By: MSMZ

SOFTWARE QUALITY

QA: Quality Assurance

QUALITY ASSURANCE

- J. M. Juran defines QA as the activity of providing to all concerned the evidence needed to establish confidence that the quality function is being performed adequately.

Quality Assurance

- According to IEEE, quality assurance is defined as "a planned and systematic pattern of all actions necessary to provide adequate confidence that an item or product conforms to established technical requirements."

QUALITY ASSURANCE

- Product assurance:
  - Making sure that the final product meets its specifications. This is usually done via thorough testing. Ideally, it also includes verifying that the requirements are correct, the design meets the requirements, and the implementation reflects the design.

- Process assurance:
  - Looks at the process used to create that final product. Was the development effort planned? Were the plans followed, or just put on the shelf and ignored? Does the development process meet any required standards? Are best practices used to develop the product? In process assurance, QA provides management with objective feedback regarding compliance to approved plans, procedures, standards, and analyses.

DEFINITION : SOFTWARE QUALITY ASSURANCE (SQA)

- Donald Reifer, SQA is the system of methods and procedures used to assure that the software product meets its requirement.

- The procedure involves planning, measuring and monitoring developmental activities performed by others.
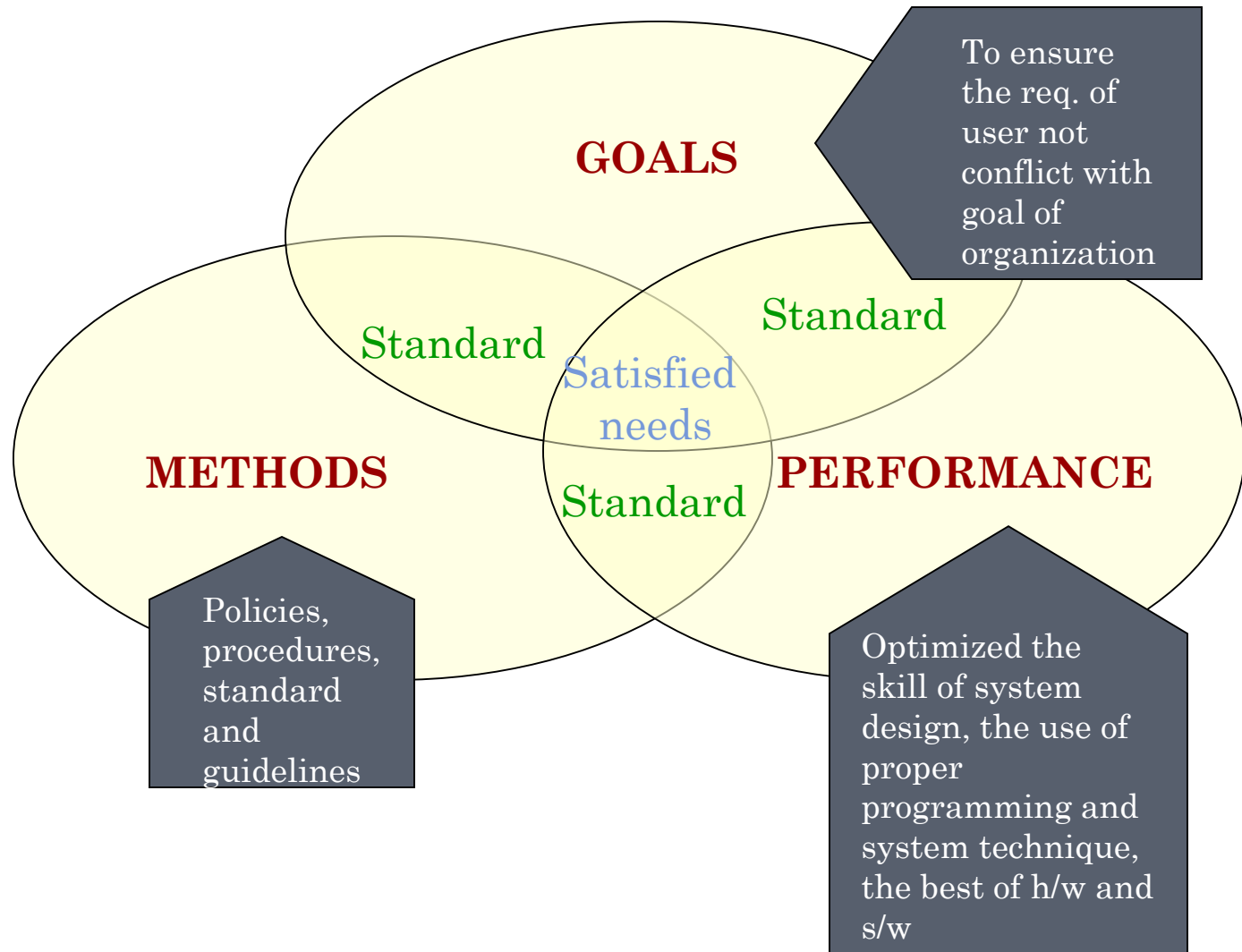
QUALITY ASSURANCE FUNCTION

- Quality Assurance (QA) function is a technique to improve the quality of computerized application.

