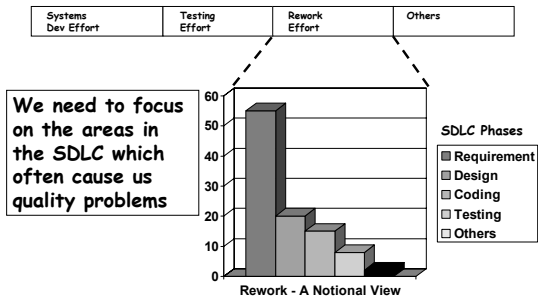


Source of Rework in the SDLC



To A Layman...Quality Could Mean

- Defect-free
- A degree of excellence
- Guarantee return and repair
- Value for money
- No breakage



Definition of Quality - Best Practices

- Deming – ‘continuous improvement’
- Juran – ‘fit for use’
- Crosby – ‘conformance to requirements’
-

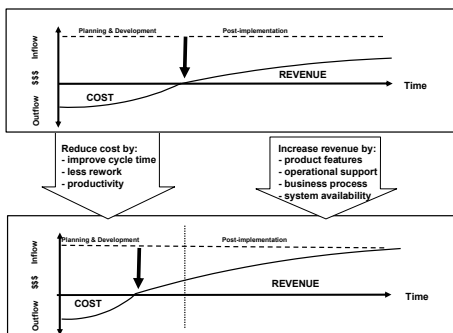


Why Software Quality?

- Profit
- Competitive advantage
- Stay in business
- Life and death proposition
-



The Result of Quality vs Non-Quality



When Do We Introduce Quality?

Anytime in the development life cycle

- Executive support
- User requirement definition
- Design
- Coding
- Testing
- Operation and support
-

Issues Related to User Requirements

- User has only some ideas
- User does not understand how they look like
- User often changes his mind
- User often procrastinate
- User pretends he is technical and design solution instead of telling what he needs
-

Techniques to Define Requirements

- Interview
- Brainstorming
- Story board
- Prototype
- Use case
- Joint requirement definition (JRD)
- Joint application design (JAD)
- Quality function deployment (QFD)

Quality Design – some examples

- Modular vs tightly coupled system design
- Unique transaction identifier
- Master and slave relationship
- One-direction transaction flow
- System checkpoint files
- Pull and push data



Testing, QC and QA

- Testing is the process of operating a system or system component under specified conditions, observing or recording the results
- A systematic series of evaluation activities performed to validate that the software fulfils technical and performance requirements
- For example:
 - A light bulb
 - A customer credit limit field would not handle > HK\$1 million
 - FX transaction requires dual entries in order to be valid



Testing, QC and QA

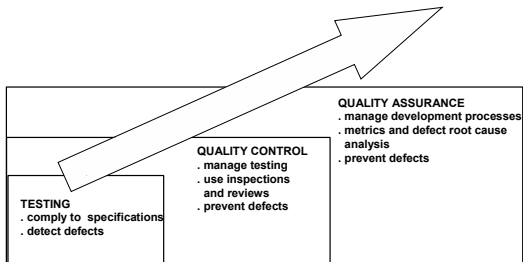
- QC is the process by which product quality is compared with applicable standards and actions taken when non-conformance is detected*
- To determine the output meets specifications
 - in manufacturing, QC uses statistical methods
 - in software, QC uses inspections and walkthroughs
- Depends on the 'tolerance' level or quality target, the deliverables could be accepted or rejected



Testing, QC and QA

- It deals with the processes which would help improve the product quality
- It ensures standards are followed
- It performs problem root-cause analysis
- It determines problem patterns and trends
- It assists the deployment of better tools and techniques

Testing, QC and QA



Types of Tests

- Development test – unit, string & sub-system
- QC functional test
- Acceptance and operability tests
- Volume test
- Stress test
- Regression test
- Performance test
- Penetration test
- Hacking test

Risk & Test Level Assessments

- Define test scope
- Determine the amount of tests required
- Impact / Probability questionnaire
- 4 pre-defined levels of testing
- Cost effective balance between test coverage and risk

FINANCIAL ASSESSMENT

Source: Bank of Montreal

SYSTEM ASSESSMENT

RISK: Response X Weight = Score

What is the size of the financial base of this system?

