Quality Management makes People and Organizations "Smarter"

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Born in 1947. Graduated from the University of Tokyo in 1970.
Teaching and researching at the University of Tokyo for 1976-2013.

His major as a university student was statistical analysis.
His research has been focusing on **quality management**, including TQM, ISO 9000, Structured Knowledge Engineering, Healthcare Social System Engineering, Software Quality, and Nuclear Safety.

President, Japanese Society for Quality Control (JSQC) for 2003-05.
Chair, Deming Application Prize Committee (TQM) for 2008-11.
Chair, the national committee for ISO/TC 176 (ISO 9000s) for 2000-2012
Chair, QMS Accreditation Committee, Japan Accreditation Board (JAB) for 1999-2012.
A Board, Japanese Society for Healthcare Quality and Safety for 2006-
Chair, Society of Embedded Software Skill Acquisition for Managers and Engineers (SESSAME) 2000-
Chair, JUSE/SQiP (Software Quality Profession) for 1994-2012

Awarded *Deming Prize for Individuals* in 2006.
Awarded *Nikkei Quality Management Literature* in 96, 98, 99, 02, 03, 06, 09 and 12.
ASQ (American Society for Quality)/ *Freund-Marquardt Medal* in 2010.
Industrial Standardization Awards/ *Prime Minister's Award* in 2012.

Quality management and I

- University
    - Undergraduate and master's majors: Statistical analysis, applied statistics and statistical engineering
    - Found a job at university： Teacher without any alternatives
- Quality management
    - Interest in quality management: A field where statistical approaches are useful
    - Aware of the importance of management: Methodology for making use of inherent technology
    - Design process: Management of the quality of a task which appears to be performed only once
- Application to various fields
    - Software quality: Aware of the importance of software
    - Improvement of healthcare quality: Healthcare safety, healthcare quality assurance, and healthcare TQM
    - Nuclear power: Quality assurance for nuclear safety
- My specialties
    - Quality management: TQM, ISO 9000, design process, software quality, healthcare quality and safety, and nuclear safety
    - "Science of generalized purpose achievement"： Setting and rational achievement of reasonable purposes

If you learn Quality Management, you become Smarter!

If you seriously learn quality management and master the theory and practice of quality management, you become very smart, or intelligent, brilliant, bright, and wise!

If your organization seriously learns quality management and properly apply the ideas, methodologies and techniques of quality management to its operations, your organization becomes smarter!

Is this true? (Yes, it is absolutely true!!!)

If so, why?

What is "quality management"?

- Inspection! It may also include claim processing.

- Not only. It is a control of manufacturing process based on the principle of "building quality in the process."

- Not limited to manufacturing. It is more than 30 years since it is said "building quality in planning and design."

- In the sense of focusing customers, the key function is sales and marketing.

- It covers all activities to improve management quality performed throughout whole organization.

- We should regard it as a comprehensive management for providing customer value through products and services.
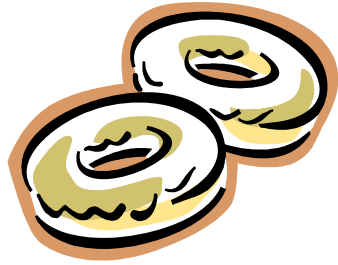
Donut phenomenon of Quality Management

- Quality management neglecting quality
    - Quality management approach can be applied to any purposes…! …?
    - Quality management for less cost, better efficiency, higher production volume and shorter lead time
    - Donut phenomenon of quality management
- Quality assurance
    - When did the term "quality assurance" start to be commonly used?
    - Around 1960?......Donut phenomenon of quality management
    - Quality assurance = the purpose, core and essence of quality management

- Why did this phenomenon occur?
    - The concepts and principles of quality management can be applied to various purposes.
    - This may be true, but does quality management have any other aspects of greater importance?

