Goal-Question-Metric (GQM)

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Choosing Metrics

- Goal-Question-Metric (GQM) has been proposed by Basili and Weiss
- It is a technique to identify meaningful metrics for the measurement process
- You may want to use the GQM method to choose the appropriate metric
GQM Overview

- Questions are formulated based on a more abstract goal
- Metrics are chosen to answer each question
- GQM emphasizes the need to
  - Establish an explicit measurement goal
  - Define a set of questions to achieve the goal
  - Identify metrics to answer the questions
The GQM Method

- **Goals**
  - They define what the organization wants to improve

- **Questions**
  - They refine each goal to a more quantifiable way

- **Metrics**
  - They indicate the metrics required to answer each question
GQM Representation

Goal 1
- Q1
  - M1
- Q2
  - M2
- Q3
  - M3

Goal 2
- Q4
  - M4
- Q5
Example of Use (1)

- **Goal**
  - Increase productivity

- **Questions**
  - What are productivity bottlenecks?
  - How can we increase the amount of code we produce?

- **Metrics**
  - Current lines of code (LOC) per developer
Example of Use (2)

- **Goal**
  - Decrease development time

- **Questions**
  - What are the bottlenecks?
  - How to decrease specification time?

- **Metrics**
  - Time required for requirements
  - Time required for modeling
Goal Definition Template

Analyze \{the name of activity or attribute\}

for the purpose of \{overall goal\}

with respect to \{the aspect to be considered\}

from the viewpoint of \{interested people\}

in the context of \{environment\}
Example of Goal

**Analyze** the Health Watcher software architecture **for the purpose of** evaluating architectural components **with respect to** the ability to make Heath Watcher more extensible **from the viewpoint of** the software architects performing the work **in the context of** product enhancement over the next three years.
Examples of Questions

Q1: Are architectural components characterized in a manner that modularizes function and related data?

Q2: Is the complexity of each component within bounds that will facilitate modification and extension?
Examples of Metrics

- To answer Q1
  - Coupling metrics
  - Cohesion metrics

- To answer Q2
  - Component size
  - Interface complexity
Bibliography

  - Sections 24.4 and 26.2

  - Section 30.1.4