Responses: _____ X 4 = _____

1. Large
2. Moderate
3. Small
4. Non-financial

What is the (worst case) financial impact to the Bank if the system produces erroneous results?

Responses: _____ X 6 = _____

1. Major loss of assets
2. Moderate loss of assets
3. Small loss of assets
4. None

What is the financial impact to the Bank if the system is unavailable for use external day?

Responses: _____ X 3 = _____

1. Major loss of revenue
2. Small loss of revenue
3. Loss of interest/reputation
4. None

What is the financial impact if one transaction is lost and cannot be recovered? (What is the average dollar value of each transaction)

Responses: _____ X 7 = _____

1. > \$1,000,000
- \$1,000 - \$500,000
- < \$1,000
- Non-financial

RISK: Response X Weight = Score

What is the impact to the user if the system is unavailable for one day per year?

Responses: _____ X 1 = _____

1. Business cannot be conducted and user must file
2. Business can be conducted manually at great expense; no extensive recording
3. Business can be conducted manually with little additional expense
4. None

How critical is it to recover the system, if it fails?

Responses: _____ X 2 = _____

1. Immediate recovery required - large system
2. Immediate recovery required - small system
3. Recovery non-critical - large system
4. Recovery non-critical - small system

What is the impact if data is inadvertently made available to the public?

Responses: _____ X 1 = _____

1. Major financial loss
2. Financial or market share loss
3. Loss of customer confidence
4. Internal impact only

How many times do costs support this application?

Responses: _____ X 2 = _____

1. > 100,000
- \$0,000 - \$5,000
- \$5,000 - \$9,999
- < \$20,000

Some Pitfalls to Avoid

- QC tests the wrong version of the spec
- QC test results not reliable
- UAT repeats almost all the test cases and scenarios of QC tests
- Time-box testing (not the same as time-box development)

**Why are these situations happening?
How could we overcome them?**

Peer Reviews - types

- Inspection
- Review
- Walkthrough
- Ad hoc review

Peer Reviews – Benefits

- Improve project success through less rework, schedule slippage, cost containment and better quality
- Satisfy customers

Example: IBM reported each hour of inspection could save 20 hours of testing and 82 hours of rework effort*

Reusability vs Usability

- Reusability is the building of software from pre-defined components that are designed for reuse. It aims to enhance quality, increase productivity and reduce cost
- Usability is the effectiveness and efficiency of the system product. It aims to satisfy user requirements

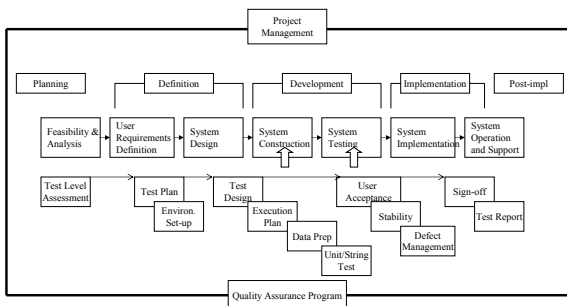
Quality Assurance

- Where are we in the SDLC – which parts are OK / not OK?
- How do we start to improve?
- Do we have a meaningful way to guide use our limited resources and effort?
- What are the organisation strategy and commitment on quality?
-

Error vs Defect

- Error is a problem that is created through the normal course of operation. Error is usual introduced, caught and corrected within the same phase
- Defect is a problem that escape the process in which it is inserted and it is found in subsequent phase

Error vs Defect (cont')



Process Improvement

- An old saying:
'A thousand-mile journey starts with a single step'
- Process Improvement is a journey and is continuous



