Quality Principles, Processes and Techniques Applied to Information Quality Management

ABSTRACT

Quality Management is predicated on the theory of a common core set of Principles, Processes, with Techniques applied to improve Quality of manufactured products or delivered services. These Principles, Processes and Techniques apply to Information Quality Management with only slight variations.

World-class organizations apply the same quality principles, such as Deming’s Fourteen Points, Kaizen, Quality Function Deployment (QFD), the Baldrige Criteria and Six Sigma for Business Performance Excellence to Information. This presentation addresses how these principles and techniques apply directly to information as a product and knowledge workers and information producers as “information consumers.”

In this tutorial Mr. English describes the fundamental principles of Quality Management and how they apply to Total Information Quality Management. He describes how an organization can improve the quality and value of its information resources. He describes metrics for measuring information quality and the management principles for implementing an effective information quality environment. Mr. English describes how organizations have successfully implemented information quality processes to improve the effectiveness of their business and information system processes.

- Fundamental Principles of Quality Management Applied to Information Quality
- Applying Principles of Quality Management to Information Process Quality
- Culture Transformation: Creating a Sustainable Environment for Quality Information

BIOGRAPHY

Larry P. English
President
Information Impact International, Inc.

Larry P. English, president and principal of INFORMATION IMPACT International, Inc., is an internationally recognized speaker, teacher, consultant, and author in information and knowledge management and information quality improvement. He has provided consulting and education in ~ 40 countries on five continents. Mr. English was featured as one of the “21 Voices for the 21st Century” in Quality Progress. DAMA awarded him the 1998 “Individual Achievement Award” for his contributions to the field of information resource management. He has chaired Information Quality Conferences in the US and Europe and is a co-founder of the International Association for Information and Data Quality (IAIDQ).
Mr. English’s TIQM® Quality System for information quality improvement has been implemented in several organizations worldwide. Mr. English’s widely acclaimed book, *Improving Data Warehouse and Business Information Quality*, has been translated into Japanese by the first information services organization to win the Deming Prize for Quality. His new book, *Information Quality Applied: Best Practices for Improving Business Information, Processes and Systems*, is available in mid 2009.
Larry P. English  
President and Principal

Mr. English is an internationally recognized speaker, educator, author and consultant in information and knowledge management and information quality improvement. He also provides consulting and education in information stewardship, strategic information visioning, information technology evaluation, information resource management and data administration, data modeling and facilitation, and value-centric application development methods. Mr. English has developed the Total Quality data Management (TQM®) methodology applying Kaizen® quality principles to information quality management. He chairs Information Quality Conferences around the world and he is a co-founder of the International Association of Information and Data Quality (IAIDQ).

Prior to founding INFORMATION IMPACT International, Inc. (www.infoimpact.com), Brentwood, TN, over nineteen years ago, Mr. English was Vice President of an international IRM consulting firm. Before that, he was manager of systems development and then for information management with a large publishing firm. Before positions as Senior Instructor for a computer manufacturer and Information Systems Training Coordinator for a major insurance firm, Mr. English began his career with Sears, Roebuck, and Co., as a programmer and systems analyst.

He was featured as one of the “21 Voices for the 21st Century” in the January, 2000 issue of Quality Progress. DAMA awarded him the 1998 “Individual Achievement Award” for his contributions to the field of information resource management. Mr. English has served as an Adjunct Associate Professor in computer science. He is a member of the American Society for Quality and is a former advisor for DAMA. He has also been an active member of various ANSI (American National Standards Institute) standards committees, and he is an editorial advisor for DM Review.

A magna cum laude graduate of Hardin-Simmons University, Mr. English holds a Masters Degree from the Southern Baptist Theological Seminary where he was a Luther Rice Scholar and a Garrett Fellow. He is listed in Outstanding Young Men in America and Who’s Who Worldwide. He has provided consulting and educational services in more than 30 countries on five continents to such organizations as Aera Energy, Air Canada, American Express, Belgacom, Boeing, British Telecom, Coca-Cola Foods, Dow Chemical, Eastman Kodak, Eli Lilly, the FDA, Hewlett-Packard, The Hartford, IBM, L. L. Bean, NTT DATA, Optical Fibres, Sprint, Telenor, Toyota Motor Sales, UNUM Life Insurance Co., the U.S. Navy, Western Health Alliance and Weyerhaeuser.

A frequent keynote speaker, Mr. English writes the monthly “Plain English about Information Quality” column for DM Review, and is the author of the highly acclaimed Improving Data Warehouse and Business Information Quality, also available in Japanese, and numerous articles for publications in the US and Europe.

