Establishing a Goal-Based Measurement Program

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Agenda

- Use of Metrics
- Goals Definition
- GQ(I)M
- Measurement Implementation Considerations
- Questions / Wrap-up

Uses of Metrics

- Understand the current state / take a baseline – where do we stand right now?
  - Understanding the current state can help identify improvement goals
  - Verify that we are staying within a target range
- Understand how our organization compares to competitors and / or industry benchmarks
  - Measures that are below benchmark standards could highlight improvement opportunities
- Identify problem areas
  - Measures that are below an acceptable level can indicate that there are underlying problems and trigger taking actions
- Understand what progress is being made against goals
  - Taking periodic measures helps understand what progress, if any, is being made against the corresponding goals
  - Understanding how we are doing can help identify areas where additional actions need to be taken

Defining Goals

Terminology

Goal	**Aim**	**Ambition**	**Aspiration**
Objective	**Desire**	**Intent**	**Commitment**
Outcome	**End State**	**Target**	**Others**

- While these words may not mean exactly the same thing they all imply something desired to be achieved
- We tend to confuse the language by changing the wording, but do we really mean to change the intent?
- The GQ(I)M approach to defining measures uses the word "goal", but it could have just as easily used another word and not change the fundamental intent of the approach

A "goal" by any other name is still a "goal"

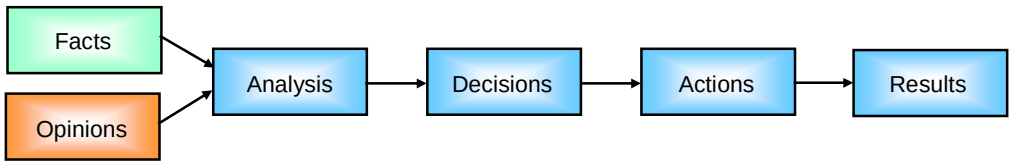
Subjective vs. Objective Goals

Objective goals:

- Can be measured with facts using observable data
- Example: "Grow the number of customers by 10%"

Subjective goals:

- Can not be measured objectively with facts
- Are based on how we feel rather than what can be observed
- We often measure subjective goals using surveys or other ways to understand how we feel, and convert subjective feelings into numeric scores
- Example: "Increase customer satisfaction by 25%"



Goal Decomposition and Clarification

- Goals often contain multiple sub goals or implementation strategies. For example:
  The goal "Improve my health" might have the following sub-goals:
  - ✓ Increase working out
  - ✓ Lose weight
  - ✓ Quit smoking
- Sub-goals help decompose high-level goals into something more specific and help clarify what is desired to be achieved
- Achievement of the overall goal is measured by achievement of the sub-goals



Goal Clarification and Decomposition

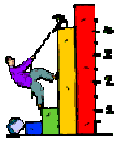
More Examples:

- A corporate goal might be to "grow profitably at attractive returns". This goal might have the following sub-goals:
  - Grow revenue
  - Reduce expenses
  - Increase profit margin

- A personal goal might be to "retire early". This goal might have the following sub-goals:
  - Build a retirement net worth of $1 million
  - Acquire a vacation home
  - Build a college education fund that will pay for 4 years of college for each of my children

S.M.A.R.T. Goals

- In order to be measurable, goals and/or sub goals should be stated in a manner that allows for a clear and understandable measurement
- One technique for defining goals in such a manner is the S.M.A.R.T. goal technique



- **Specific** - Clear statement of what is to be achieved
- **Measurable** - Clear, objective measurement
- **Attainable** - Can you really achieve the goal?
- **Realistic** - Are you willing and able to work towards the goal?
- **Timely** - Specify a timeframe in which the goal is to be achieved

There are multiple definitions of S.M.A.R.T. and no known single point of origin. However, they all essentially have a common intent.

