

GQM Instances

Internal and External Attributes

- An internal attribute can be measured by examining the product, process, or resource on its own, separate from its behaviour.

(Program size, complexity, dependencies).

- External attributes are those that can be measured only with respect to how the product, process or resource relates to the environment.

(Experienced failures, timing and performance)

Metrics and Goals

- **Internal Attributes**

- Size, Effort, Cost
- Code Complexity
- Functionality
- Modularity
- Redundancy
- Syntactic
- Reuse

- **External Attributes**

- Usability
- Integrity
- Efficiency
- Testability
- Reusability
- Correctness
- Portability
- Interoperability

Table 3.1: Components of software measurement

ENTITIES	ATTRIBUTES	
<i>Products</i>	<i>Internal</i>	<i>External</i>
Specifications	size, reuse, modularity, redundancy, functionality, syntactic correctness, ...	comprehensibility, maintainability, ...
Designs	size, reuse, modularity, coupling, cohesiveness, functionality, ...	quality, complexity, maintainability, ...
Code	size, reuse, modularity, coupling, functionality, algorithmic complexity, control-flow structuredness, ...	reliability, usability, maintainability, ...
Test data	size, coverage level, ...	quality, ...
...
<i>Processes</i>		
Constructing specification	time, effort, number of requirements changes, ...	quality, cost, stability, ...
Detailed design	time, effort, number of specification faults found, ...	cost, cost-effectiveness, ...
...		
Testing	time, effort, number of coding faults found, ...	cost, cost-effectiveness, stability, ...
...
<i>Resources</i>		
Personnel	age, price, ...	productivity, experience, intelligence, ...
Teams	size, communication level, structuredness, ...	productivity, quality, ...
Software	price, size, ...	usability, reliability, ...
Hardware	price, speed, memory size, ...	reliability, ...
Offices	size, temperature, light, ...	comfort, quality, ...

Generic GQM Example

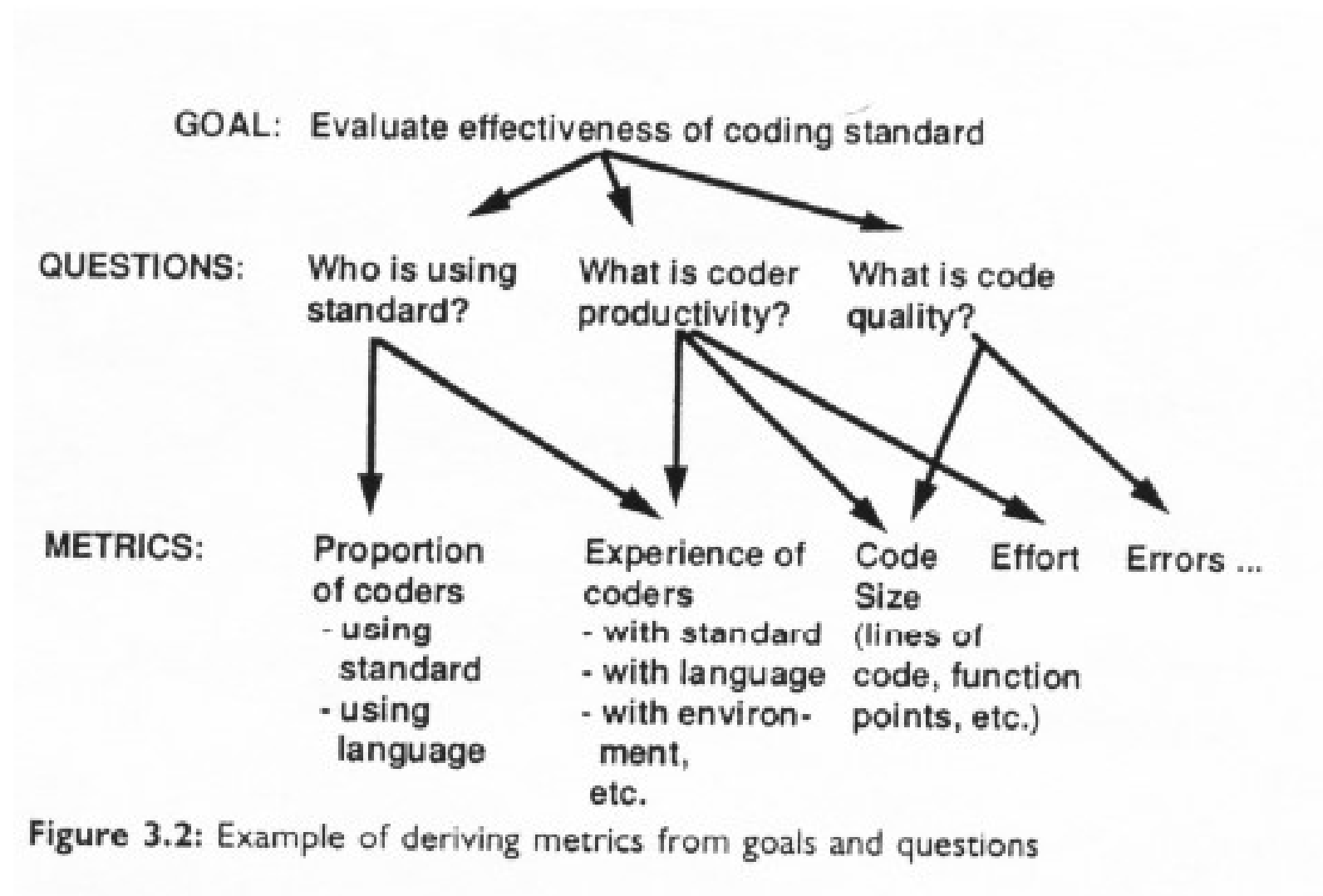


Figure 3.2: Example of deriving metrics from goals and questions

Sample GQM Map for Inspections