QUALITY MANAGEMENT PRINCIPLES, PROCESSES AND TECHNIQUES APPLIED TO IQ MANAGEMENT  
Learning Objectives

- Understand How the proven Quality Management Principles of Deming, Juran, Crosby, Kaizen and other proven Quality Systems apply to Information Quality Management

- Understand Why and How Proven Quality Management Principles Must be applied to Information as a Product of Business and Information Processes
SHORT LIST OF PROVEN QUALITY SYSTEMS

- Deming’s System of Profound Knowledge and 14 Points of Mgt Transformation (*Out of the Crisis*)
- Juran’s Trilogy: *Quality Planning, Quality Control, Quality Improvement*
- Walter Shewhart: *Quality Control Charts* and the *Plan-Do-Study-Act* cycle of Process Improvement
- Armand Feigenbaum: *Total Quality Control*
- Genichi Taguchi: *Robust Engineering* and the Quality Loss Function
- Philip Crosby: *Quality Is Free, Quality Without Tears*
- Masaaki Imai: *Kaizen* and *Gemba Kaizen*
- *The Baldrige Criteria*
- *Six Sigma*

**THREE CHOICES FOR THE FUTURE OF THE INFORMATION QUALITY DISCIPLINE**

1. **You can maintain the Status Quo** of your current rate of defective information, incurring the high costs of process failure and Information Scrap and Rework, possibly leading to Enterprise Failure.

2. **You can embrace a conservative, reactive approach** of “Playing at Information Quality” by following a failed “Inspect and Correct” model of “data profiling” and “data cleansing” [sic. “Information Scrap and Rework”]

3. **You can embrace a proactive model of Total Information Quality Management** by designing quality and error-proofing into the Information Processes. This requires transforming the Culture of the Enterprise through education, training and replacing detrimental performance measures of speed with measures of Information Consumer Satisfaction and Continuous Information Process Improvement.
PHILIP CROSBY’S QUALITY “ABSOLUTES”

1. Quality has to be defined as conformance to [customer] requirements, not as goodness.

2. The system for causing quality is prevention, not appraisal.

3. The performance standard must be zero defects, not “that’s close enough”.

4. The measurement of quality is the price of nonconformance, not indexes [scorecards].

Crosby, Quality Without Tears

KAIZEN QUALITY AND INFORMATION QUALITY

Kaizen* and Management: Two major functions:
- Maintaining management and quality standards
- Elevating quality standards and innovation

- The next process is the Customer
- Establish non-blame, non-judgmental environment
- Process versus Result
- Speak with Data [“Manage by Fact”]
- Follow the Plan-Do-Check/Study-Act and Standardize-Do-Check/Study-Act Cycles**
- Put Quality FIRST
- Eliminate Muda (“waste”)
- Solve Information Quality problems at Gemba (“the real place”)

* Kaizen: Japanese word for continuous process improvement involving everybody
** PDSA or PDCA & SDSA or SDCA

Adapted from: Masaaki Imai, Gemba Kaizen
BALDRIGE PERFORMANCE EXCELLENCE CRITERIA FRAMEWORK

Organizational Profile: Environment, Relationships, and Challenges

1. Leadership
2. Strategic Planning
3. Customer & Market Focus
4. Measurement, Analysis, and Knowledge Management
5. Human Resource Focus
6. Process Management
7. Business Results

“How the organization selects, gathers, analyzes, manages, and improves its data, information, and KNOWLEDGE ASSETS.”

Source: H. Hertz, NIST National Quality Pgm

SEVEN DEADLY MISCONCEPTIONS ABOUT INFORMATION QUALITY

1. “Information Quality is data cleansing”
2. “Information Quality is data assessment”
3. “Conformance to business rules is same as accuracy”
4. “Information Quality is data accuracy”; and counterpoint: ‘Information Quality is fitness for purpose’
5. “Information Quality problems are caused by Information Producers”; and its corollary: ‘Information Quality is produced by an Information Quality Group’
6. “Information Quality problems can be edited out by implementing Business Rules”
7. “Information Quality is too expensive”
THE FUNDAMENTAL QUALITY PRINCIPLES

- **Customer Focus**
  - Customer satisfaction
  - Supplier / Customer Partnership

- **Continuous Process Improvement**
  - Process definition
  - Product specification (customer-focused)
  - Process Improvement (CPI) and Business Process Reengineering (BPR)

- **Proven, scientific Methods**
  - Statistical quality control
  - PDS/CA (Shewhart) cycle
  - SIPOC*

- **Management Accountability**

---

SUB-OPTIMIZED VALUE / COST CIRCLE

Value Circle: “A closed-loop, end-to-end set of activities that begins with a request from a Customer and ends with a benefit to Customer. Activities either add Value or they add Waste & Cost.”

