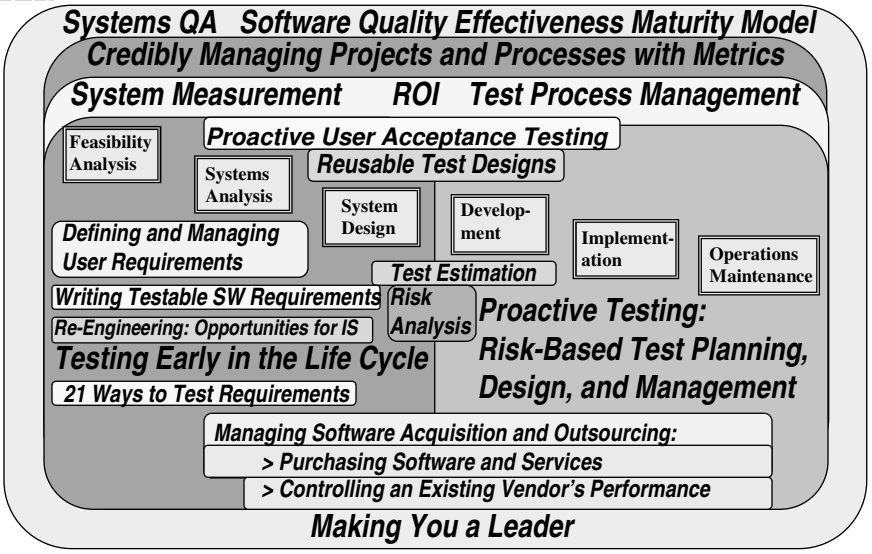

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- President of Go Pro Management, Inc. consultancy since 1982, working directly with and training professionals in business engineering, requirements analysis, software acquisition, project management, quality and testing.
- Partner with ProveIT.net in REAL ROI™ and ROI Value Modeling™.
- Previously a developer, systems programmer/DBA/QA, and project leader with the City of Cleveland, leading financial institutions, and a "Big 4" consulting firm.
- Degrees: Kenyon College, A.B.; Pennsylvania State University, M.S. in Psychology; Suffolk University, J.D.; Boston University, LL.M. in Tax Law.
- Published author and frequent speaker at leading professional conferences.
- Formerly International Vice President of the Association for Systems Management and Executive Editor of the *Journal of Systems Management*.
- Founding Chairman of the New England Center for Organizational Effectiveness.
- Member of the Boston SPIN and SEPG'95 Planning and Program Committees.
- Chair of record-setting BOSCON 2000 and 2001, ASQ Boston Section's Annual Quality Conferences.
- TechTarget, SearchSoftwareQuality requirements and testing subject expert.
- Member IEEE Std. 829 for Software Test Documentation Standard Revision Committee.
- Member IEEE P730 Working Group rewriting IEEE Std. 730-2002 for Software Quality Assurance Plans.
- Member IEEE P1805 Working Group developing a Requirements Capture Language (RCL) standard.
- International Institute of Business Analysis (IIBA) Business Analysis Body of Knowledge (BABOK) subject expert.
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