Software Quality Focus

- Quality should be considered and built in during the development process
- Once quality has been built in, the operating and maintenance processes must not degrade it
- Use a structure way to influence and determine the level of quality achieved in a software product

Software Quality Focus (cont')

- Establish software quality requirements
- Determine, implement and enforce methodologies, processes and procedures to develop, operate and maintain software
- Measure and improve

In a bigger scope, some organisations also institutionalize something calls Total Quality Improvement (TQM)

QC Test vs UAT – an example

- System readiness test
- Meet specifications
- Functional test
- Positive & negative test
- Volume & stress test
- Perform by independent third party

- Business readiness test
- System operability test
- Limited function test
- Should not duplicate QC test effort
- Perform by users

Why would some organisations continue to duplicate the UAT and QC test effort???

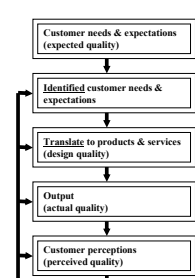
Total Quality Management

At the corporate level, it is an organized way to achieve customer satisfaction:

- Know what turn your customers on
- Organisation commitment and support
- Every employee must contribute ... be part of it
- Focus on certain key areas and processes
- Measurement and root-cause analysis
- Adopt relevant best practices and models
 - CMM, ISO 9000 etc
- Continuous improvement

Total Quality Management (cont')

- Customer-driven quality
- Create satisfied customers
 - Expected quality
 - Actual quality
 - Perceived quality



The Journey Begins . . .

Tested in the world's most competitive environment, Total Quality Control becomes HP's basic propulsion system.

The Haggish. . . . In 1977, HP's joint venture in Japan, Yokogawa Hewlett-Packard (YHP), had experienced a long and difficult exposure to the fiercely competitive environment of the homeland. Their performance was unimpressive in a number of key areas. High defect and failure rates, high manufacturing costs, and uncertain delivery schedules all have done to profit margins. To turn that around, YHP Division launched a Total Quality Control program. Within a few years they made a spectacular recovery.

The renaissance. . . . YHP's flagship efforts quickly earned the attention of HP's top management across the U.S. In fact, when HP's president, CEO, did something else to get HP's attention. He set a stretch objective—to reduce hardware failure rates by a ten-fold factor during the decade of the 80s. Why test? To challenge people to approach problems in an entirely new way. . . to change their expectations about what was possible. Several HP study groups were sent to Japan to learn all they could about this "secret weapon" TQC.

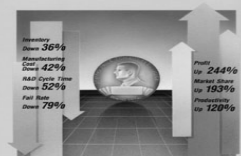
Early results. . . . Manufacturing took the early lead, using TQC and just-in-time (JIT) manufacturing techniques to score major advances, saving the company \$62 million in inventory. The use of TQC in the pre-charge repair center has enabled the U.S. support organization to improve their repair turnaround time by 20 percent. Substantial improvements were made in vendor relationships, leading to lower defect inspection rates and lower material costs. All of these efforts resulted in higher reliability, improved durability, lower production costs, and more competitive prices.

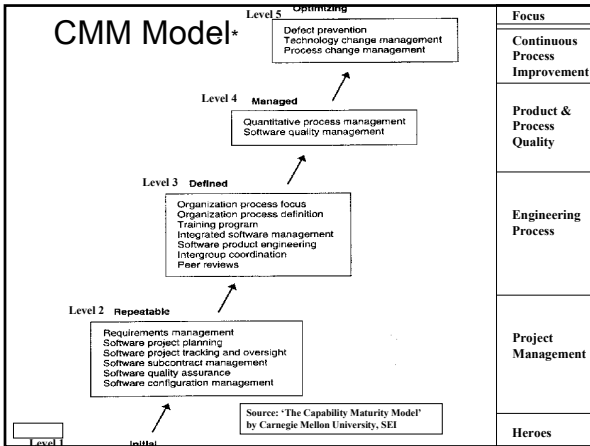
*Source: Hewlett-Packard's "Quest for Total Quality"

TQC defined. . . . TOTAL QUALITY CONTROL (TQC)—or what HP people often refer to as Total Quality Commitment—is a management philosophy and a way of operating that:

- Requires a total commitment to quality.
- Focuses directly on customer needs and expectations.
- Views all activities as processes which can be continually improved through the use of scientific methods.
- Requires universal participation and a team-work approach to problem solving.
- Seeks perfection as the goal.