“Functional Optimization” = Dysfunctional Enterprise

Customer Request

Customer Benefit

VC: Value Basis
NVC: Non-Value Adding Cost = Waste

(2-6 hours)

Ord Date: 3/12/00
Cust ID: 44123
Tel Num: 555-1234
Time: 3 hours

Create Partial Capture

Rediscover

I/T
Repair Order
Facts
Svc Date: 3/15/00
Equip Type: M12AB01
Problem Desc: Poor volume out
Ord Date: 3/12/00
Cust ID: 44123
Tel Num: 555-1234
Time: 3.2 Hrs

Customer Request

"Value Circle"
(Enterprise)
Optimization
= Effective Learning Organization

IQ Point 9: “Break down barriers between business areas.”

Complete, Accurate Capture

Me

Shared Data

Controlled Distribution

Customer Benefit

2-6 hours

Rediscover
OPTIMIZED VALUE CIRCLE

Customer Request: "Satisfied Customer"

Value Circle: an end-to-end set of processes that begins with a Customer Request and ends with a Customer Benefit

Information sharing
Knowledge Worker feedback

IP = Information Producer
KW = Knowledge Worker

*Template available on IQApplied.com to High IQ Team Members

© INFORMATION IMPACT Confidential & Proprietary

BUSINESS VALUE / COST CIRCLE TEMPLATE

© INFORMATION IMPACT Confidential & Proprietary
CUSTOMER ORDER PROCESS VALUE CIRCLE
With Redundancy and Missing Feedback

1. Create Customer Order
2. Pick Order
3. Ship Customer Order
4. Invoice Customer Order
5. Approve Customer Order
6. Apply Customer Payment
7. Audit Order/Shipment/Payment
8. Retail Customer
9. Credit Analyst
10. Ware House Clerk
11. A/R Clerk
12. Call Center Rep

Value Circle: an end-to-end set of processes that begins with a Customer Request and ends with a Customer Benefit

CUSTOMER CARE VALUE CIRCLE
“Prospect-to-Valued-and-Valuable Customer”

1. Identify Prospective Customers
2. Understand Prospective Customers
3. Communicate With Prospective Customers
4. Sell to Customers
5. Provide Value, Serve Customers
6. Relate to Customers
7. Listen to Customer Feedback
8. Enhance Customer Life Time Value

Value Circle: “A closed-loop, end-to-end set of activities that begins with a request from a Customer and ends with a benefit to Customer”
SUPPLY CHAIN COST / VALUE CIRCLE
“Forecast-to-Satisfied-Customer”

1. Understand Customer
2. Plan Products
3. Forecast Demand
4. Specify Goods
5. Specify Materials
6. Schedule Shipment
7. Ship to Supplier
8. Ship to Distributor
9. Supply Warehouse
10a. Ship to Customer
10b. Fill Order
11a. Deliver Order
11b. Question, Complain
12. Satisfy Customer
13. Feedback

Retail Store
Retail Warehouse
Retail Store
Tier 2 Supplier
Tier 1 Supplier
Distributor
Retail Hdq

e-BUSINESS VALUE CIRCLE

1. Understand Customer
2. Find you
3. Access web site
4. Trust you
5. Find information
6. Evaluate
7. Select item / service
8. Place order / provide information
9. Confirm order
10a. Fill order
10b. Inquire order
11. Shop
12. Satisfy e-Customer
13. Keep in touch

e-Surfer / e-Customer
Retail Store
Information Quality is NOT* about what is in databases
(*well, it is, but that is not all)

Information Quality (IQ) is ABOUT business, service and manufacturing performance excellence by improving information process quality for mission accomplishment

TIQM addresses:
- Quality of Information Definition, Models, DB Designs
- Quality of Information Content
- Quality of Information Presentation
- Quality of Business Communication

Total Information Quality Management results in:
- Increased Customer Satisfaction
- Increased Employee Satisfaction and Productivity
- Decreased Costs and Increased Profits / Surplus

Components of Information Quality:
- Information Product Specifications (Definition and Business Rules) and Information Architecture
- Information Content
- Information Presentation

“Consistently meeting* all Knowledge Workers’ and end-Customers’ Expectations”

through Information and Information Services so:
- Knowledge Workers accomplish enterprise objectives
- Customers are Successful with your products

Larry P. English, TIQM*

World-class organizations do not stop here—they strive to “delight” their customers
THE DISCIPLINE OF INFORMATION QUALITY MANAGEMENT

