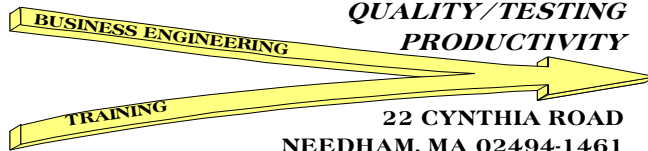# Defining Quality in Positive Terms

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PRODUCTIVITY

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Robin F. Goldsmith

Discovering
REAL
Business
Requirements
for Software
Project Success

Objectives

- Analyze common definitions of software quality
- Contrast QA's traditional negative measures of quality with laypeople's often positive measures
- Explore some ways to more workably define, quantify, and compare both positive and negative aspects of software quality

Some Common Definitions of Quality

- Customer satisfaction
- Meets or exceeds customer expectations
- Optimization, value
- Conformance to requirements (Philip Crosby)
- Percent of (a sample of) products passing inspection for defects; lack of defects (~Deming)
- Minimal variation within specification (Six Sigma)
- Fitness for use (Joseph Juran)

*Any problems with these definitions? Relation to systems?*

What We Mean By System Quality

- Fits system specs
- Runs efficiently
- Doesn't blow up
- Follows standards
- Current technology
- Modern techniques
- Easily modified
  - without code change
  - when code changes

What *Others* *Mean By* System Quality

- Does what needs to be done correctly
- Performs adequately
- Reliable/consistent
- Easy to use
- Supported quickly and correctly
- On-time, in budget

Until We Share a Common Definition of System Quality...
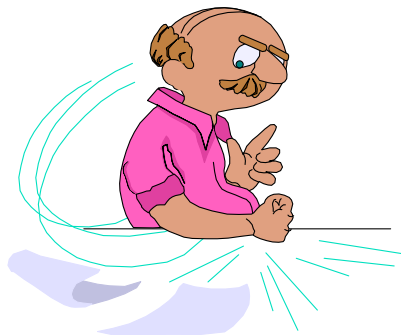
- ✓ Users, managers, developers, and Quality professionals will continue to disappoint each other
- ✓ Each has a different idea of what to deliver and how to tell whether it has been delivered adequately
- ✓ Each thinks the others don't care about Quality

QA/Testing Equates Software Quality to (Lack of) Categorized Defects

- ✓ Criticality
  - ✓ Showstopper
  - ✓ Injury, damage
  - ✓ Failure to function
  - ✓ Impeded effectiveness
  - ✓ Cosmetic
- ✓ Nature of problem, e.g.,
  - ✓ Hardware
  - ✓ Communications
  - ✓ User error

- ✓ System, module, screen
- ✓ Symptom, e.g., lockup, miscalculation, no space
- ✓ Impact on business, breadth and depth
- ➢ Cost, effort, risk to fix
- ➢ Priority--likelihood, workaround

Are two software products with equal defect densities equal in quality?

Is a software product with lower defect density necessarily higher quality than a software product with higher defect density?

For comparable uses?
For different uses?

Who has higher quality food? Why?

What Makes Chef Mario Batali's Food Higher Quality than Burger King's?

- .
- .

Both consistently produce defect-free dishes

JD Power Automotive Performance & Design Ratings - 2013 APEAL Study

The J.D. Power and Associates Automotive Performance, Execution and Layout (APEAL) Study examines what consumers like about their new vehicles after 90 days of ownership. Often referred to as "things gone right," APEAL is based on eight categories of vehicle performance and design: engine/transmission; ride, handling and braking; comfort/convenience; seats; cockpit/instrument panel; heating, ventilation and cooling; sound system; and styling/exterior.

http://autos.jdpower.com/ratings/performance.htm

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APEAL

City Car
2013 FIAT 500

Compact Car
2013 Chevrolet Volt

2013 Initial Quality Study (IQS) of owner-reported problems in the first 90 days of new-vehicle ownership

City Car
2013 Smart Fortwo

Compact Car
2013 Honda Civic

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Who has higher quality? Why?

Windows 8.1   **iPad Air**

What Makes Apple iPad Air Higher Quality than Microsoft Windows 8.1?

- .   - .