Quality

Quality management
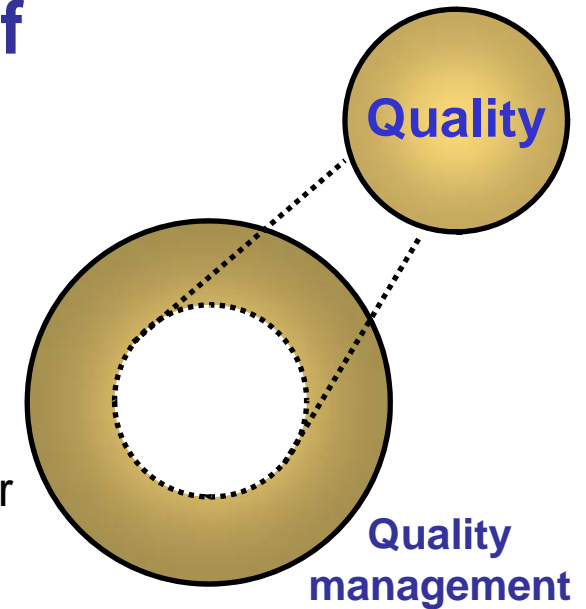
Quality Management approach can be applied to any purposes…! …?

- Development of quality management
    - From manufacturing industries to non-manufacturing industries (construction, electric power, services, software, etc.)
    - From manufacturing processes to the upstream processes (production preparation, design and development, and planning)
    - From manufacturing functions to related functions (production engineering, design and development, marketing and administration)
    - From product quality to totality of quality, cost and delivery/volume, etc., and further to quality of jobs
    - From manufacturing process management to general process management

- Why was this development possible?
    - The concepts and principles of quality management can be applied to various purposes.
    - This may be true, but does quality management have any other aspects of greater importance?

Quality Management approach can be applied to any purposes…! …?

- Applicable to various problems and issues
  - Development and improvement of design and development process
  - Design of rational inspection, and study of effective design review
  - Development and improvement of work systems and information systems
- Applicable to personal issues
  - What should be the party next week like?
  - Where should my laboratory's study camp next month take place? And what should it be like?
  - How should I spend time with my old friend tomorrow?

- Why can quality management approach be applied to a broad range of purposes?
  - The concepts and principles of quality management can be applied to various purposes.
  - This may be true, but does quality management have any other aspects of greater importance?

What are "Smart" people like?

- I discussed this with my former students in a new year's gathering.
    - "Good memory"
        - This answer is not interesting.
    - "Sharp," "excellent understanding" and "insight into the essence of things"
        - These answers are also not interesting, because these abilities are inherited.
    - Are there any abilities we can acquire through efforts?
        - People who can make efforts, can persevere and can continue efforts can be considered smart!
    - Why can they make efforts? Why can they persevere?
        - Because they understand the purpose.
        - Because they understand means to achieve the purpose and the cause-and-effect relationship.
    - People who can make efforts and learn from their failures can be considered smart!
        - Those who are good at learning can also be considered smart!

What are "Smart" people like?

- What are the smartest people like?
  - "Those who can understand the purpose"……Those with this ability can be considered the smartest…!

- Smartness

  1) Purpose: Can understand the purpose and can think and act toward the purpose.

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  3) Essence: Can understand the essence of events, generalize or abstract events, and apply the essence of events to practice, as well as can analyze problems deeply, give a broad range of recurrence prevention, and take preventive actions against possible problems.

  4) Learning: Can learn lessons a lot from failures and experiences.

- Wait!!
  - Are these the core of fundamental concepts and methodologies of quality management?

1) Purpose: Quality Concept

- Quality is defined by customers.

- Customer orientation, customer first, customer focus, customer centered, customer satisfaction, …

- Market-in (vs. product-out)

- A quality concept is nothing but a purpose-oriented concept.

- Quality carries very profound meaning.

We are taught in quality management

An interview with a healthcare professional
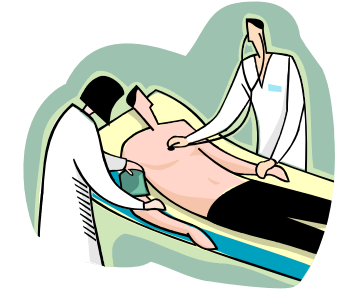
Quality = customer satisfaction

- Quality is defined as the degree of user (customer) satisfaction and fitness for use.
  - Quality is determined by customers' evaluation.
  - Quality is not determined by product/service providers' criteria.
- Good quality is
  - Quality satisfying customers
    - Kaoru Ishikawa: Quality satisfying consumers
    - J. M. Juran: Fitness for use

"Why is quality about customer satisfaction?"