Information Quality Management is:
The application of proven Quality Management Principles, Processes and Practices to Information as a Product of the Enterprise Processes (business, manufacturing & service) to meet or exceed Information Consumers’ expectations so they can accomplish the Mission of the Enterprise

Larry P. English

THE FUNDAMENTAL QUALITY PRINCIPLES

- **Customer** Focus
  - Customer satisfaction
  - Supplier / Customer Partnership

- Continuous Process **Improvement**
  - Process definition
  - Product specification (customer-focused)
  - Process Improvement (CPI) and Business Process Reengineering (BPR)

- Proven, scientific **Methods**
  - Statistical quality control
  - PDS/CA (Shewhart) cycle
  - SIPOC*

- Management **Accountability**
TOTAL QUALITY MANAGEMENT
Deming’s 14 Points

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

2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.

3. Cease dependence on mass inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.

4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.

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

6. Institute training on the job.

7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of... workers.

Source: Deming, Out of the Crisis

8. Drive out fear, so everyone may work effectively for the company

9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.

10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.

11. a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.

   b. Eliminate management by objective. Eliminate management by numbers, numerical goals. numerical goals. Substitute leadership.

12. a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.

   b. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, inter alia, abolishment of the annual or merit rating and of management by objective.

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

14. Put everyone to work to accomplish the transformation. The transformation is everybody’s job. Management will explain by seminars and other means why change is necessary, and that the change will involve everybody.

Source: Deming, Out of the Crisis, Chapter 2
IQ 1. CREATE CONSTANCY OF PURPOSE FOR IMPROVEMENT OF INFORMATION PRODUCT & SERVICE

- Management's two sets of problems:
  - Those of today: “It is easy to stay bound up in the tangled knots of the problems of today, becoming even more efficient in them.”
  - Those of tomorrow: “No company without a plan for the future will stay in business.” *Deming*

- “The obligation to the Customer never ceases”

Information Quality ramifications:
- Define IM / IQ Mission, Vision and Objectives based on enterprise mission and vision to include quality for information products & services to meet information consumers' needs
- Develop IM / IQ plans with both long term and short term deliverables that enable Strategic Business Objectives
- Implement and define IM / IQ processes & tools with customer focus that leads to quality & process improvement

- “The obligation to the Knowledge Worker never ceases”

IQ 2. ADOPT THE NEW PHILOSOPHY—QUALITY INFORMATION REDUCES COSTS

- The economic realities of today require new standards
  - “Reliable service reduces costs” *Deming*
  - “Point two really means . . . a transformation of management” *Deming*

Information Quality ramifications:
- Enable a paradigm shift to information as a shared business resource and quality information as a product
- Implement quality information philosophy and policy:
  - “Reliable, managed information reduces costs and increases value”
  - “Reliable, quality shared information reduces costs and increases value”
- *This means a transformation of business and information systems management*
  - Business management *accountability* for information
  - Systems management *accountability* for value delivery
IQ 3. CEASE DEPENDENCE ON DATA ASSESSMENTS & INSPECTIONS ALONE—DESIGN QUALITY INTO PROCESS

- Quality assurance (inspection) has a goal to discover faulty products and correct them (rework) or throw them out (scrap)

  “Quality comes not from inspection but from improvement of the process”
  
  *Deming*

Information Quality ramifications:

- Replace data model and definition “review and approval” with front-end; cross-functional, business-driven data modeling that builds quality in and produces databases that are (1) stable, (2) flexible, and (3) reused
- Reengineer processes to eliminate causes of defects before automating them
- Design error-proofing techniques into the databases, process, forms, application screens and programs, and procedures and training that prevent cause of defects

THE BUSINESS CASE FOR IQ MANAGEMENT: Poor Quality Information Costs

- “As much as 40 to 50 % or more of the typical IT budget is really ‘information scrap and rework’” and waste of moving and transforming data to disparately defined redundant databases*

- “Poor quality information often causes 40 to 60 % of manufacturing scrap and rework costs”

- “The direct costs of poor quality information, including irrecoverable costs, rework of products and services, workarounds, and fines and customer compensation can be as high as 20 to 30+ percent of a large organization’s [operating] revenue or budget.”**
### QUALITY CONTROL: MANUFACTURING vs INFORMATION

**MANUFACTURING:**
- **Objective:** Improvement action on a production process
- **Population:** Process
- **Sample:** Lot
- **Data:** Sample Data
- **Measurement:** Improvement Action

