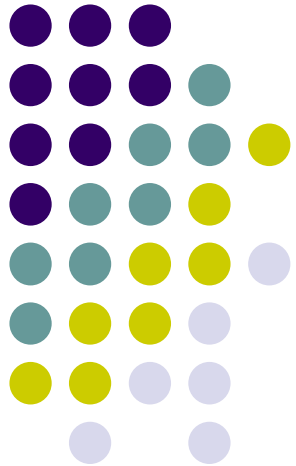
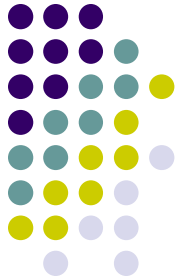
Quality Costs

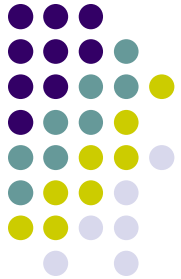


Learning Objectives



- Upon completion you will:
  - Understand the impact of measuring the cost of quality
  - Be able to identify the quality costs in an organization
  - Understand the process for measuring the cost of quality

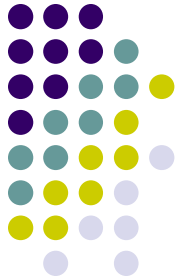
Basic Thought and Question



"What gets measured gets done"

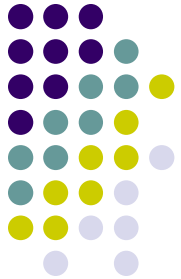
Just because we CAN measure something does that mean we SHOULD?

Benefits of Measurement



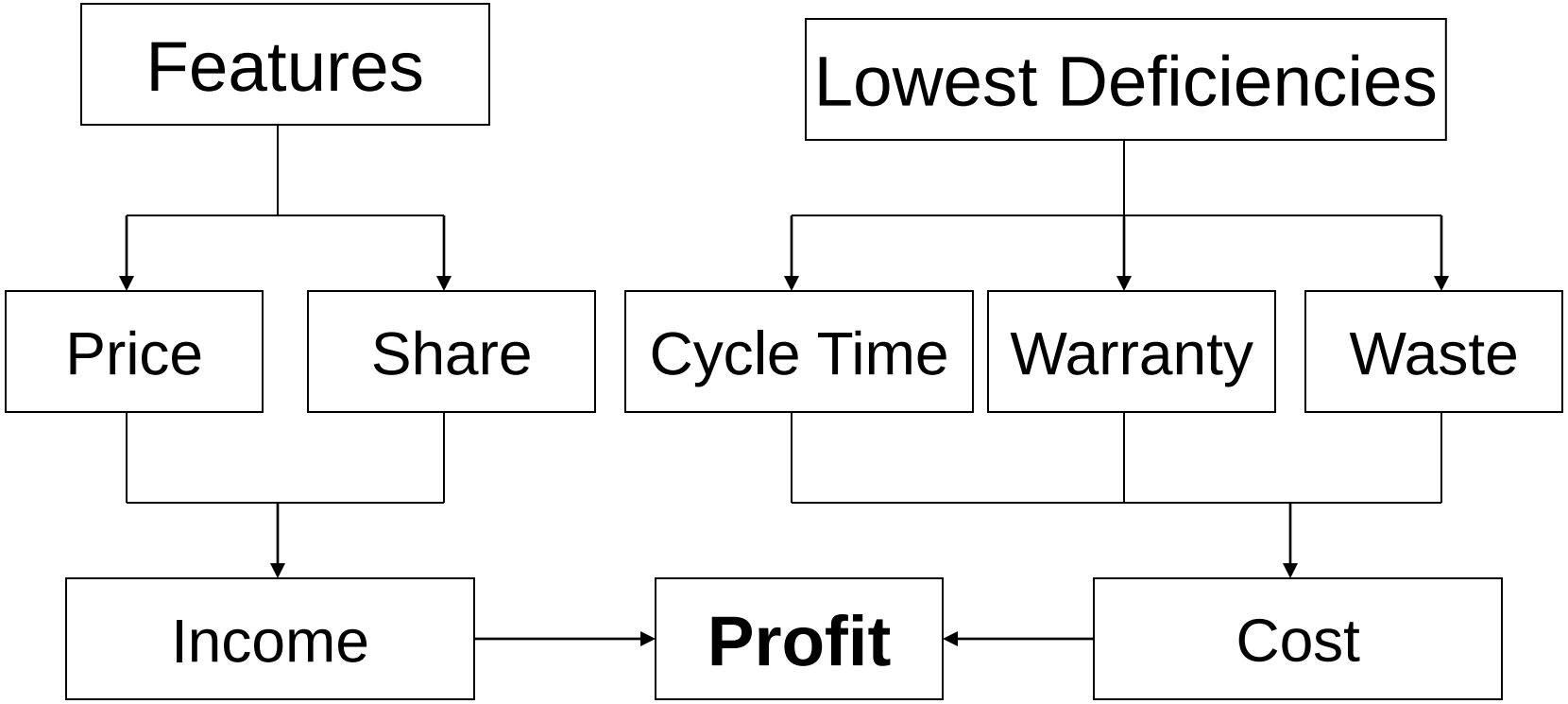
- What are the benefits of measuring?
  - Gain insight into the product or process
  - Allow us to manage by facts
  - Takes away the guess work
  - Others?