An interview with a healthcare professional

Why is quality about customer satisfaction?

Iizuka: The philosophy of "patients first" is beautiful, isn't it? But why is this philosophy important? Why do patients, who know nothing about the technical aspects of medicine, have the right to evaluate healthcare service provided by medical experts.

Iizuka: In case of an ordinary product, we can say "I don't buy it" if we don't like it and buy it even at a high price if we want it, so sellers work hard to provide buyers with products which can satisfy them. But this does not apply to healthcare service because patients know nothing about the technical aspects of healthcare. Healthcare experts must understand what patients, who are not healthcare experts, really want and gain their understanding before treating them. Why is it?

An interview with a healthcare professional
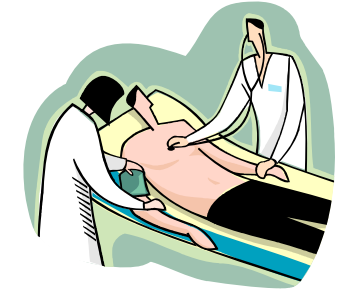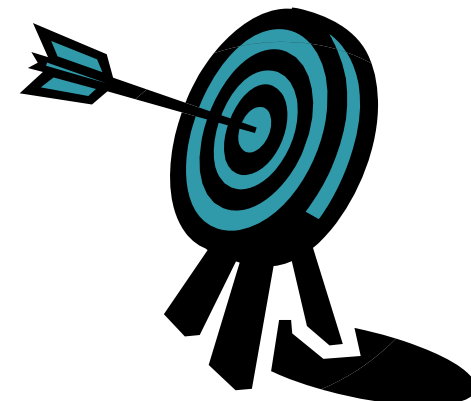
Why is quality about customer satisfaction?

Iizuka: There is a Zen dialogue（禅問答）: "In a forest with nobody in it, a tree fell with a noise. Can you say there was a noise?" This Zen dialogue means nothing can exist unless someone recognizes it. Any business, including medical practice, is meaningless unless someone recognizes it or unless the customer considers it good.

Iizuka: Any work undertaken by a person for another person can't be considered good unless the other person considers it good.

Iizuka: In this sense, we can say the idea that quality is about customer satisfaction is "purpose-oriented." Purposes are external criteria. Product or service providers can't decide whether their product or service is good or not according to their own criteria.

Profound meaning of Quality

- Definition (My favorite one)
    - Quality = A totality of characteristics of an entity that bears on its needs
    - Quality = A totality of characteristics of an entity
    - A point: "that bears on its needs"
        - Those who have needs are customers.
    - We can consider the quality about any entities
        - Products, services, systems, people, processes, projects, tasks, work, management, operations, ...
- This definition leads to a profound meaning of quality, i.e. the purpose-oriented way of thinking and doing.
- Quality concept is...
    - Customer satisfaction
    - External criteria
    - Purpose-oriented
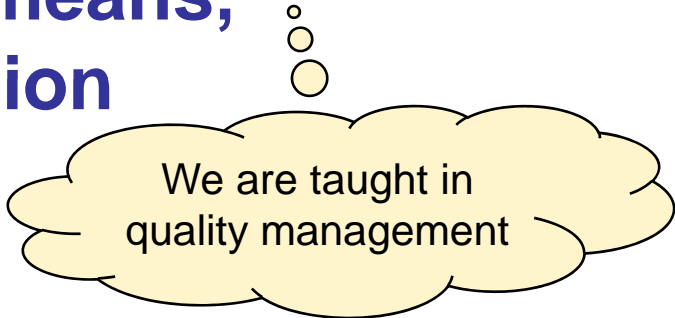
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2) Cause and Effect: Causes, means, processes and standardization

We are taught in quality management

- **Effects－Causes**
  - Performance－Systems and processes
  - System thinking and process-oriented approach
    - Overall purpose, the relationship with the components, and the specifications for the components
    - Understanding of a cause-and-effect mechanism
- **Building quality in the process**
  - Building quality
  - Checking quality
- **Standardization**
  - Things and/or methods which have already been found to be good based on experience
  - Reuse of knowledge, sharing of best practices, and saving of thinking

Essence of TQM

(1) Focusing on quality

- TQM can manage the quality of many aspects in a management system.
- Quality is underlying value.