The customer concept applies to both external and internal customers. To satisfy the external customer, the internal relationship in an organization must work in harmony. The concept of the next process in the organization is every person and every unit in the organization, and to insist on receiving and delivering products and services of perfect quality at each stage of the process until they reach the end user.



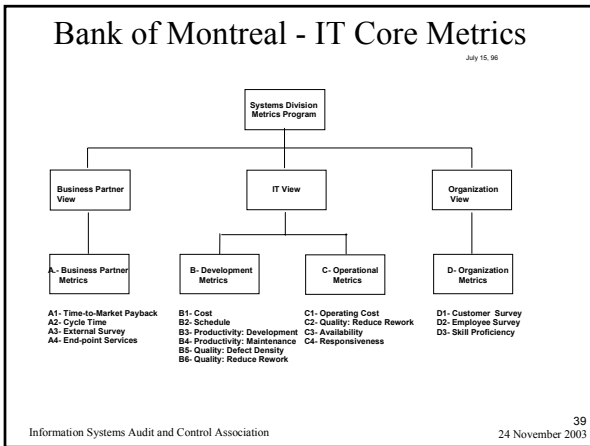


ISO 9000 Family of Standards*

- ISO 9000 - Quality management systems – Fundamentals and vocabulary
- ISO 9001 - Quality management system – Requirements
- ISO 9004 - Quality management systems – Guidelines for performance improvements

ISO 9000 is not a system. It is a group of document which provides interrelated ideas, principles and rules. It is also a set of interrelated or interacting processes that achieve the quality policy and quality objective.

*Source: 'ISO 9000 Quality Systems Handbook', by David Hoyle
Information Systems Audit and Control Association



Bank of Montreal 'Continuous Quality Improvement' Methodology

CQI focuses on:

- Determine the attributes* that will ensure customer satisfaction.
- Understand problem root causes.
- Conduct continuous quality improvement in project processes.

*There are 6 customer satisfaction attribute groups:

1. Usability (product related)
2. Effectiveness (product related)
3. Customer Service (service related)
4. Schedule (service related)
5. Cost (service related)
6. Additional Opportunities (user defined)

Information Systems Audit and Control Association

Measurement – an example*

優質服務標準 Customer Service Standards

服務類別	服務項目	2002年評核標準	2003年優質服務標準
電力供應 ELECTRICITY SUPPLY	電力供應中斷次數	每百萬用戶小時	每百萬用戶小時
	電力供應中斷時間	每百萬用戶小時	每百萬用戶小時
	電力供應中斷原因	每百萬用戶小時	每百萬用戶小時
電力供應 CONNECTION OF SUPPLY	電力供應中斷次數	每百萬用戶小時	每百萬用戶小時
	電力供應中斷時間	每百萬用戶小時	每百萬用戶小時
	電力供應中斷原因	每百萬用戶小時	每百萬用戶小時
電力供應 ELECTRICITY ACCOUNTS & METERS	電力供應中斷次數	每百萬用戶小時	每百萬用戶小時
	電力供應中斷時間	每百萬用戶小時	每百萬用戶小時
	電力供應中斷原因	每百萬用戶小時	每百萬用戶小時
客戶服務標準 CUSTOMER ENQUIRIES & RESPONSES	客戶服務標準	每百萬用戶小時	每百萬用戶小時
	客戶服務標準	每百萬用戶小時	每百萬用戶小時
	客戶服務標準	每百萬用戶小時	每百萬用戶小時
緊急服務 EMERGENCY SERVICES	緊急服務	每百萬用戶小時	每百萬用戶小時
	緊急服務	每百萬用戶小時	每百萬用戶小時
	緊急服務	每百萬用戶小時	每百萬用戶小時