**OBJECTIVE:**
- **Data:** Measurement
- **Sample:** Improvement Action
- **Object / Event:** Sample Data

**INFORMATION:**
- **Objective:** Improvement action on a production process
- **Population:** Process
- **Sample:** Data Set
- **Data:** Collect data
- **Measurement:** Improvement Action

**OBJECTIVE:**
- **Data:** Improvement Action
- **Sample:** Data Set
- **Object / Event:** Data Set

The relation between products and samples, and data population and data samples and object / event

Source: Ishikawa, Guide to Quality Control

### CUSTOMER INFORMATION ACCURACY

**p Control Chart 2000-2003**

- **UCL**
- **LCL**
- **Mean**
- **Short Term Target**
- **Long Term Target**

Inaccurate data  Mean  Upper Control Limit  Lower Control Limit  Accuracy Temp Std

The Fourth MIT Information Quality Industry Symposium, July 14-16, 2010
IQ 4. END THE PRACTICE OF PROJECTS OR DATA CAPTURE ON COST OR TIME MEASURES ALONE

- The practice of lowest price has had the impact of actually increasing costs while increasing defects—instead, minimize "total costs" of ownership
  - "Price has no meaning without a measure of the quality purchased"  
  Deming
  - "Purchasing should be a team effort and ... include ... representatives ... of [all] departments involved with the product"  
  Deming
  - "A buyer will serve his company best by developing a long-term relationship of loyalty and trust with a single vendor"  
  Deming

Information Quality ramifications:
- Include quality guarantee / measures in cost estimate
- Measure software & information "cost of ownership"
- Develop databases to support all Knowledge Workers
- Develop relationships of trust in natural Information Producers

APPLICATION DEVELOPMENT PARADIGMS

Wrong: Application Requirements Analysis ("IPO"*only)

Right: *Value Circle Analysis (SIPOC*)

* Identify information required by downstream knowledge workers inherent to create processes & information required from upstream information producers

*SIPOC = Supplier-Input-Process-Output-Customer
SIPOC (Supplier-Input-Process-Output-Customer)

1. Identify your information products
2. Identify your information customers; expectations
3. Identify your information suppliers; barriers and your expectations

Customer Request → Customer Benefit

1. My Information Products
2. My Information Suppliers
3. My Information Customers

My process controls:
- Assessment:
- Training:
- Resources:
- Perf Measures:
- Procedures:
- Error Proofing:
- QA:
- Cust Satisfaction Measurement:

My IQ Expectations:
- Completeness:
- Accuracy:
- Timeliness:
- Non-duplication:
- Consistency:
- Presentation Q:
- Definition Clarity:
- Other:

Customer IQ Expectations:
- Completeness:
- Accuracy:
- Timeliness:
- Non-duplication:
- Consistency:
- Presentation Q:
- Definition Clarity:
- Other:

Process Using My Information

Barriers / Obstacles:
- Assessment:
- Training:
- Resources:
- Perf Measures:
- Procedures:
- Error Proofing:
- QA:
- Cust Satisfaction Measurement:

Problems / cost of Poor Quality:
- Time:
- Money:
- Materials:
- Equip/facilities:
- Computer resources:

My Information Supplier(s) → Me → My Information Customer(s)

Info I Require → My Process → Info I Produce

My IQ Expectations:

The Fourth MIT Information Quality Industry Symposium, July 14-16, 2010
SIPOC (Supplier-Input-Process-Output-Customer)
Quality Planning / Improvement Procedure Steps (1 of 3)

1. Identify the process(es) you or your work team(s) perform
2. Identify the important Information Groups (such as Customer Address data, or Product Price data) created or updated by your process(es)
   - Create a SIPOC chart for each Information Group
3. Identify all customer groups who require that data
   - Document in the enterprise Data Dictionary or repository for future reference
4a. Identify all processes that depend on the data
4b. List the general (or specific, if known) costs incurred if the data is wrong, missing or not available on an acceptable time frame

SIPOC (Supplier-Input-Process-Output-Customer)
Quality Planning / Improvement Procedure Steps (2 of 3)

5a. List and understand the quality requirements each customer group has for the information
5b. Measure or have the data measured against the quality requirements
6. If there are gaps, conduct a PDCA* to identify root cause and plan, test and implement improvements
   - Note: measure costs of nonquality before, and cost-reductions / opportunity gain afterwards
   - Document ROI (return on investment) and lessons learned in the Information Quality knowledge base
7. List the Information Group(s) (such as Product Inventory data or Supplier Contact data) you require to perform your process(es)

*PDCA= Plan-Do-Check-Act Process Improvement
8. Identify your Information Producer(s) (Supplier(s))