(2) Managing systems (processes and resources)
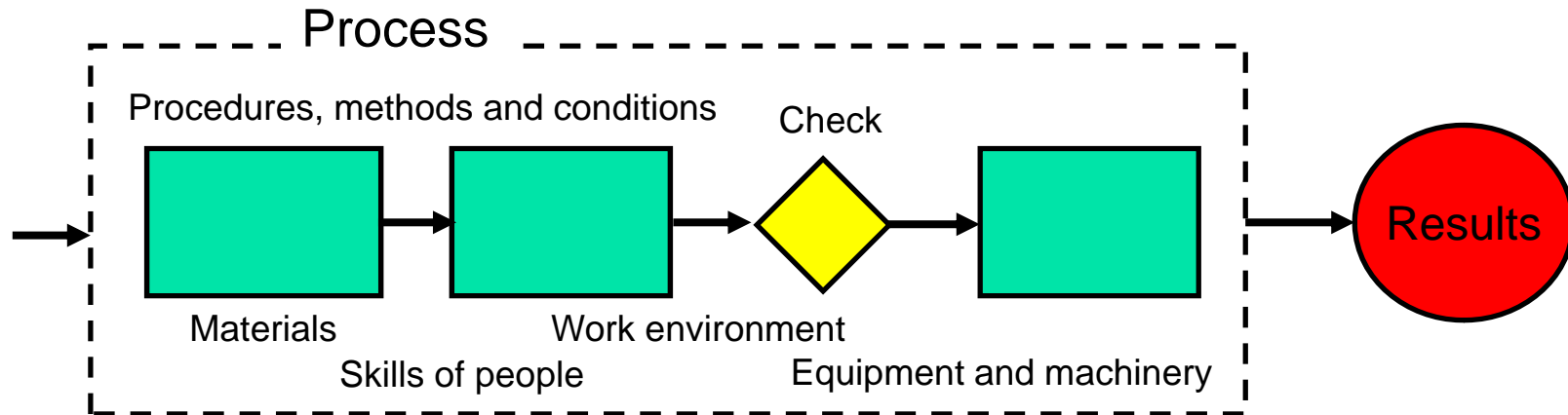
- Focusing on causes, which produce effects
- A universal principle for effective and efficient management
- To be recognized as a management science.