- The QA function has the primary responsibility of determining if users' need have been adequately satisfied.

- As a means of determining if the users' need are being satisfied, QA evaluates three areas:

    - Goals
    - Methods
    - Performance

QUALITY ASSURANCE FUNCTION

GOALS

To ensure the req. of user not conflict with goal of organization

Standard

Standard

Satisfied needs

METHODS

Standard

PERFORMANCE

Policies, procedures, standard and guidelines

Optimized the skill of system design, the use of proper programming and system technique, the best of h/w and s/w

By: MSMZ

QA OBJECTIVES: GOALS

QA reviews each system to determine that the system:

- Meet user needs

- Consistent with needs of other users

- Consistent with organization objectives

- Meet MIS department objectives

- Consistent with industry & government requirements

- Controlled & auditable

QA OBJECTIVES: METHODS

The system being implemented is using the organization & MIS department:

- **Policies:**
  - The broad-based course of action selected by the organization
- **Procedures:**
  - The particular methods outlined by the organization to accomplish

- **Standards:**
  - Rules set up by the organization for the measure of quantity or quality of work
- **Guidelines:**
  - Recommended methods for performing

QA OBJECTIVES: PERFORMANCE

QA reviews systems to determine that the design is:

- Economical:
  - The system is to be performed in the way that requires the least cost
- Effective:
  - The system will accomplish the results desired with minimum effort

- Efficient:
  - The system as designed maximizes the use of people and machine

By: MSMZ

Three General Principles of QA

- Know what you are doing
- Know what you should be doing
- Know how to measure the difference

By: MSMZ

KNOW WHAT YOU ARE DOING

- Understand what is being built, how it is being built and what it currently does
- Suppose a software development process with
  - management structure (milestones, scheduling)
  - reporting policies
  - tracking

Know what you should be doing

- Having explicit requirements and specifications
- Suppose a software development process with
  - requirements analysis,
  - acceptance tests,
  - frequent user feedback