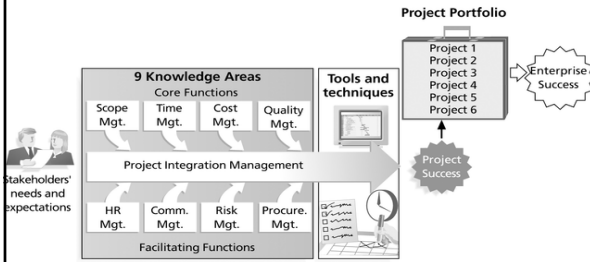
*Source: The Hong Kong Electric Co. Ltd
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Definition of Project Management

- It is the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholders' needs and expectations from a project

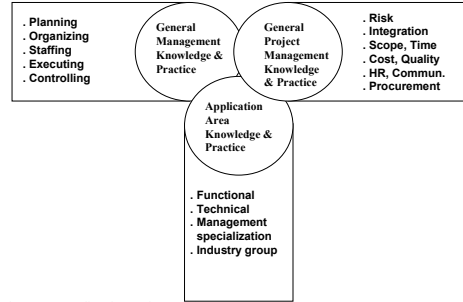
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Fundamental to the Success of a Project



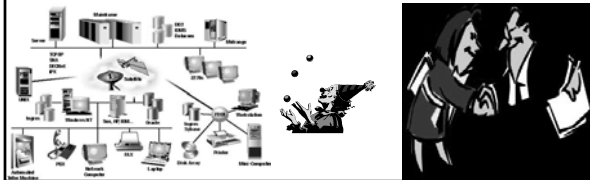
Source: Information Technology Project Management, by Kathy Schwabbe

Relationship of Project Management to Other Management Disciplines



The Making of a Good Project Manager

- How technical should he be?
- How business-oriented should he be?
- How many project could he manage at one time?



Achieving Quality At What Cost

- Adhere to standards, processes, guidelines and methodologies
- Deploy more tools and advanced techniques
- Quality program
- Enhance developers, testers and project managers' proficiencies
-

Cost of Quality

$$= \text{Cost of Prevention} + \text{Cost of Appraisal} + \text{Cost of Failure}$$

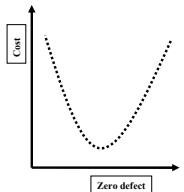
- Training
- Planning
- Risk Management
- Quality Program
- Standard & Process

- Testing
- Peer Review

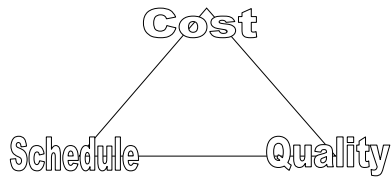
- Rework
- Delay
- Loss Business

Should We Achieve Zero Defect?

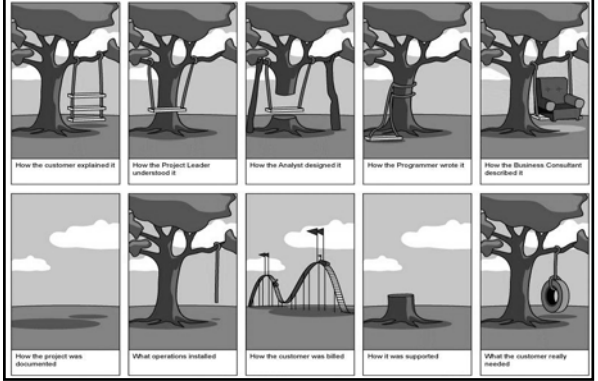
- Six-sigma is a target to meet ... (may be close to zero defect)
- Achieve zero defect may not be cost justified



The On-going Challenges



A Good Project Manager Could Prevent...



Thank You