System

Framework

Processes

Output

Quality

Price

Timing

Resources
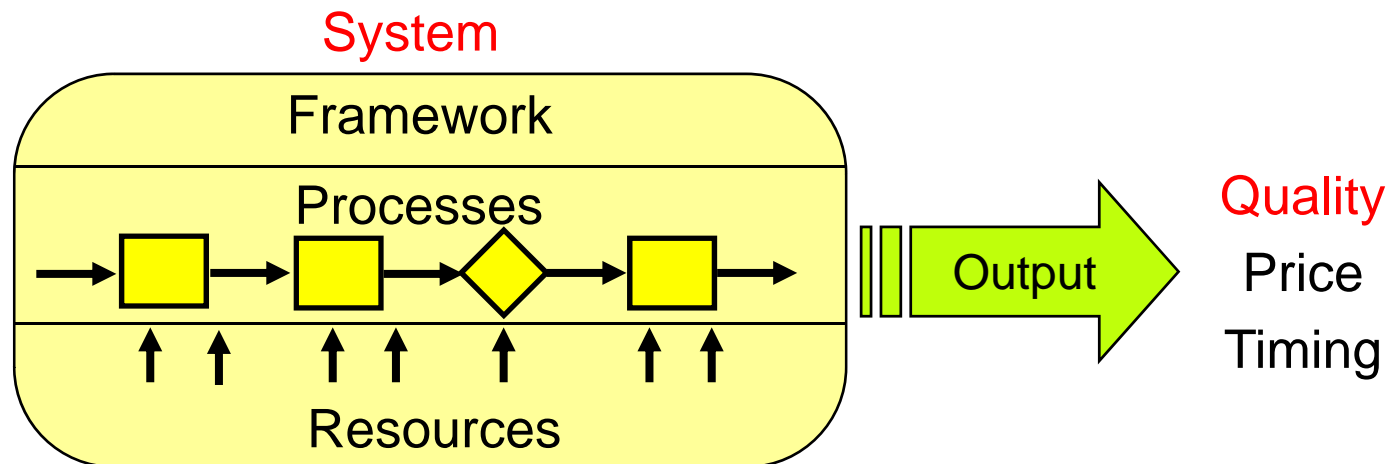
Analysis of Causes

- When a problem occurs
  - First, give the problem a quick fix! (immediate remedy)
  - By the way, "why" did the problem occur?
    What are the causes of the problem?
  - Think "why" five times.
  - Eliminate the causes and give a permanent fix to the problem.
    (recurrence prevention)
- Cause-and-effect diagram (Fishbone diagram)
  - Relationship between effects/results and factors/causes
  - Study of cause-and-effect mechanisms of how the problem occurred

Process Control

Process

Procedures, methods and conditions   Check

Materials   Work environment

Skills of people   Equipment and machinery

Results

An approach of focusing on processes (how to do work), controlling them and improving work systems and procedures, in addition to just pursuing the results.

- Process standardization for desirable process conditions
    - Determine process conditions which can produce good results.
    - Determine what should be checked in the process to produce good results.
    - Standardize tasks in the process and work according to the standards.
- Control and improvement
    - Analyze the causes of differences between the goal and the actual results and control the causes.

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Principles of Design and Development Process Control

- **Clearly define design and development steps**
  - Definition of the process flow
  - Definition of each process: Input, output and procedure
  - Assignment of roles (responsibilities, cooperation and communication)

- **Perform quality and efficient work**
  - Excellent plan: Prevention of omissions and prioritized control
    - Identify and give priority to difficult and important tasks.
  - Use of experience and reuse of knowledge (standardization)
  - Making difficult tasks easier
    - Prevent considerations from being omitted.
    - Accurately understand relations.
    - Make reasonable judgments.

Principles of Design and Development Process Control

- Detect failures earlier

    - Evaluation in appropriate steps

    - Prevention of evaluation items from being omitted

    - Evaluation conditions considering usage

    - Rational evaluation criteria

- Prompt and proper actions against failures

    - Preparedness for failures (prediction of failures and preparation of alternatives)

    - Accurate understanding of problems

    - Identification of causes

    - Reasonable actions (prediction of effects and side effects)

    - Sure implementation

PDCA: Management Cycle

Plan

P1: Determine the purpose, goal and aim

P2: Determine means to achieve the purpose

Do

D1: Prepare for actions needed

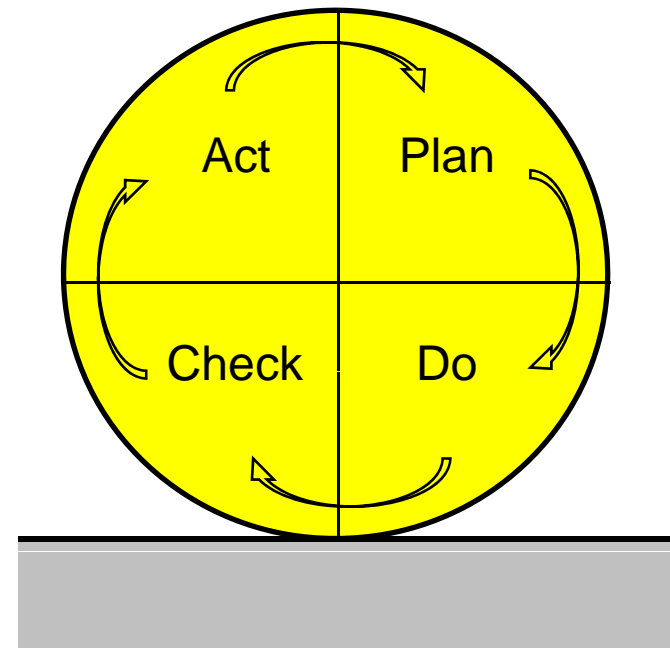D2: Take the actions (according to the plan, instructions and standards)

Check

C1: Check the progress toward the goal and take necessary measures

C2: Check for and cope with side effects

Act

A1: Give immediate remedies to problems and prevent the spread of problems

A2: Give recurrence preventions and take preventive actions against problems

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Immediate remedy, recurrence prevention and preventive action

- Immediate remedy
  - Actions to remove undesirable situations or symptoms.
  - Temporary actions before recurrence preventions.
    Actions taken to the results of work or the causes of abnormalities against abnormalities of unknown cause or abnormalities of known cause against which no direct action can be taken due to some difficulties in order to prevent the expansion of losses resulting from such abnormalities.

