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The Value of Quality Assurance and Quality Control
WHAT IS QUALITY?

“You get what you expected”

WHAT IS QUALITY TO THE SOFTWARE DEVELOPMENT LIFECYCLE?
To the Business: Quality is Meeting Requirements

To the User: Quality is a User Friendly Product

WHY IS AN ACCEPTABLE LEVEL OF QUALITY IMPORTANT?
It is the only way to economically produce software in today’s complex IT environment.

In 1998 TENS OF BILLIONS of dollars were wasted on failed IT projects!
Dr. Deming’s 14 Points of Quality

1. Create constancy of purpose toward improvement of a product and service, with the aim to become competitive, to stay in business and to provide jobs.

2. Adopt the new philosophy, take on leadership for change

3. Cease dependence on inspection to achieve quality.

4. End the practice of awarding business on the basis of the price tag.
Dr. Deming’s 14 Points of Quality

5. Improve constantly, and forever, the system of production and service to improve quality and productivity and constantly decrease costs.

6. Institute training on the job.

7. Institute leadership.

8. Drive out fear.


10. Eliminate quotas and slogans by management. Substitute leadership.

11. Remove the barriers that rob the worker of his right to pride of workmanship.
Dr. Deming’s 14 Points of Quality

12. Remove the barriers that rob management and engineering of their right to pride of workmanship.

13. Institute a program of education and self-improvement.

14. Put everybody in the company to work to accomplish the transformation.

QA/QC is a Business Value Proposition
QA/QC

- QA  Quality Assurance
  The process of assuring that quality control is in place and effective. Preventive in nature. The management of quality.

- QC  Quality Control
  The process of finding defects. Corrective in nature. Performed by the person or group creating the product.

Value of QA/QC

- Understand and Represent the Interests of the Client/Key Stakeholders
- Establish and Maintain Effective Client/Key Stakeholder Relationships
- Detect, Analyze and Prevent Faults to reduce development costs
- Continually Assess Risk for the benefit of the Client/Key Stakeholders
WHAT IS RISK?

- Probability of Something Failing
- Consequence of Something Failing

Why Manage Risk?

- When we manage risk the business can manage the value related to:
  - Software Testing
  - Process Testing
  - Documentation
  - Change Control
  - Project Management
“V” Diagram

- Business Need
- Define Requirements
- Design System
- Code System
- Unit Test
- Integration Test
- System Test
- Acceptance Test
- Validate Business Need
- Verify Business Need
- Verify Requirements
- Validate Design
- Validate Code
- Validate Requirements
- Verify System
- Validate System

Benefits from “V” Diagram

- Illustrates all software development approaches
- Illustration is clear and intuitive
- Assists in QA/QC activity management
- Illustrates the purpose of each activity
- Assists in “Scoping” and scope management
Combined Benefits of “V” Diagram and Risk Management

- Provides common understanding, focus and priority to activities
- Supports and enhances working relationships between teams
- Enables QA programs to be directed to maximize the business value

The Bottom Line

- You need to determine the acceptable level of risk in order to determine the appropriate level of QA/QC resources and effort to be allocated and the appropriate level and type of verification, validation and support processes
Quality Management is Everyone’s Responsibility

• QA standards must be designed and implemented to appropriately manage business risk in all activities in the “V” diagram

• QC must be effectively performed to collectively assess the business risks associated with systems at any point in the “V” diagram

• The sooner defects and risks are identified the more successful systems will be at managing the business risks

Where Do Defects Originate?

**Ranking:**
1. Incomplete Requirements
2. Ambiguous Requirements
3. Code Logic Defects
4. Defect Handling
5. Wrong Requirements

![Pie chart showing distribution of defect origins]

Source: Quality Assurance Institute 1995
The Software Engineering Institute’s Capability Maturity Model (CMM)

Key Process Areas by Maturity Level

- **Level 5 (Optimized)**: Process Change Management, Technology Change Management, Defect Prevention

- **Level 4 (Managed)**: Software Quality Management, Quantitative Quality management
  - Peer Reviews, Intergroup Coordination, Software Product Engineering, Integrated Software Management, Training Program, Organization Process Definition, Organization Process Focus

- **Level 3 (Defined)**: Software Configuration Management, Software Quality Assurance, Software Subcontract Management, Software Project Tracking and Oversight, Software Project Planning, Requirements Management

- **Level 2 (Repeatable)**: Software Configuration Management, Software Quality Assurance, Software Subcontract Management, Software Project Tracking and Oversight, Software Project Planning, Requirements Management
Quality Elements

- Management responsibility
- Management review
- Contract review
- Development plans
- Document and data control
- Control of customer products
- Process control
- Inspection and test status
- Internal quality audits
- Organization
- Quality system
- Design control
- Quality plans
- Purchasing
- Product identification/traceability
- Inspection and test
- Control of quality records
- Training

The Quality Assurance Institute’s Approach to Managing Quality in a Changing World
State of the Industry

- Most organizations admit that their testing is:
  - Frequently ad-hoc
  - Poorly documented
  - Inconsistently executed
  - Primarily manual
  - Limited in scope
- Less than 50% of organizations using client/server testing tools practice any form of test methodology
- Only 25% of organizations perform regression testing
- The “defect removal rate” using ad-hoc testing methods is approximately 70% (medium and low defects)
- Separate development and testing life cycles

Where Testing Value is Wasted

![Chart showing testing value distribution across stages]
The Relative Cost of Fixing Defects

The Bottom Line

- Most defects are created in the early stages of a project
- Most defects are found in the later stages of a project
- It costs 10 to 100 times as much to fix a defect in the later phases of a project.
THANK YOU FOR THIS OPPORTUNITY