Besides defects

✪ *Quality Dimension: Quality of* **Design** *(What's it need to do)*

- Required functions, capabilities, and performance levels defined appropriately
  - needs of all stakeholders identified
  - definitions accurate and complete
  - meaningful common understanding
- Design suitably meets requirements
- Costs/benefits/schedules are accurate
- Trade-offs based on adequate information

✪ *Quality Dimension: Quality of* **Conformance** *(How it's produced)*

- Products conform to design
- Products apply standards/conventions
- Workers use expected skill and care
- Workers apply defined methods, tools
- Management uses appropriate practices
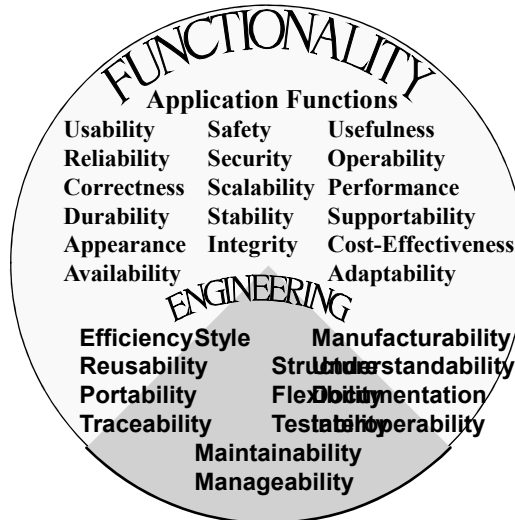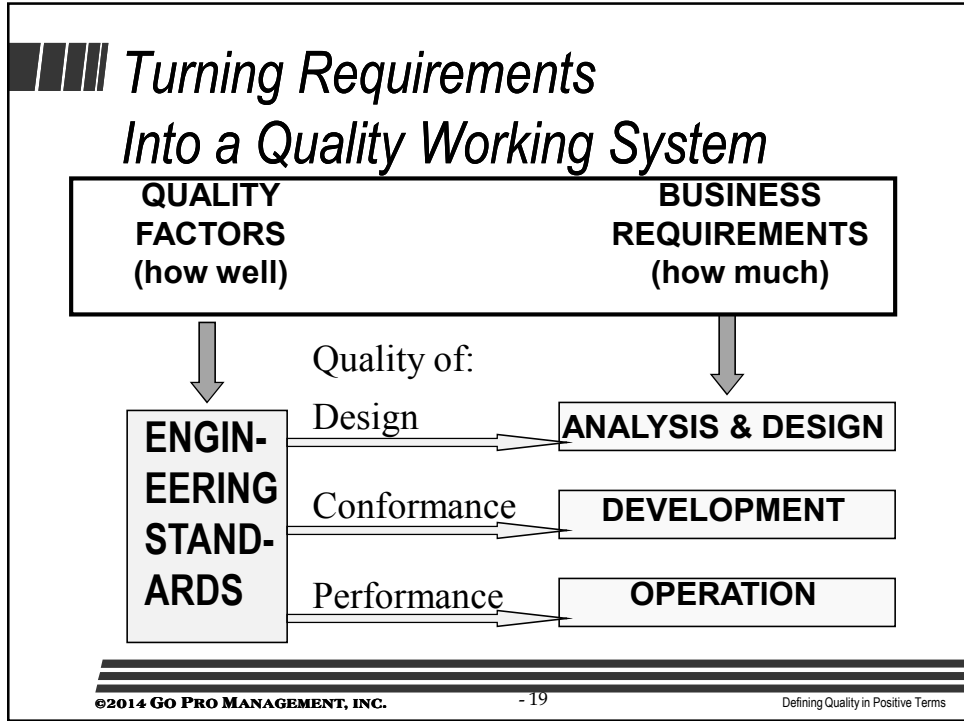- Product is delivered on-time, in-budget

✪ Quality Dimension: Quality of *Performance* (How it's delivered)

- Product is available as needed for use
- Product works in intended manner
- Product works reliably and accurately
- Product handles workload adequately
- Product is supported and maintained responsively