- Recurrence prevention
  - Actions to remove causes of problems in processes or work systems based on causal analysis in order to prevent the recurrence of similar problems. Removal of causes based on the analysis.

- Preventive action
  - Actions to identify potential problems at a stage of planning and take necessary actions against such possible problems. Prediction and prevention.

Standardization

- Standard: Agreements on objects, performance, abilities, arrangements, conditions, actions, processes, methods, procedures, responsibilities, obligations, authority, ideas, concepts and the like established for unification and simplification making it possible for the relevant interested parties to get benefits or convenience fairly

- Standardization: Organizational activities of establishing and implementing standards

- But, standardization is not exactly equal to unification...
  - Inflexible regulations and rules
  - Restrictions on freedom
  - Giving priority to rules over anything
  - Unable to do any work other than routine work
  - Obstacle to freewheeling thinking
  - Obstacle to originality
  - Uniformed view (in bad meaning)
  - Unable to cope with diversity
  - Increase of people who do everything according to a manual without thinking
  - Progress starts with breaking rules...

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Standard = Plan

PDCA: Management cycle

Plan

    P1: Determine the purpose, goal and aim

    P2: Determine means for achieving the purpose

Do

    D1: Prepare for actions needed

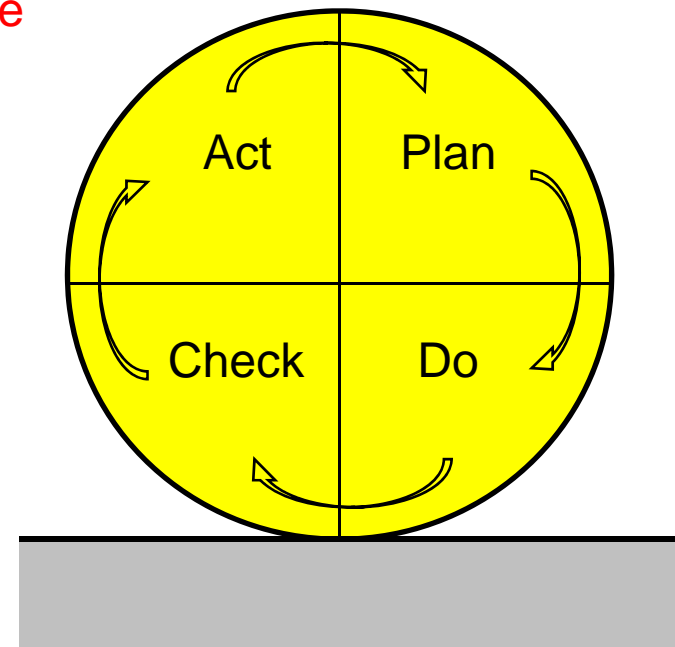   D2: Take the actions (according to the plan, instructions and standards)

Check

    C1: Check the progress toward the goal and take necessary measures

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Act

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Standardization = Reuse of Knowledge

- Two types of standard
    - Standard which must be defined: Prevention of confusions by bringing about unification
    - Standard which should be defined: Utilization of experience and simplification of "plan"

- Standard and standardization
    - (Technical) standard = Things and/or methods which have already been found to be good based on experience
    - Standardization = Reuse of knowledge, effective use of experience, saving of thinking, and sharing of best practices

- Standardization of methods and procedures
    - Saving of thinking in planning
    - Adoption of proven correct methods

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Standardization = Base for originality

- Application of what is good and what is right
  Apply things and/or methods already found to be good and right through someone's experience, and achieve quality and efficiency at the same time.

- Base for improvement
  Clarify current methods (plans or criteria) and look for the causes of problems in plans or criteria. Ensure performance improvements by changing the plans or criteria (standards).