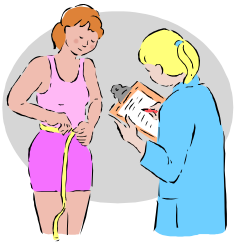
S.M.A.R.T. Goals - Alternative Definitions

Alternative 1
- Specific
- Measurable
- Agreed Upon
- Realistic
- Time-Based

Alternative 2
- Specific
- Measurable
- Attainable
- Relevant
- Time-Bound

S.M.A.R.T. Goals - Example 1

- Goal Statement:
  - Lose weight
- Is this a S.M.A.R.T. goal?
  - Specific – No, does not say how much weight
  - Measurable – Yes (your weight)
  - Attainable – ???
  - Realistic – ???
  - Timely – is a timeframe specified? – No
- Restated S.M.A.R.T. goal:
  - Lose 10 pounds (specific) within the next 12 months (timeframe specified)
  - Assumes you are willing to achieve the goal and that 10 pounds is realistic



S.M.A.R.T. Goals - Example 2

- Goal Statement:
  - Improve testing performance
- Is this a S.M.A.R.T. goal?
  - Specific – No (what do we mean by performance?)
  - Measurable – No
  - Attainable – ???
  - Realistic – ???
  - Timely – is a timeframe specified? – No
- This is a Subjective Goal that can not be measured through observable data unless “performance” is more clearly defined as a measurable quantity
- Perhaps this goal could be decomposed into:
  - Reduce the percent of testing effort that is rework by x% by year-end
  - Reduce testing defect density by y% by year-end
  - Reduce the testing effort as a percent of total project effort by z% by year-end

S.M.A.R.T. Goals - Example 3

- Goal statement:
  - Create an environment where employees do their best work
- Is this a S.M.A.R.T. goal?
  - Specific – No (what do we mean by “best work”)?
  - Measurable – No (can you measure an environment or best work?)
  - Attainable – ???
  - Realistic – ???
  - Timely – is a timeframe specified? – No
- This is a Subjective Goal that can not be measured through observable data and may require an employee survey
- Possible restated S.M.A.R.T. goal:
  - Increase the employee survey score by at least 10% on the next survey

GQ(I)M

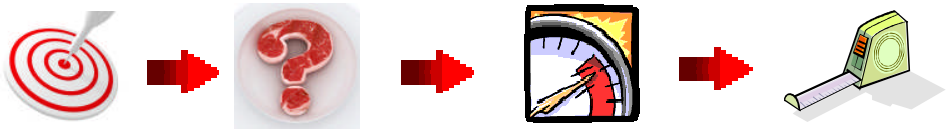
GQM / GQ(I)M* Overview

Version 1: GQM - Goal / Question / Measure

- Specify a desired goal (preferably as a S.M.A.R.T. goal or sub-goal)
- Determine questions that need to be answered to determine if goal is being achieved
- Identify measures needed to answer the questions

Version 2: GQ(I)M - Goal / Question / (Indicator) / Measure

- Added indicator, the meaningful display of the measures



• An approach to software metrics developed by Victor Basili of the University of Maryland, College Park and the Software Engineering Laboratory at the NASA Goddard Space Flight Center.

Questions, Measures and Indicators

- Questions are derived from the S.M.A.R.T. goals and usually fall out
- Measures are the raw data needed to answer the questions
- Calculations may be needed from the raw data. These calculations are often referred to as derived measures or metrics.
- Indicators are the representation of the measures, usually as a graph.

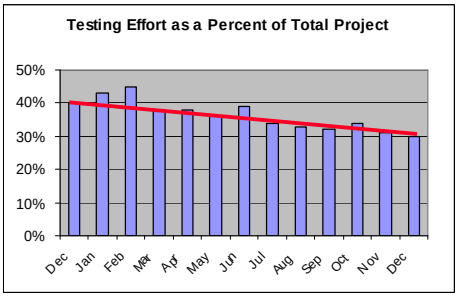
Example 1

S.M.A.R.T. Goal: Reduce the testing effort as a percent of total project effort by 25% by year-end

Question: What percent of total project effort is testing at the beginning of the year and at the end of each month?

