The Goal Question Metric Approach

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Outline

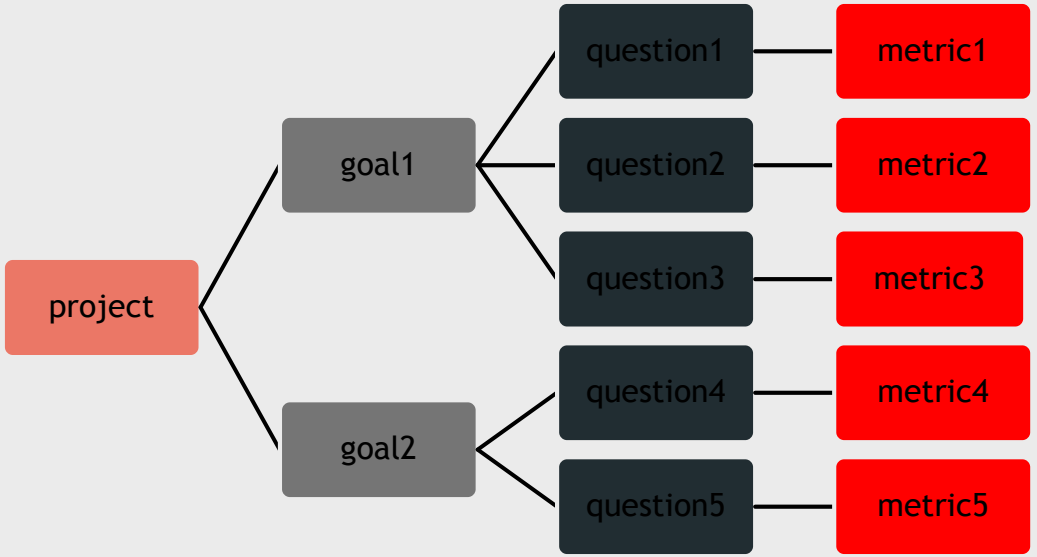
- GQM Definition
- GQM Levels
- Examples
- References

Goal Question Metric Approach

- A top-down approach
- A measurement framework for evaluation
- Overall goals of the project are identified
- Some questions are generated with respect to the goals
- The questions are analysed to identify measurements
- Simple, intuitive approach for specifying metrics
- Metrics can be “reused” by several questions