By: MSMZ

KNOW HOW TO MEASURE THE DIFFERENCE

- Having explicit measures comparing what is being done from what should be done

- Four complementary methods:
  - formal methods – verify mathematically specified properties
  - testing – explicit input to exercise software and check for expected output
  - inspections – human examination of requirements, design, code, … based on checklists
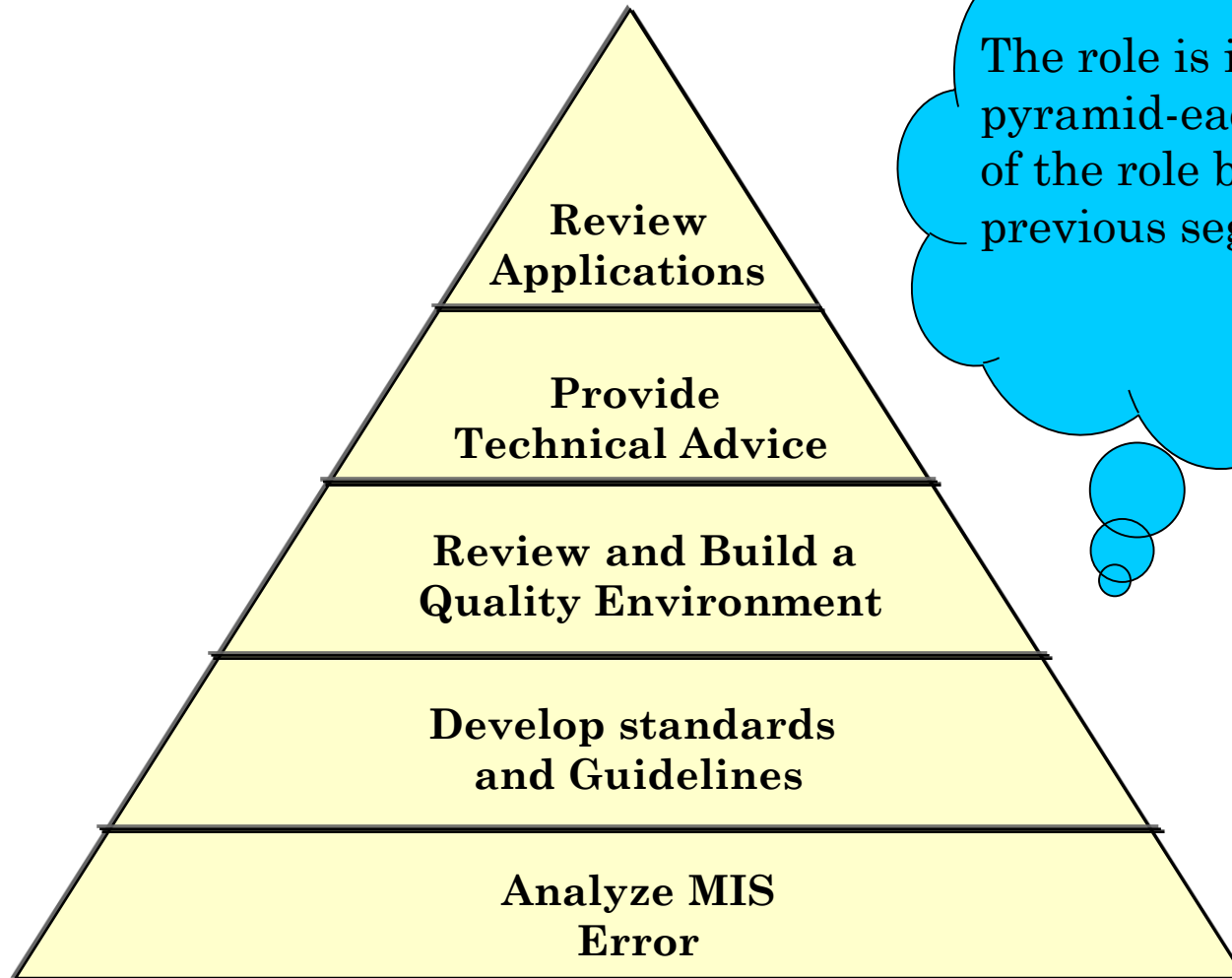 - metrics – measures a known set of properties related to quality

Role of a QA group

- Is to steer project development in the right direction by:-
  - Assist the organization in developing the standards and guidelines necessary to build competent systems
  - Review the adequacy of and adherence to general controls such as operating procedure
  - Provide technical advise to the project team
  - Review the development of all applications to assure compliance with the organization's goals, methods and performance criteria

TASKS OF A QA GROUP

Review Applications

Provide Technical Advice

Review and Build a Quality Environment

Develop standards and Guidelines

Analyze MIS Error

The role is illustrated as a pyramid-each segment of the role build upon the previous segment

By: MSMZ

QA GROUP TASKS

- It is important that the role and tasks be established and known before the group become active

- The role QA can perform in helping the MIS Department with them.

ANALYZE MIS ERRORS:

- Analyzing errors or problems that can provide the basis for improving the quality of the MIS environment.
- The QA group issues an "error alert" report for common errors. An error alert serves two purposes:
  - It helps programmers avoid repeating the same error.
  - It publicizes the fact that the QA group is providing a positive service to all systems analysts and programmers.

DEVELOP STANDARDS & GUIDELINES

The types of standards and guidelines that are needed include the following:

1. System development process standards

   - The steps and methods by which an organization approves, implements and enhances computerized application.

2. Documentation standards

   - The types and contents of documentation that will be produces as a result of developing computerized applications.

DEVELOP STANDARDS & GUIDELINES

3. Programming standards
   - The methods and procedures that programmers will follow in designing, coding, documenting, and testing programs.

4. Control standards
   - The methods by which computer system and programs will be controlled.

5. Operating standards
   - The procedures that must be followed to place programs into production and operate programs in a production mode.

DEVELOP STANDARDS & GUIDELINES

6. Hardware and software standards
   - The types of hardware and software packages that will be used by the organizations and those features within software that will be utilized during operation.

7. Performance standard
   - The level or criteria to be achieved in doing work.

REVIEW & BUILD A QUALITY ENVIRONMENT

- QA should review the general controls in an operating environment and determine whether they are adequate and comply with general control. A review of general controls can be done either as a special review or when a specific application is being reviewed.