Measures: Total project effort, testing effort
Derived Measure: Testing as a % of total

Indicator:



Questions, Measures and Indicators

Example 2

S.M.A.R.T. Goal: "Grow the number of active customers by at least 2% by the end of 2009"

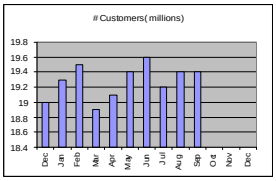
Question 1: How many active customers do we have monthly?

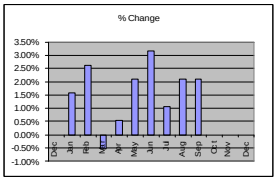
Question 2: What is the percent change?

Measure: Number of active customers

Derived Measure: Percent change from beginning of year

Indicators:





GQIM Template

Goal Measured
State the S.M.A.R.T. goal that the indicator is intended to show progress against.

Questions Answered
List questions answered by these measures to determine if the goal is being achieved

Measures Collected
List the measures collected to answer the questions

Draw the chart here

Value
Describe the value of the measure

Desired Trend
Describe the desired trend (up, down or even)

Chart Does Not Show
Describe what is not shown

Usage
How often or when should the chart be refreshed

Conclusions
What conclusions can be drawn from the data shown?

Data Elements
- **What specific data points are needed?**

Data Source
- **Where does the data come from?**

Calculations
- **Describe any calculations**

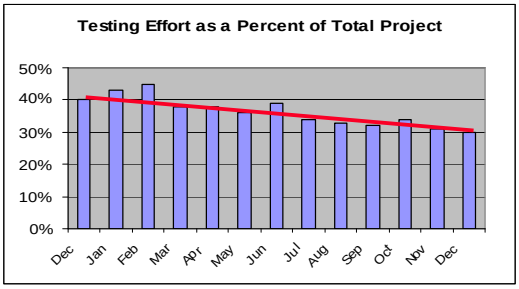
Assumptions/Notes

GQIM Template Example

Goal Measured
- Reduce the testing effort as a percent of total project effort by 25% by year-end

Questions Answered
- What percent of total project effort is testing at the beginning of the year and at the end of each month?

Measures Collected
- Total project effort, total testing effort



Value
- Shows if progress is being made toward the goal

Desired Trend
- Downward trend from 40% to 30% or lower

Chart Does Not Show
- Reasons why the testing effort is changing

Usage
- Measure monthly

Conclusions
The goal is met: testing effort has been reduced by 25%.

Data Elements
- **Project effort, testing effort**

Data Source
- **Timekeeping system**

Calculations
- **Testing effort / total project effort**

Assumptions/Notes
Employees are accurately entering time into the timekeeping system

Measurement Implementation Considerations

Measurement Implementation Considerations

- Collecting Data
- Storing Data
- Reporting
- Analysis
- Automating
- Improving
- Maintaining Momentum

Measurement Implementation Considerations Collecting Data

- Where can the data be collected from, how it can be collected?
  - Is the data in some existing system?
  - Can it be extracted?
  - If not, does someone have the data?
  - How can you get it from them?

    - *Example: Effort data exists in the timekeeping system, but you do not have security to access it*
    - *Example: The training department records attendance in manual logs, and you want a monthly summary*
- You might want to avoid asking for measures that do not currently exist or are difficult to find or collect:
  - *Example: You want customer survey results, but customer surveys are not taken on a regular basis*
  - *Example: You want effort data by calendar month, but the timekeeping system records it by week*

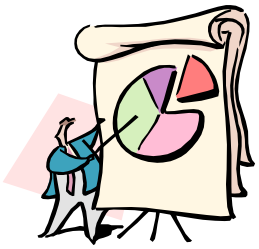
Measurement Implementation Considerations Storing Data