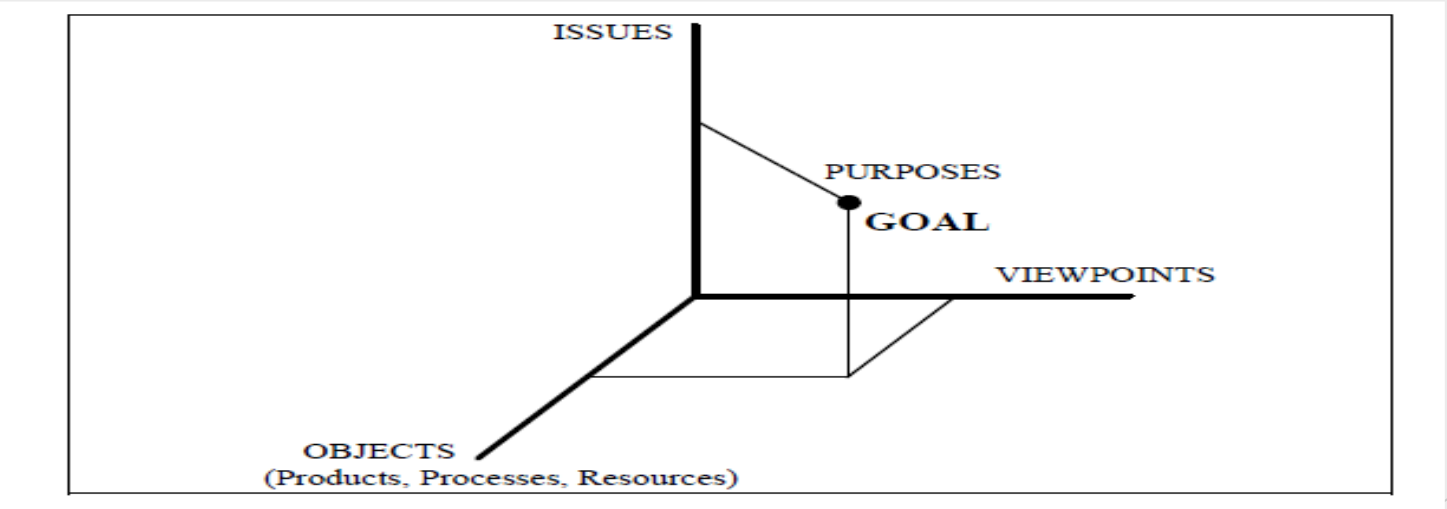
Goal Question Metric levels

- A three level Framework:
  - Goal (conceptual) level
  - Question (operational) level
  - Metric (quantitative) level



GQM Goal

- A goal has three coordinates and a purpose
  - **Object:** could be products, processes or resources
  - **Issue:** shows the qualities or properties of the object of measurement
  - **View:**specifies the user of output of measurement
- **Purpose:** explains how the output of measurement is used



Example1

Evaluating Student performance in a course

Grading:

- Assignment 1 (team work, 4-5 students in a team, **15%**)
- Project (team work, **30%**)
- Exam 1 (**30%**)
- Exam 2 (**20%**)
- Essays on: 1) Ethics, and 2) Equity & Professionalism: (team work, **2.5%** each)

GQM for Example 1

- Goal: Student Performance in a course

Question1:

- What is the student performance in Assignment of the course?Metric1: Ma

Question2:

- What is the student performance in Exam1 of the course? Metric2: Me1

Question3:

- What is the student performance in Exam2 of the course? Metric3: Me2

Question4:

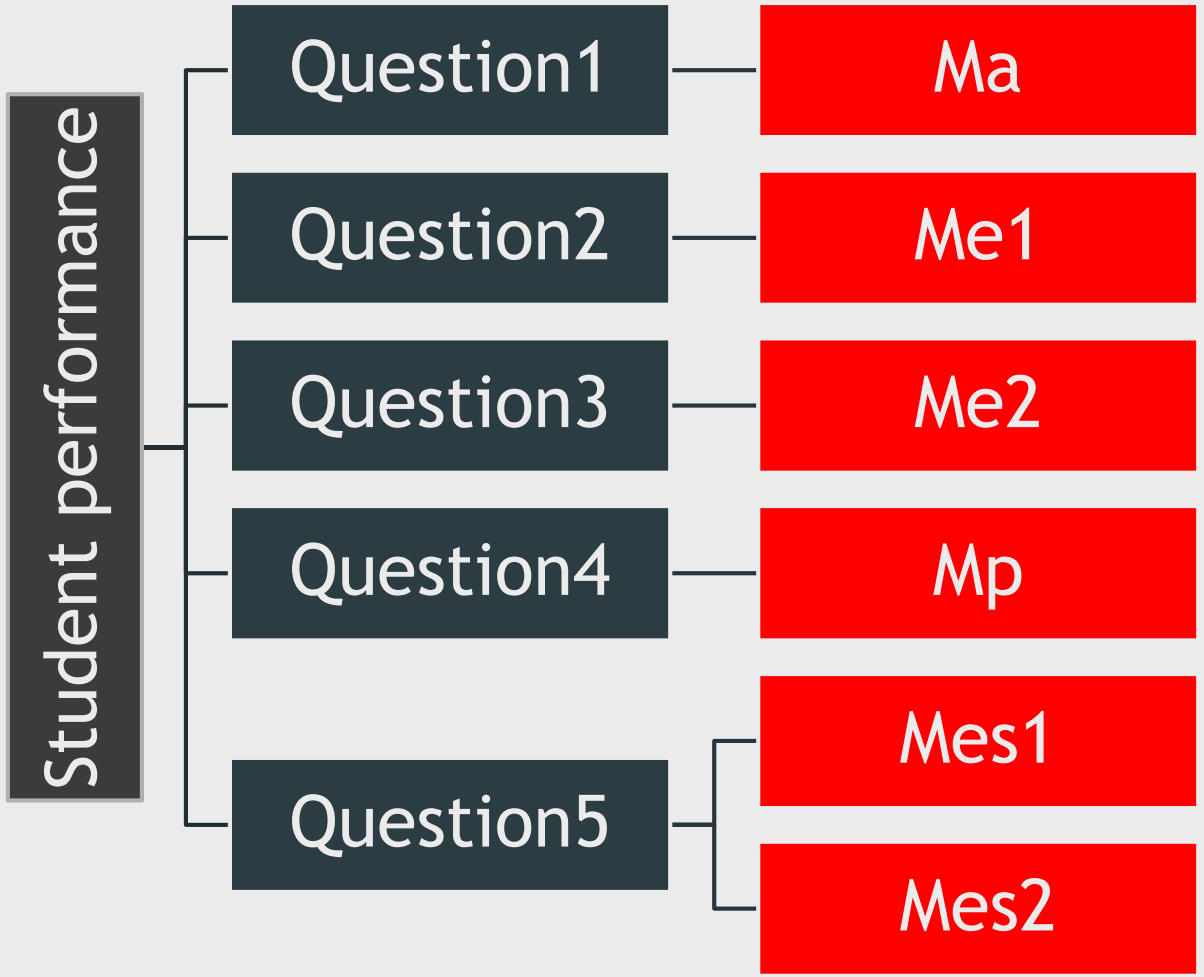
- What is the student performance in project of the course? Metric4: Mp