9. Identify the processes that create or update the information you require

10. Understand the obstacles and barriers, if any, confronted by the information producers
   - If the information does not meet your expectations work with the Information Producers or with the Information Quality team to conduct a PDCA* to eliminate root causes of Information Quality problems

11. Share your ongoing Information Quality requirements for the data you require with your Information Producers

*PDCA= Plan-Do-Check-Act Process Improvement

IQ 5. IMPROVE CONSTANTLY & FOREVER PROCESSES OF I/S* DEVELOPMENT & INFORMATION “PRODUCTION”

☐ Improvement is not a one time effort—management is obligated to continual improvement
   Quality “must be built in at the design stage” Deming
   “Everyone and every department in the company must subscribe to constant improvement” Mary Walton

☐ Fixing a problem is not the same as process improvement

⇒ Information Quality ramifications:
   - Data cleansing is not same as process improvement
   - Identify and involve the customers of IRM products and services—understand their information req’s
   - Design quality into process, application and database involving knowledge workers in the design (QFD**)
   - Everyone and every unit must participate in continual information process improvement

*I/S = Information Systems
*IRM = Information Resource Management
**QFD = Quality Function Deployment
© INFORMATION IMPACT Confidential & Proprietary
The TIQM® QUALITY SYSTEM
PROCESS P4:
Improve Information Process Quality

- P4.1 Define Project for Information Process Improvement
- P4.2 Develop Plan for Information Process Improvement
- P4.3 Do Implement Process Improvements
- P4.4 Check/Study Impact of Information Process Improvements
- P4.5 Act to Standardize Information Process Improvements

Plan-Do-Study/Check-Act (PDC/SA)

L. English, Improving Data Warehouse and Business Information Quality, p. 290. In here, the process is numbered P5. P4 is the permanent new #.

CAUSE-AND-EFFECT DIAGRAM
Order Entry Errors

Mgt environment
Application/Database Technology
Order Process / Procedures

Measurement

No emphasis on training
DB reloaded with duplicates
Conflicting procedures
No standards for name & addr
Postal file to check addr is out of date

Machines
Customer
Information
Effect

Customer look-up system faulty
Slow response
Does not ask if customer has placed order before
No step to ask all customer's name

Material

Duplicate Customer records created

Data Producer

A lienate / lose Customers; Waste money on mail, resources, recovery & correction

Does not understand customer's name

Human

Wants to be “customer-service” oriented and does not ask for customer number

- No account ability
- No emphasis on training
- DB reloaded with duplicates
- Conflicting procedures
- No standards for name & addr
- Postal file to check addr is out of date
- Measurement
IQ 6. INSTITUTE TRAINING FOR INFORMATION QUALITY

- Proper training is essential for workers to perform their jobs effectively
  
  "If someone learns how to play the piano from a self-taught piano teacher; they will learn a lot wrong, some right" and "neither pupil nor teacher will know what is right and what is wrong" - Deming

- Information Quality ramifications:
  - Institute IQ education and training at all levels:
    - Executive Leadership
    - Business Management
    - Knowledge Workers and Information Producers
    - Information Systems Management
    - Information Resource Management staff
    - Application Developers
    - New employees (Orientation)

IQ 7. INSTITUTE LEADERSHIP FOR INFORMATION QUALITY

- Management is Leadership—not “supervision”
  - Leaders enable workers to improve their processes
  - Most supervisors are just the opposite, because they implement inappropriate measures and rewards

- Information Quality ramifications:
  - Take the lead in information quality improvement
  - Educate and coach executives
  - Implement management accountability
  - Learn how your customers use information
  - Measure and reward the right things:
    - Teamwork, customer satisfaction, waste reduction, total cost of ownership
IQ 8. DRIVE OUT FEAR SO INFORMATION PRODUCERS
& KNOWLEDGE WORKERS CAN WORK EFFECTIVELY

- Improvement in quality requires people to feel secure
  “Most people … do not understand what their job is, nor what is right or wrong”
  Deming
  “So seldom is anything done to correct problems that there is no incentive to expose them”
  Mary Walton

- Information Quality ramifications:
  - Establish a non-blame, non-judgmental environment
  - Provide producers training in information quality requirements, information customer expectations; and empower them to improve processes
  - Implement accountability and encourage eliminating information problem causes and take action
  - Create an anonymous information quality hotline
  - Allow risk to try and fail without punishment

IQ 9. BREAK DOWN BARRIERS BETWEEN STAFF AREAS
(INFO SYSTEMS TO BUSINESS & BUSINESS TO BUSINESS)