- Do we need to store the data?
  - Data collected manually needs to be stored
  - Meaningful metrics may require comingling of disparate data from multiple sources
  - *Example: Defect density calculation needs defects and size / functionality*
- Where you will store the data once it is collected?
  - Hard drive / Shared drive / Web site
- In what format will you store the data?
  - Excel / Word / Database
- How will it get into that format?
  - Export and convert it into the format
  - Manually key it in
- A database is more powerful than word processing or presentation files
  - Easier to access, sort, summarize, etc. using SQL / MS Access
  - Export to Excel or business intelligence tool (e.g. Business Objects) for reporting

Measurement Implementation Considerations Reporting

- Who will the measures be reported to?
  - Management (executive, senior, middle) / Supervisors / Staff
- Will there be different reports for different audiences?
  - Company level summaries for executive management
  - Department level summaries for middle managers
- What will the reports contain?
  - Raw data / Charts / Explanations
- Who will create the reports and how much time will it take?
  - Dedicated resource vs. additional responsibility
  - Are approvals necessary?
- In what format will the reports be delivered?
  - PowerPoint / Excel / Web site
- How will the reports be distributed?
  - Email
  - Face-to-face meeting / presentation
  - On-line lookup

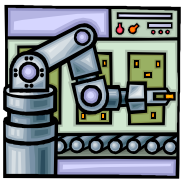
Measurement Implementation Considerations Analysis



- What is the data showing?
  - A baseline
  - A trend
  - Progress toward a goal
  - Forecast for the future
- Are there reasons for anomalies?
  - Why did a trend go in the other direction one time?
  - Why is the data out of the normal range?
  - *Example: Time reported is under the normal number of hours – reason is holiday on Monday*
- Are there any actions that need to be taken?
  - *Example: SLA responding to help tickets has increased 50% over the last 4 months. The number of requests is steadily increasing due to three new systems. We may need to increase help desk staff.*
  - *Example: Timesheet submission is showing a downward trend. We may need to monitor those that are not submitting their time.*

Measurement Implementation Considerations Automating

- Manual measurement collection and reporting programs can be highly labor intensive:
  - Get data from other sources
  - Copy and paste
  - Manually create charts and presentations



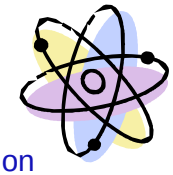
- Automating can:
  - Save time by significantly reducing manual effort
  - Improve accuracy by eliminating opportunities to make mistakes
  - More easily use same measurement data for multiple purposes
  - Allow the measurement professionals to focus on improvements, analysis and new measures

Measurement Implementation Considerations Improving

- What are the sources of measurement process improvement ideas?
  - Client feedback
  - Facilitated focus group meeting
  - Appraisal results
  - Support personnel for automated system
  - Suggestion box
  - Contest

- How will improvement ideas be evaluated and incorporated?
  - Governance (Change Control Board, cost/benefit analysis, prioritization / slotting, etc.)
  - Process steward / advocate
  - Scheduled measurement process releases
  - Formal process improvement approaches (CMMI, Six Sigma, etc.)

Measurement Implementation Considerations Maintaining Momentum



- Momentum may diminish over time:
  - Initial excitement, management attention, high degree of cooperation
  - Over time, excitement wanes and management focuses on new opportunities and challenges
  - The measurement team gets tired of all the manual effort
  - The providers of the measures deliver late or quit delivering their data
  - The transfer of responsibilities gets neglected when people leave
  - Inappropriate reactions may negatively impact the measurement program
- Maintaining momentum:
  - Automation helps ease the manual effort
  - Ensure the measurements continue to provide value
  - Analysis of initial measures may lead to additional/alternative measures
  - Provide visibility into the measurement results
  - Continuous improvement (alignment to goals, reporting, communication, evaluate use of measures, etc.)

Summary

Today we covered:

- Uses of metrics
- Defining S.M.A.R.T. goals
- Applying GQM / GQ(I)M to the goals
- Measurement implementation considerations

Questions

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