Question5:

- What is the student performance in essays of the course?

Metric5: Mes1 & Metric6: Mes2

GQM for Example1



Interpretation for Example1

We measure the metrics for each question in scale of 100.

- Total= Ma*15%+ Me1*30%+Me2*20%+Mp*30%+(Mes1+Mes2)*5%

Grade	Range
>95	A+
92.5-95	A
90-92.4	A-
88-89	B+
85-88	B
80-84	B-
75-79	C

Example 2

Improving the usability of a website

- A "usable" Web site is designed in such a way that facilitates human interaction
- Users could easily find what they need and could complete tasks required fast.

Questions

- Goal: Improving the usability of a website
- Q1. Does the current website have enough Visibility?
  - when visiting a web site , users need to know : "Where am I?" and "Where can I go next?“
- Q2. Is the current website consistent and does it conform to the standards?
  - "standards" on the Web means following HTML and other specifications.
- Q3. Is there a good matching between the current website and the real world?
  - The words and phrases used in the website should be familiar to the users' language.

Metrics:

- We defined five usability metrics for each question. Each metric is evaluated according to the following scale: ***High***, ***Medium***, ***Low***, ***No***.

Question1

Q1. Does the current website have enough Visibility?

- M1: Does every display begin with a title or a header that describes screen contents? ***Low***
- M2: Is there visual feedback in menus or dialog boxes about the selectable choices? ***Low***
- M3: Does the system provide visibility, in other words, can the user tell the state of the system and the alternatives for action? ***Low***
- M4: Do GUI menus make obvious which item has been selected? ***Low***
- M5: If users must navigate between multiple screens, does the system use menu maps, and place markers as navigational aids? ***No***

Question2

Q2. Is current website consistent and does it conform to the standards?

- M1: Has a heavy use of all uppercase letters on a screen been avoided? ***No***
- M2: Are vertical and horizontal scrolling possible in each window? ***High***
- M3: Are menu choice lists presented vertically? ***No***

Question3

Q3. Is there a good matching between the current website and the real world?

- M1: On data entry screens, are tasks described in terminology familiar to users? ***Medium***
- M2: Do the selected colors correspond to common expectations about color codes? ***High***
- M3: Are command names specific rather than general? ***High***
- M4: Does the command language employ user jargon and avoid computer jargon? ***High***
- M5: Do related and interdependent fields appear on the same screen? ***Medium***