Pitfalls of Measurement



- What are the pitfalls in measuring?
  - Can sometimes drive undesirable behavior
  - Can create fear
  - Can blind you to other factors
  - Others?

Quality Costs and Profit

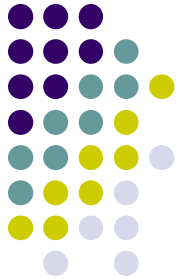


Cost of Quality

- Quality costs can mean two things:
  - Cost of attaining quality
  - Cost of poor quality

- Can run 10 - 30% of sales or 25 – 40% of operating expenses

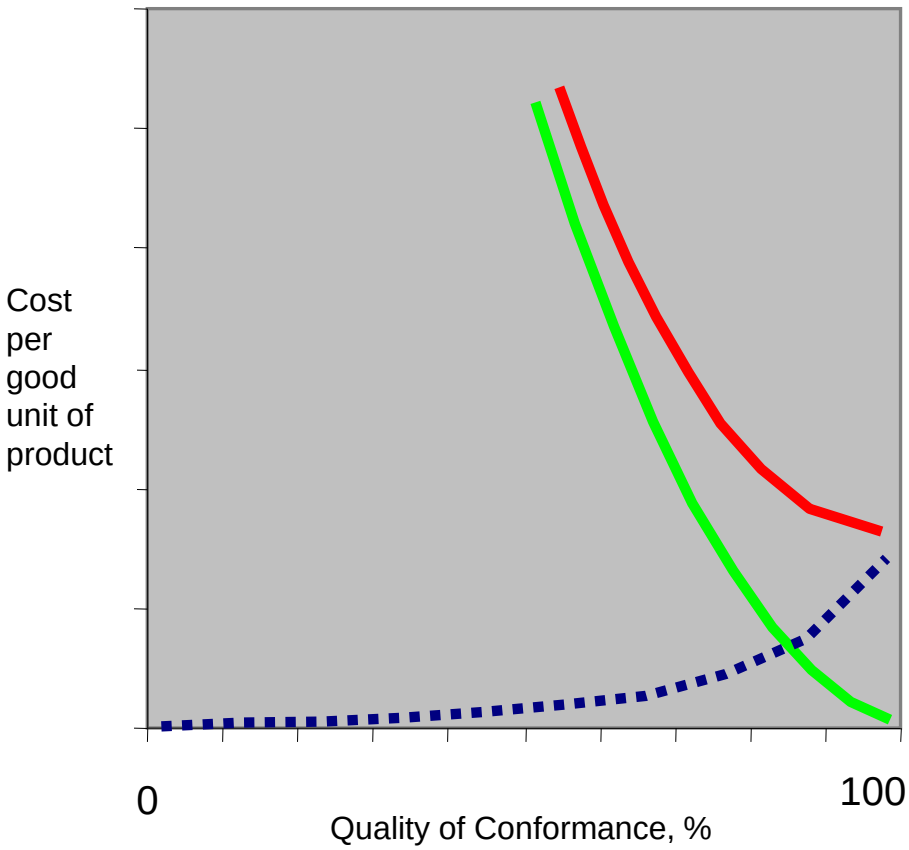
Cost of Quality



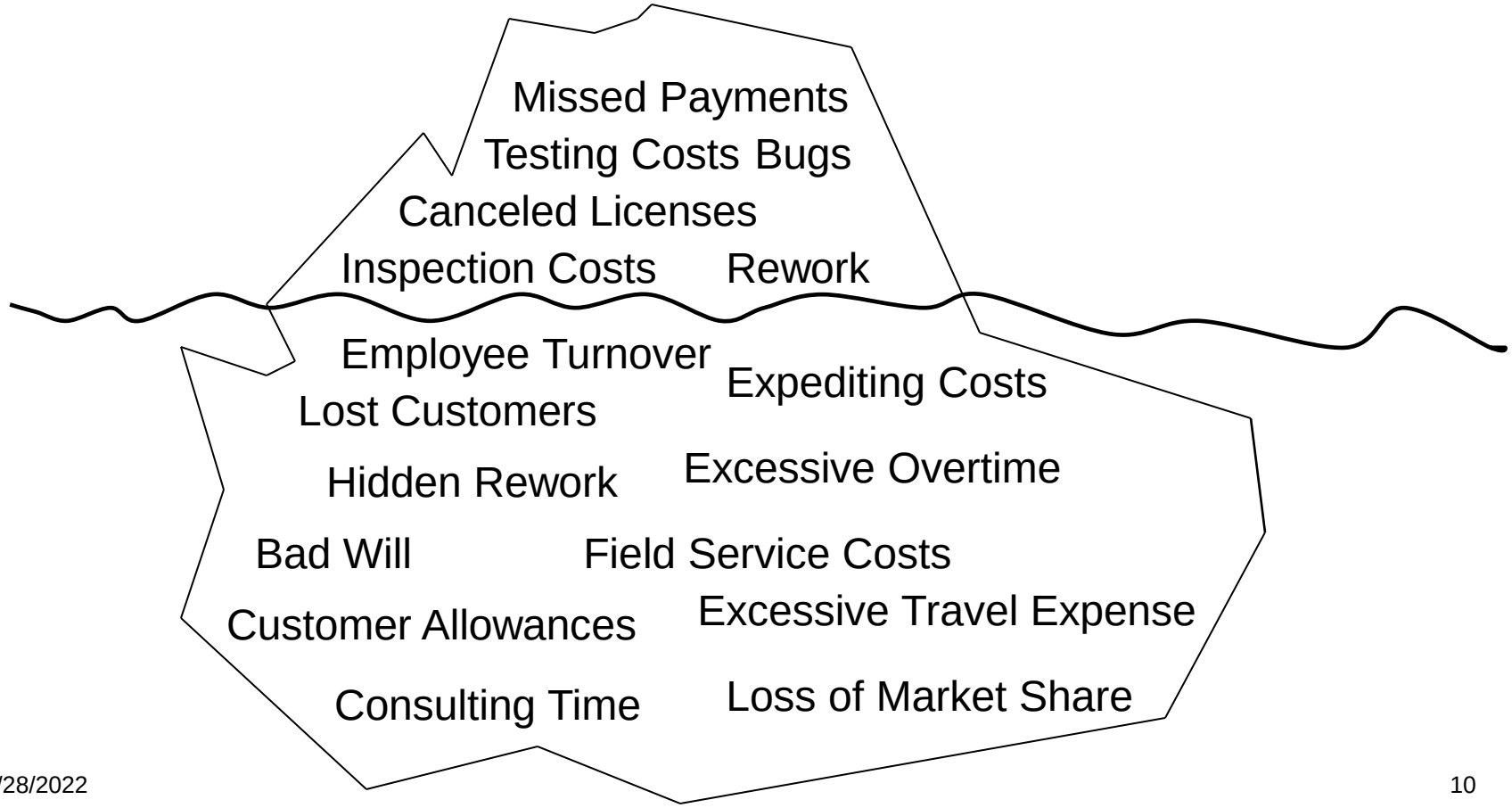
"We need to communicate to management the impact of quality in language they understand which is often in terms of dollars."

"Quality cost measurement and publication does not solve quality problems."

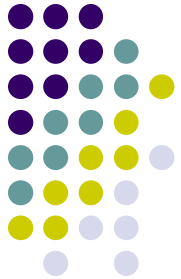
Cost of Quality



Hidden Cost of Quality

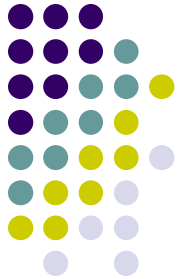


Hidden Cost of Quality



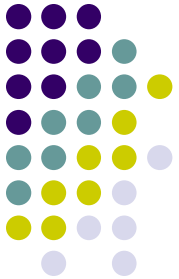
- Costs incurred in understating the cost of poor quality
  - Hardware
    - Lost sales
    - Redesign of product and process
    - Product recall
  - Software
    - Production, control and release of patches
    - Rework
    - Cost built into estimates

Cost of Quality



- Broken down into two classifications and four categories
  - Conformance
    - Prevention costs
    - Appraisal costs
  - Non conformance
    - Internal failure costs
    - External failure costs