✪ Addressing Quality Factors

FUNCTIONALITY

Application Functions

Usability	Safety	Usefulness
Reliability	Security	Operability
Correctness	Scalability	Performance
Durability	Stability	Supportability
Appearance	Integrity	Cost-Effectiveness
Availability		Adaptability

ENGINEERING

Efficiency	Style	Manufacturability
Reusability	Structure	Understandability
Portability	Flexibility	Documentation
Traceability	Testability	Interoperability
	Maintainability	
	Manageability	

Factors:
  Exterior
  Interior
  Future

Turning Requirements
Into a Quality Working System

QUALITY FACTORS (how well)	BUSINESS REQUIREMENTS (how much)

Quality of:

ENGIN-EERING STAND-ARDS

Design → **ANALYSIS & DESIGN**

Conformance → **DEVELOPMENT**

Performance → **OPERATION**

Our Working Definition of Quality

A **system**'s **quality is the extent** to which **it meets** weighted stated and implied exterior, interior, and future **requirements** of all affected internal and external stakeholders **consistent with standards** of design, workmanship, and performance.

The more of the relevant requirements which are met, and the more demanding the standards are with respect to meeting those requirements, the higher the quality.

Quality is absolute. The amount of quality one receives is governed by available resources, priorities, and other constraints.

Value is the perceived benefit of quality received relative to the costs of producing and receiving it.

Engineered Deliverable Quality™

How Much   ### *How Well*

Deliverable Capability	Weight/ Priority	Minimum	Desirable	Ideal

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What Requirements/Quality Levels Distinguish Batali from Burger King?

- .
- .

What Requirements/Quality Levels Distinguish iPad Air from Windows 8.1?

- .
- .

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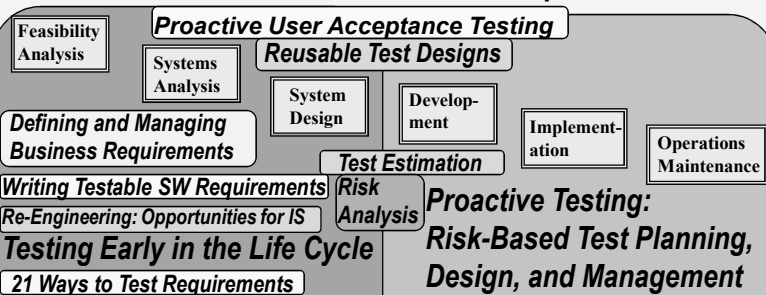
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- President of Go Pro Management, Inc. consultancy since 1982, working directly with and training professionals in business engineering, requirements analysis, software acquisition, project management, quality and testing.
- Partner with ProveIT.net 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.
- Attendee Networking Coordinator for STAR, Better Software, and Test Automation Conferences.
- Chair of record-setting attendance BOSCON 2000 and 2001, ASQ Boston Section's Annual Quality Conferences.
- Member IEEE Std. 829 for Software Test Documentation Standard Revision Committee.
- Member IEEE P1805 working group to develop a standard for Requirements Capture Language (RCL).
- Member IEEE P730 standard for Software Quality Assurance Revision Committee.
- International Institute of Business Analysis (IIBA) Business Analysis Body of Knowledge (BABOK) subject expert.
- TechTarget SearchSoftwareQuality.com requirements and testing expert.
- Admitted to the Massachusetts Bar and licensed to practice law in Massachusetts.
- Author of book: **Discovering REAL Business Requirements for Software Project Success**

Systems QA   Software Quality Effectiveness Maturity Model

Credibly Managing Projects and Processes with Metrics

Software, Test Process Measurement & Improvement

Feasibility Analysis

Proactive User Acceptance Testing

Systems Analysis

Reusable Test Designs

System Design

Develop-ment

Implement-ation

Operations Maintenance

Defining and Managing Business Requirements

Test Estimation

Writing Testable SW Requirements

Risk Analysis

Re-Engineering: Opportunities for IS

Proactive Testing: Risk-Based Test Planning, Design, and Management

Testing Early in the Life Cycle

21 Ways to Test Requirements

Presented by IEEE Boston 5/19-20, 21

Managing Software Acquisition and Outsourcing:
> Purchasing Software and Services
> Controlling an Existing Vendor's Performance

Making You a Leader