REVIEW & BUILD A QUALITY ENVIRONMENT

- Examples of general control:
  - Differentiate of duties between various functions as outlined in depart. charters, job descriptions and an organization's policies and procedures

By: MSMZ

PROVIDE TECHNICAL ADVICE

- There are three main areas in which project teams need advice:
  - Understanding the intent and meaning of an organization's policies, procedures, standards and guidelines
  - Determining the best method for using the organization's hardware and software
  - Assessing the impact of the application being developed on other applications currently in operation or under development

PROVIDE TECHNICAL ADVICE

- The technical assistance QA provides takes two forms:
  - Answering specific requests by the project team: this can be an interpretation of standard, advice requested on how best to accomplish some part of the project req. or merely a general discussion on various approaches
  - Advice volunteered by QA members where they feel it is needed. This advice can be the result of personal experiences utilizing good techniques and understanding where the project team is violating standards or policies of the organization

By: MSMZ

REVIEW APPLICATION

The QA review comprise six parts:

- Review the system under development. Such as
  - Cost of the system
  - Satisfying needs of users.
- Determine that the system development project is consistent with the plan and goals of the data processing depart. and organization

By: MSMZ

REVIEW APPLICATION

- Determine that the system under development is in compliance with the organization's policies, procedures, standards and guidelines.

- Determine that the system under development makes effective and economic use of the organization's hardware, software and other resources.

REVIEW APPLICATION

- Determine that the plan for testing the system is adequate.
- Determine that the plan for converting from one system to another or placing the new system into production is adequate.

ROLE	MIS Department Challenge	Quality Assurance Tasks
Review Application	When to abort a project Executives management ignorance of MIS User ignorance of MIS Audit requirements	Evaluates system in all phases Provide executives management with a technical assessment Ascertains user requirements are met Ascertains audit requirements are met
Provide Technical Advice	Changing technology Use of consultants Ability to keep current technically Complexity of systems	Knows current technology Acts as internal consultant Acts as a technical consultant to system analysts Knows many system
Review and Build a Quality Environment	How to evaluate MIS product Build a quality environment	Evaluates MIS product Counsel MIS management
Develop standards and guidelines	Few systems and programming standards Few system development standards Professionalism	Helps set standards Help set standard Evaluates quality of work
Analyze MIS errors	Know type of problems Know cost of problems Know magnitude of problem	Quantify problems Identify problems Determine cost of problem
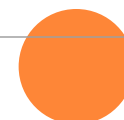
TECHNIQUES OF PROCESS ASSURANCE

The tools and techniques listed in this topic are used to identify problems and to identify and implement solutions within an organisation or a department.

1. Affinity Diagrams
2. Brainstorming

By: MSMZ

AFFINITY DIAGRAMS

A way of sorting a variety of ideas, problems or issues into related groups or under specific heading. Affinity diagrams are usually constructed by a team of people.

- The team identifies the possible issues, problems or ideas (e.g. By brainstorming).
- Each issue, problem or idea identified is recorded on a separate card or post-it note.
- The card or post-it-notes are laid our randomly.
- The team begins to group each of the cards or post-it-notes, moving those that they do not agree with until everyone is happy with the grouping.
- A brief description is produced for each grouping.
- The team identifies how the headings relate to each other.

By: MSMZ

Conditions of service
- Low pay
- Lost benefits
- Poor pension
- Compulsory overtime
- Unpaid overtime

Environment
- Low pay
- Cramped office conditions
- Location
- Old buildings
- Decoration
- No staff room

Workload
- Excessive workload
- Staff shortages
- Uneven work distribution
- Some staff not helping out with problems

Staff
- Office gossip
- No socialising
- Untrained staff
- Unhelpful colleagues

Figure 7.3: An example of an affinity diagram

7.4.2 Brainstorming

According to http:www.eric.ed.gov, brainstorming is a simple way to generate a large number of ideas from a group of people in a relatively short period of time. This group of people simply generate any ideas which come to their mind. However, ideas that are seen as impractical are taken so that later it can be improved upon to produce better ones.

Steps in brainstorming are:

- Write the problem on a board or flipchart.
- Choose a group leader.
- Assemble the group in front of the board or flipchart.
- Members of the team give out ideas for solving the problem. This can either be done in rotation or randomly.
- All ideas are written on the board or flipchart.
- After all the ideas have been listed, the team then eliminates the ones not eligible and prioritises those that remain.

Brainstorming rules are:

- Everyone's comments and ideas are equally valid.
- All ideas must be recorded, no matter how absurd they may seem.
- There should be no criticism on the ideas contributed on the part of idea generation during brainstorming.
- Think the unthinkable.