Cost of Quality

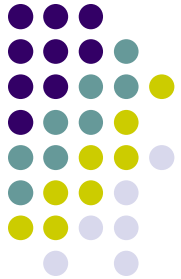


- Appraisal cost activities
  - Inspecting
  - Testing
  - Monitoring
  - Auditing software/hardware processes
  - Maintaining test machines/equipment

Cost of Quality

- Prevention cost activities
  - Analyzing requirements
  - Planning for quality
  - Process control
  - Quality audits
  - Conducting supplier evaluations
  - Attending training
  - Consulting

Cost of Quality

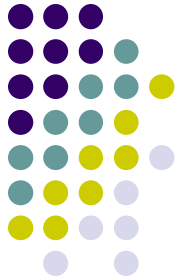


- Internal failure cost activities
  - Scrap
  - Rework
  - Failure analysis
  - Re-inspection and retest
  - Expediting
  - Time away from development or manufacturing

Cost of Quality

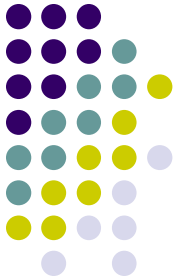
- External failure cost activities
  - Paying warranty costs
  - Providing a help desk
  - Non billable consulting time
  - Cancelled licenses or orders
  - Making allowances

Group Exercise – Quality Costs Analysis



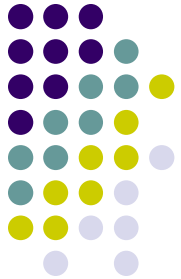
- Your senior management wants to have an impartial third party determine the true cost of quality for the past project.
- As a group of quality specialists, you are about to receive a report on costs associated with a software development effort.
- Your task will be to review each cost, assign it to an appropriate category, and then make recommendations to management as to a possible course of action.
- Keep in mind that the only measure you have is time and so you will need to assess the percentages as part of the entire development effort.

Group Exercise – Quality Costs Analysis



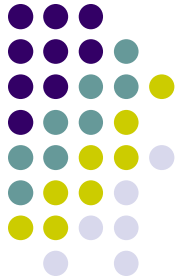
- The costs are as follows:
  - code reviews - 20 hrs
  - training - 240 hrs
  - system test – 1200 hrs
  - component testing - 300 hrs
  - test script writing - 200 hrs
  - requirements review - 50 hrs
  - bug fixes - 1780 Hrs
  - retesting fixed bugs - 1200 hrs
  - post-mortem review - 8 hrs
  - Total effort – 6500 hrs

Group Exercise – Quality Costs



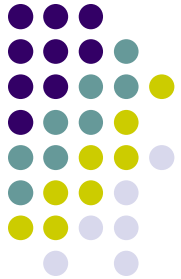
- Is there another way we could gain the same insight into the process without measuring quality costs?
- What else could we measure in conjunction with quality cost?

Cost of Quality – Example



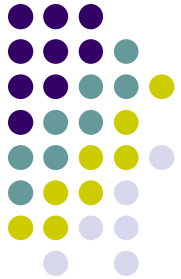
- Tracking costs
  - Testing
  - Bug/defect fixing
  - Planning
  - Training