- Enterprise Failure occurs when organizational units operate autonomously toward their own goals
  The parable of the shoes

- Information Quality ramifications:
  - Create IRM* / Application Development partnership
  - Create Information Systems to Business Partnerships
  - Define Cross-functional Business Value Circles
  - Develop Business Area Partnerships across Business Value Circles
  - Define Supplier-customer “contracts” between Business Area Managers for Information Quality
  - Provide Training and Resources to deliver quality

*IRM = Information Resource Management
IQ 10. ELIMINATE SLOGANS AND EXHORTATIONS; REPLACE WITH ACTIONS FOR INFORMATION QUALITY

☐ Slogans do not help people do a good job
- “Don’t skate on an oil slick” (sign in a U.S. factory)
  versus
- Elimination of oil slicks

Information Quality ramifications:
- Develop *effective* information management and information quality improvement processes
- Develop IQ improvement processes that prevent information “oil slicks” by eliminating the causes
- Then, when you discover data defects, don’t just fix or ignore them—identify and eliminate the cause(s)

IQ 11. ELIMINATE QUOTAS OF “PRODUCTIVITY” WITH METRICS OF QUALITY

☐ Quotas and other work standards hurt quality probably more than any other single working condition
☐ Quotas cause above-average workers to slow their output and cause below-average workers frustration

Information Quality ramifications:
- Replace “productivity” metrics with focus on real business performance:
  - Management ownership (total) costs of doing business
  - Reduced costs of information scrap and rework
  - Internal knowledge worker satisfaction surveys of information products, both immediate and downstream, and both after implementation and on continued basis
  - External end-customer satisfaction, including communication and information
IQ 12. REMOVE BARRIERS TO PRIDE OF WORKMANSHIP: Let Information Producers Improve Their Own Processes

- Workers, apart from management, know the problems of their jobs and given an opportunity, will fix them.
- **Management must listen** to their Employees, **involve them actively**, not with “quick fix” programs to defuse Employee frustration but to solve the real problems.

**Information Quality ramifications:**
- Systems and Business Management must listen to their Employees as sources of quality improvement.
- Involve Employees actively in information planning, root cause analysis and process improvement.
- **And** incorporate their suggestions to improve information processes.

IQ 13. INSTITUTE A VIGOROUS PROGRAM OF EDUCATION & SELF-IMPROVEMENT FOR EVERYONE

- It is not enough to have good people with today’s skills.
  - “What an organization needs is not just good people; it needs people that are improving with education.”
  - Quality must not cost jobs. An organization “must make it clear that no one will lose their job because of improvement in productivity.”

**Information Quality ramifications:** Information-Age Paradigm shift

- Knowledge worker paradigm: “information products” and “information customers.”
- Information systems paradigm shift: information as a shared resource; value-centric applications.
- Mgt: the **Information Revolution requires** business management **across** value chains; not **down** functions.
IQ 14. TAKE ACTION TO ACCOMPLISH THE TRANSFORMATION FOR INFORMATION QUALITY

- Management must put everyone to work to transform org.
  - Must organize itself to administer the other 13 points
  - Senior management must feel the pain of status quo
  - Senior management must communicate to a critical mass of people why change is necessary for all
  - Every activity is a process that can be improved

- Use the Shewhart Cycle
  1. Study a defective process to identify root cause(s) and define improvement(s)
  2. Implement the improvement in a controlled way
  3. Study the effects of the “improvement”
  4. Roll the process out and study the results—what did we learn?

The TIQM® QUALITY SYSTEM FOR INFORMATION

- TIQM® is not a program; it is a value system, mind set, and habit of continuous improvement of:
  1. Application and data development processes
  2. Business processes

By integrating quality management values, principles and methods into the culture

Establish the Information Quality Environment
The TIQM® QUALITY SYSTEM

PROCESS P1: Assess Information Product Specifications & Architecture Quality

 Start

P1.1*
Identify Information Product Spec Qual. Characteristics

P1.2
Identify Information Group to Assess

P1.3
Identify Information Stakeholders & Groups

P1.4
Assess Info Product Specifications Quality

P1.5
Assess Information Architecture Quality

P1.6
Assess Stakeholder Satisfaction with Info Prod Specs

P1.4.01
Technical Data Definition Quality Assessment P3.1, P4.1, P5.1

P1.5.01
Information Model and Database Design Assessment P3.1, P4.1, P5.1

P1.6.01
Data Definition Customer Feedback Assessment P3.1, P4.1, P5.1

* One time step with periodic updates

PROCESS P2: Assess Information Quality

 Start

P2.1
ID Information Group for Assessment

P2.2
Plan IQ Objectives, Measures and Tests

P2.3
Identify Information Value / Cost Circle

P2.4
Determine Files or Processes to Assess

P2.5
Identify Accuracy Verification Sources

P2.6
Extract Statistically Valid Sample of Data

P2.7
Measure Information Quality

P2.8
Interpret and Report Information Quality

Information Value & Cost Chain Diagram P3.1, P4.1, P5.1

IQ Reports P3.1, P4.1, P5.1
The TIQM® QUALITY SYSTEM
PROCESS P3:
Measure Poor Quality
Information Costs and Risks