- Base for originality
  Apply good things and methods, without thinking (saving of thinking), to tasks with which you already know what to do in order to allocate resources (manpower, time and money) to new, difficult and important tasks.

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3) Essence: True causes, common causes and application to similar cases

- **Analysis of causes**
  - What are the true causes?
  - What are the root causes?
  - Identify common causes.
  - Look into the essence of the problem structure.
  - Determine the essential causes of the problem.

- **Actions**
  - Apply lessons learned to similar problems. ("Horizontal deployment"「水平展開」)
  - Prevent the recurrence of similar problems.

We are taught in quality management

Analysis of true causes

- Understand the "mechanism" of how the problem occurs.
    - Every problem has remote causes, true causes and triggering circumstances (triggers). Of course, it also has direct causes.
    - Unless you understand the structure of a problem, you cannot address appropriately with the problem and will end up allowing similar problems to occur at different time and places.
- There are deep "reasons" for the problem.
    - Every company and organization can grow through continuous learning if they understand the "reasons."
    - The most important element in the learning process is "analysis of causes."
- Study failures－Problems are a "gold mine."
    - A problem occurs where a system has flaws. Improvement of flaws and weaknesses of a system can enhance the system.
    - A study of failures can accumulate know-hows. You can learn ten or more lessons from one failure. These lessons are not expensive lessons to learn.
    - Lessons should be applied to broader range of similar cases.
    For this purpose, look into the circumstances and essential causes of the problem.

Immediate remedy, recurrence prevention and preventive action

- Immediate remedy

  - Actions to remove undesirable situations or symptoms.

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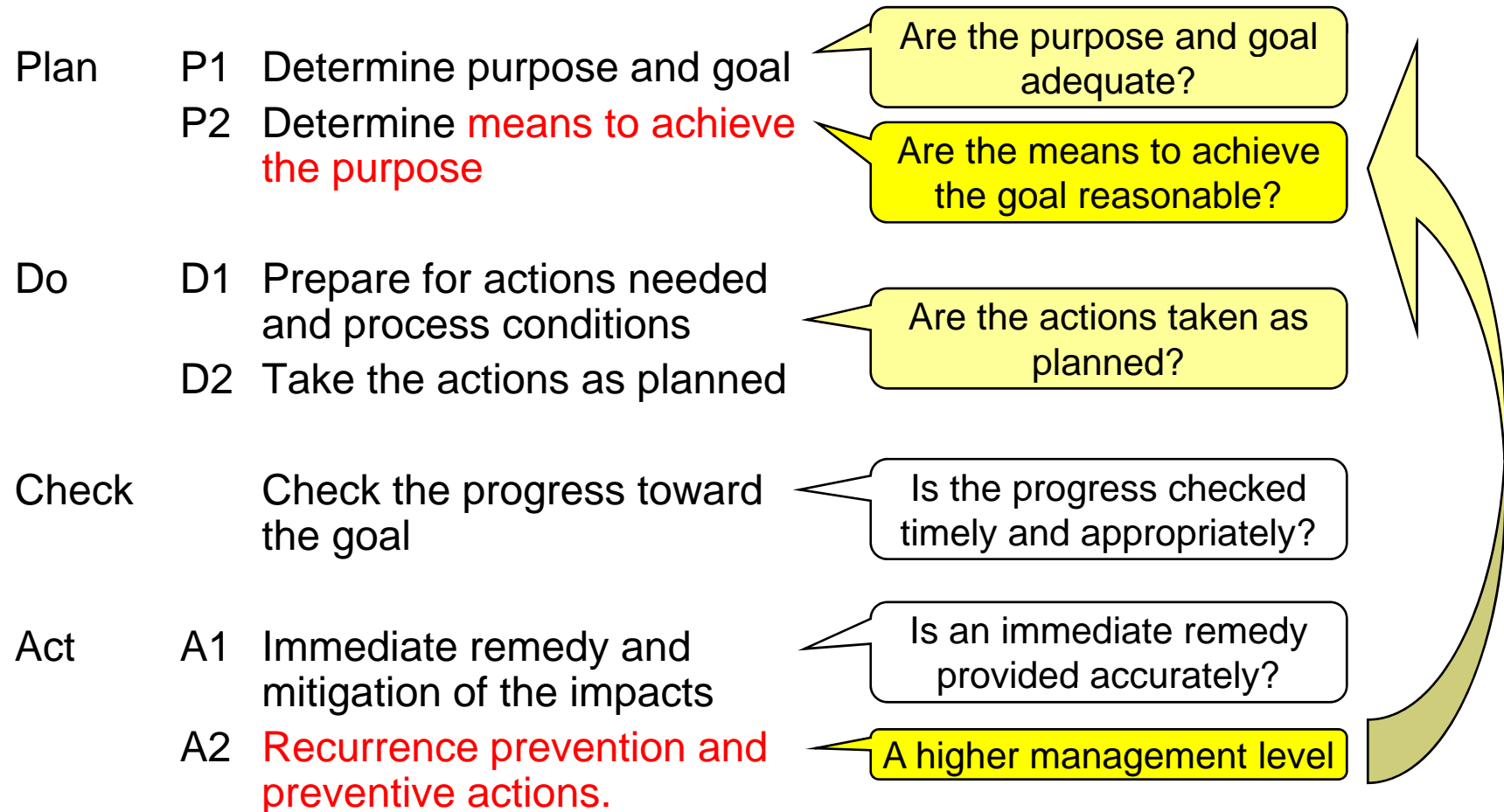
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4) Learning: Learn lessons from failures