Evaluation

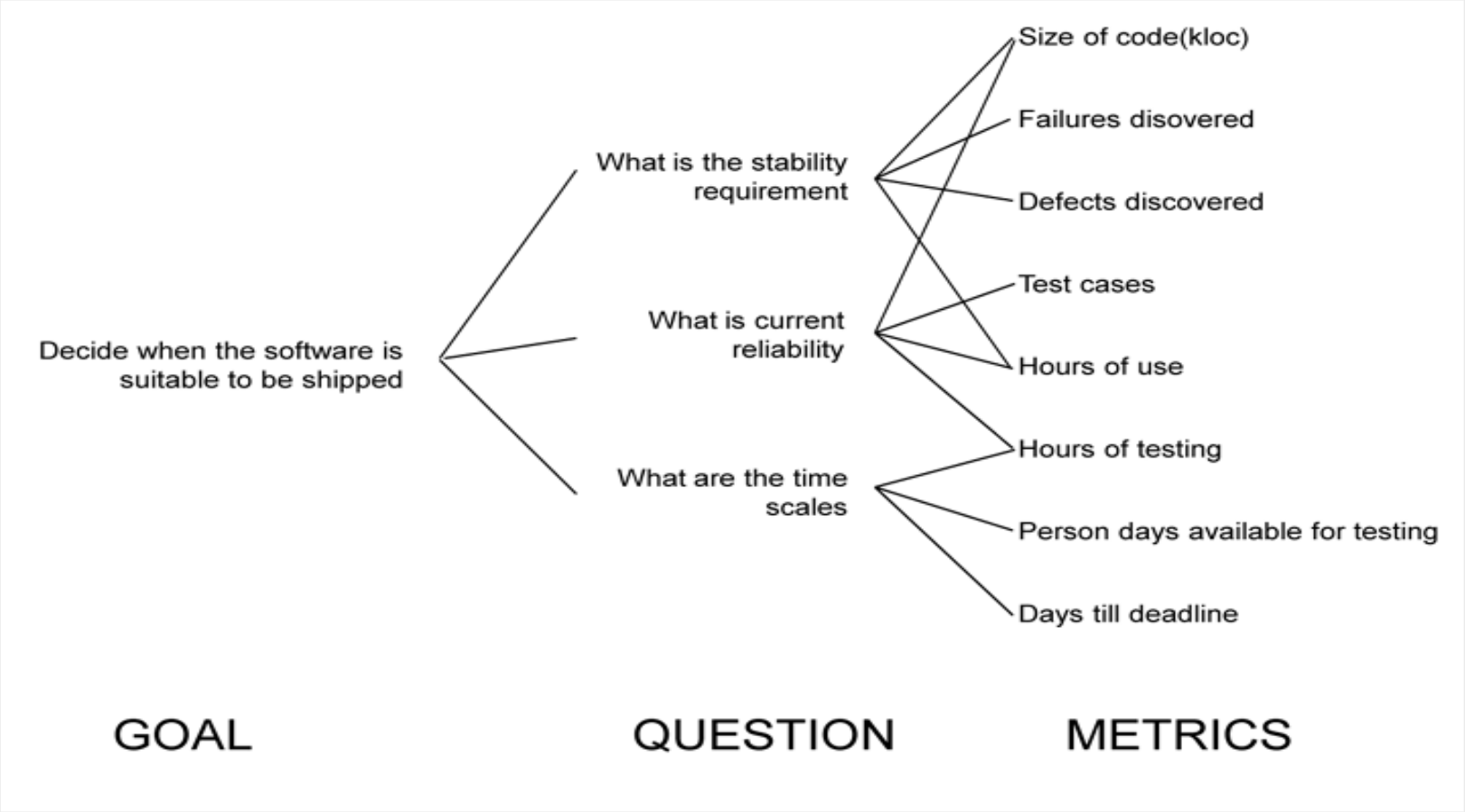
	High	Medium	Low	No
Q1	0	0	4	1
Q2	1	0	0	2
Q3	3	2	0	0

Conclusion: From these evaluations, it is clear that the current ***website*** needs to improve its visibility according to result of question#1 and the consistency and the conformance to the standards according to question2.

Example 3

Deciding when software is suitable to be shipped

GQM for Example 3



References

- **THE GOAL QUESTION METRIC APPROACH,** Victor R. Basili, Gianluigi Caldiera, H. Dieter Rombach
- ***"The Goal/Question/Metric Method"***, Rini Van Solingen
- **"A practical view of software measurement and implementation experiences within Motorola"** by Michael K. Daskalantonakis. *IEEE Transactions on Software Engineering, Vol. 18, Issue: 11, Nov. 1992*