Sequence of Events



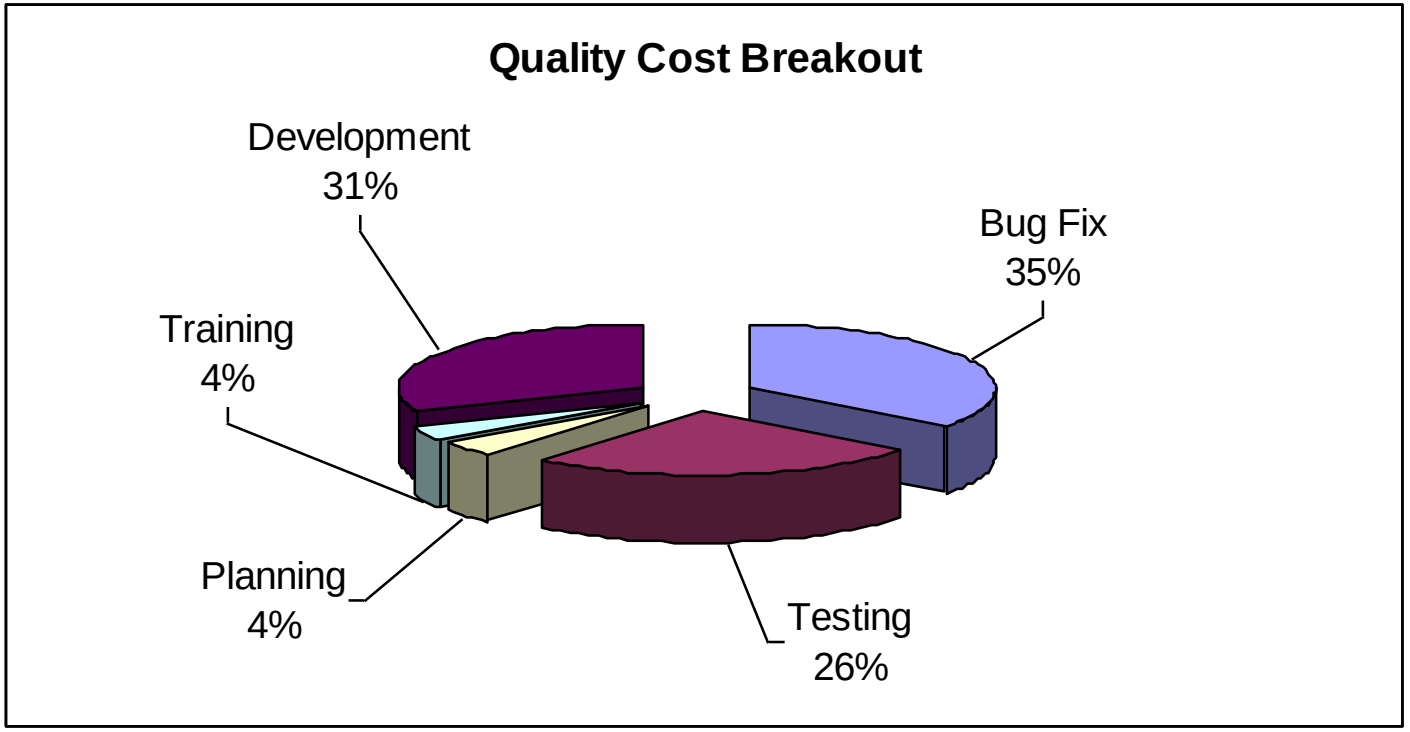
- Review available literature
- Select an organizational unit in the company
- Discuss the objectives with key people
- Collect cost available
- Make proposal for full study
- Publish draft of categories, get agreement
- Finalize definitions and get management buy in
- Establish who will collect data
- Collect and summarize data
- Present the results

Cost of Quality – Example

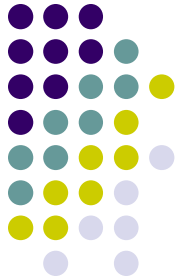


- Results
  - 72% of the development effort could be classified as quality costs
    - Bug fixing - 35%
    - Testing - 26%
    - Prevention - 8%

Cost of Quality – Example

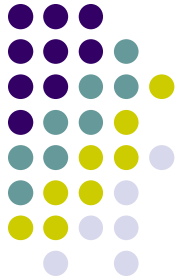


Cost of Quality – Example



February							
	Bug Fix	**Testing**	**Planning**	**Training**	**Development**	**Hrs Available**	
Phil Smith	140.0	25.0		8.0	110	283.0	
Ilene Bloggins	87.0	120.0		8.0	56	271.0	
Skip Roy	92.0		4.0	4.0	75	175.0	
Bill Lee	20.0	82.5	4.0	8.0	33.5	148.0	
Matt Truman	65.0				100	165.0	
Total	**404.0**	**227.5**	**8.0**	**28.0**	**374.5**	**1042.0**	
% of Hrs Available	38.8%	21.8%	0.8%	2.7%	35.9%	100.0%	
Total Quality Costs	**667.5**						
Quality Costs %	**64.06%**						
Bug Fix % of Quality Costs		**60.52%**					
Testing % of Quality Costs		**34.08%**					
Planning % of Quality Costs		**1.20%**					
Training % of Quality Costs		**2.69%**					

Cost of Quality – Example



- Action plan or unexpected outcome
  - Time accounting system was discontinued
  - The product was retired

References

- Juran, J.M., *Juran's Quality Handbook,* McGraw-Hill New York, 1998, pp 8.1 – 8.26
- Summers, D.C., *Quality*, Prentice Hall, Columbus Ohio, 2003, pp 548 – 575
- Schulmeyer, J., *Handbook of Software Quality Assurance*, Prentice Hall, Upper Saddle River, NJ, 1998, pp 195 - 216