- **Learning from experience**

  - Rotate PDCA cycle

  - Make improvements

  - Learn lessons from experience

  - Problems are gold mine

We are taught in
quality management

Rotate PDCA cycle smartly:
Enhancement of management level

Plan P1 Determine purpose and goal

> Are the purpose and goal adequate?

P2 Determine means to achieve the purpose

> Are the means to achieve the goal reasonable?

Do D1 Prepare for actions needed and process conditions

> Are the actions taken as planned?

D2 Take the actions as planned

Check Check the progress toward the goal

> Is the progress checked timely and appropriately?

Act A1 Immediate remedy and mitigation of the impacts

> Is an immediate remedy provided accurately?

A2 Recurrence prevention and preventive actions.

> A higher management level

Analysis of true causes

- Understand the "mechanism" of how the problem occurs.
    - Every problem has remote causes, true causes and triggering circumstances (triggers). Of course, it also has direct causes.
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Improvement

- **System's own growth and enhancement**
    - A good system has a subsystem for its own improvement.
    - An organization should continuously upgrade itself in both technology and management.

- **Improvement ability**
    - Problem awareness and consciousness
    - Positive attitude
    - Learning ability

- **Management style**
    - Careful planning, actions as planned, and progress check
    - Imperfect planning, daring actions, (minor) failures, and improvements

Quality approach: Philosophy and methodology

- Focus on external criteria and purpose-oriented way of thinking and doing
- Principles for actions to achieve the purpose
  - Purpose and goal setting
    - For what purpose? For what goal? Who are the customers?
  - Considerations on means to achieve the purpose
    - How should the purpose be achieved?   What risks are involved? Relationship between the purpose and the means and cause-and-effect relationship
  - Detailed plan for the means to achieve the purpose
    - 5WIH: When, who, where, what, why and how
    - Control standards: Work procedures and standards
  - Implementation and progress control
    - PDCA: Control, rule and management
  - Review
    - Learn lessons and acquire essential knowledge from experience

Quality Management makes People and Organization "Smarter"

- Smartness
  - **Purpose**: Understanding of the purpose and purpose-oriented
  - **Cause and effect**: Cause-and-effect relationship and relationship between the purpose and the means
  - **Essence**: Understanding, application and generalization/abstraction of the essence of events
  - **Learning**: Learning from experience, learning of lessons and growth
- Quality approach
  - Quality concept: **Purpose**-oriented
  - Methodology: **Cause-and-effect** relationship and relationship between the purpose and the means
  - True causes and common causes: Deep analysis, **generalization** and application to similar cases
  - Review and improvement: PDCA cycle, deep analysis, **review**, **a broad range of recurrence preventions** and preventive actions

TQM: An excellent management tool for **organizational improvement and innovation**

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HKSQ Special Lecture
November 26, 2013

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Dr. Yoshinori Iizuka
Professor Emeritus, The University of Tokyo

Thank you for your attention!