1. Start
   - P1.4, 5, 6
   - P2.3, 8

2. P3.1 Identify Key Business Performance Measures
3. P3.2 Calculate Information Production Cost of Ownership
4. P3.3 Calculate Direct Cost Poor Quality Information
5. P3.4 Identify Customer Segments
6. P3.5 Calculate Customer Lifetime Value
7. P3.6 Calculate Poor Quality Opportunity Costs/Risks
8. P3.7 Calculate ROI* of Process Improvement

Information Cost Analysis
- P4.1, P3.7
- Poor Quality Information Direct Cost Analysis
- P4.1, P5.1, P3.7

L. English, Improving Data Warehouse and Business Information Quality, p. 214.

ROI = Return on Investment

The TIQM® QUALITY SYSTEM
PROCESS P4:
Improve Information Process Quality

1. Start
   - P1.4, 5, 6
   - P2.3, 8
   - P3.6
   - P5.6

2. P4.1 Define Project for Information Process Improvement
3. P4.2 Develop Plan for Information Process Improvement
4. P4.3 Do Implement Process Improvements
5. P4.4 Check/Study Impact of Information Process Improvements
6. P4.5 Act to Standardize Information Process Improvements

Plan-Do-Study/Check-Act (PDC/SA)

L. English, Improving Data Warehouse and Business Information Quality, p. 290. In here, this process is numbered P5. P4 is the permanent new #.
The TIQM Quality System

PROCESS P5:
Correct Data and Control Redundant Data

Start
P2.8
P3.6

P5.1*
Identify Data, Target & Sources & Plan Audits & Controls

P5.2
TIQM P1: Assess Information Product Spec Qual

P5.3
TIQM P2: Assess Information Quality

P5.4
Standardize Data for all DBs

P5.5
Correct and Complete Data

P5.6
Match and Consolidate Data

P5.7
Audit and Control Data Extract, Transform, and Load

P5.8
Analyze Data Defect Types

P5.9**
Transform / Enhance Calculate Derived Data

Target Database / Data Warehouse Design

Defect Analysis
P4.1
Audit Control Reports; Corrected, Enhanced Data

* One time step per information group  **All steps

INFORMATION QUALITY MANAGEMENT
MATURITY AND THE COSTS OF QUALITY

Danger point
Process Failure & Information Scrap & Rework costs

Data correction costs
Assessment costs

IQ Improvement & Environment Investments

Enterprise Failure

Enterprise Optimization

"Quality is free. It’s not a gift, but it is free.” P. Crosby

Stage 1 Uncertainty
Stage 2 Awakening
Stage 3 Enlightenment
Stage 4 Wisdom
Stage 5 Certainty

Maturity
EPILOGUE

“Quality is free. It’s not a gift, but it is free. What costs money are the unquality things—all the actions that involve not doing jobs right the first time.

“Quality is not only free, it is an honest-to-everything profit maker. Every penny you don’t spend on doing things wrong, over, or instead becomes half a penny right on the bottom line. If you concentrate on making quality certain you can probably increase your profit by an amount equal to 5 to 10 percent of your sales. . . . . . . . . . . . . . . . . . . . . . . . .
That is a lot of money for free.”

Philip B. Crosby, Quality Is Free

And this does not count the increased opportunity gain that comes from exploitation of high quality information

To re-iterate:

“QUALITY IS FREE. IT’S NOT A GIFT…”

Thank you for your valuable time. Please share your feedback and comments as you apply your new knowledge (Larry.English@infoimpact.com) Larry P. English

www.infoimpact.com
Your Information Portal for Information Quality and Information Management

- See or share IQ Best Practices
- Review and link to IQ Products
- Links to Other IQ Resources
- Recommended reading in the Information Professional’s Reference Library
- Larry’s new book is available now Information Quality Applied: Best Practices for Business Information, Processes and Systems

John Wiley & Sons, 1999
Visit www.IQApplied.com

View & see reviews at Visit www.infoimpact.com