

Lab 01

GQM

Applied statistics and experiments



Agenda

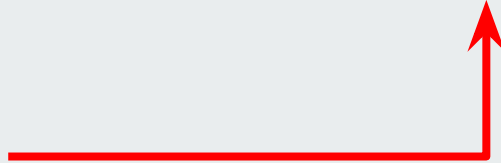
1. GQM framework
2. Example on GQM
3. GQM Paradigm
4. SMART goals
5. GQM definition template
6. Abstraction levels of GQM questions
7. GQM Phases



Lecture Recap

<https://quizizz.com/join>

Join and enter
game code





GQM

Goal

Question

Metric

Example: Diet

Goal: Why do you need a diet?

Lose weight



Example: Diet

Metric: How do you measure the Goal?



Body Weight:
Record your weight weekly to monitor progress.

Example: Diet

Question: What connects Goal and Metrics

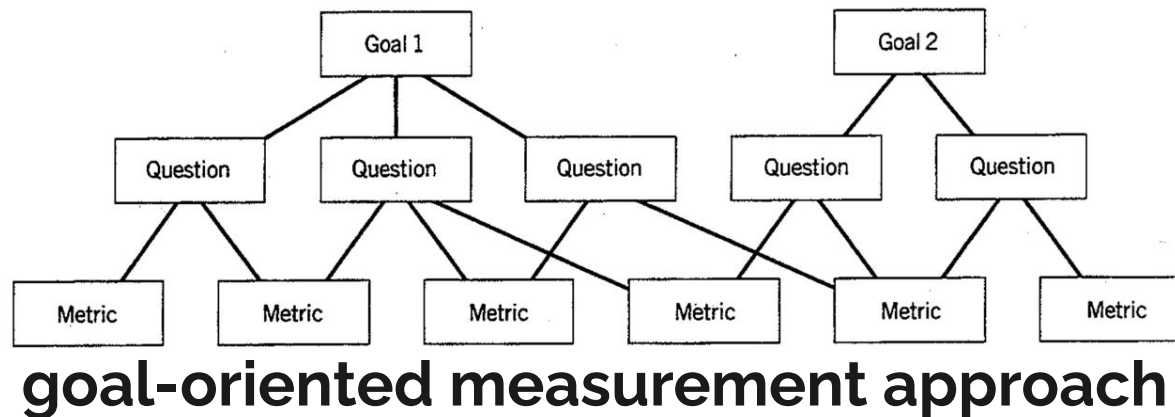
How do I lose weight?

What is your current weight and target weight?





GQM



Goal: Define the measurement goal. (*Conceptual Level*)

- Lose weight

Question: Derive questions to refine and address the goal. (*Operations Level*)

- What is your current weight and target weight?

Metric: Define metrics that, when collected, can answer the questions. (*Quantitative Level*)

- Body Weight, ...etc.

GQM - Example

G1: Improve overall health and fitness through a balanced diet.

Q1: Is the calorie intake aligned with dietary goals?

M1: Daily servings of fruits and vegetables.

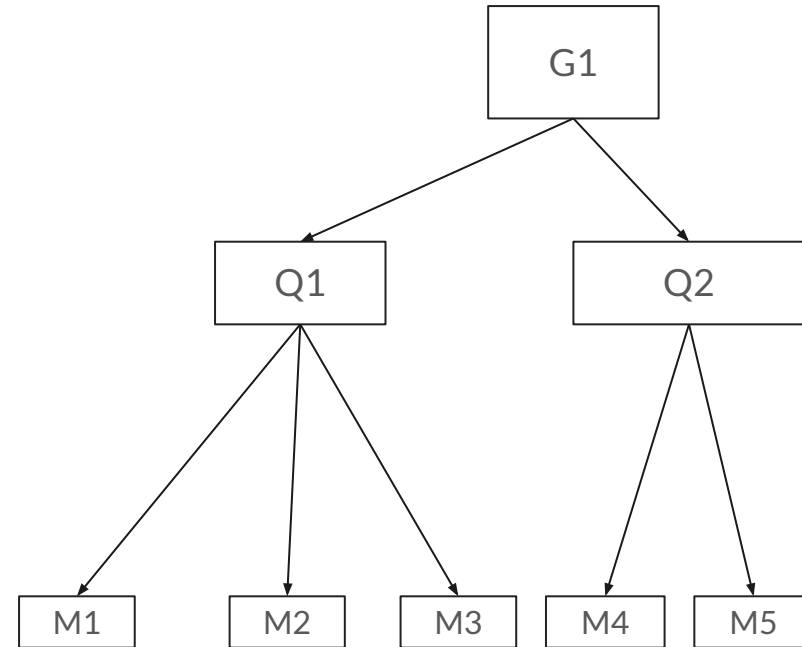
M2: Daily intake of whole grains.

M3: Daily protein intake from various sources.

Q2: How frequently are unhealthy food choices made?

M4: Number of fast food meals consumed per week.

M5: Number of sugary snacks consumed per week.





GQM - Example

G1: Improve overall health and fitness through a balanced diet.

Q3: Are dietary changes leading to measurable health outcomes?

M6: Monthly weight change.

M7: BMI before and after diet.

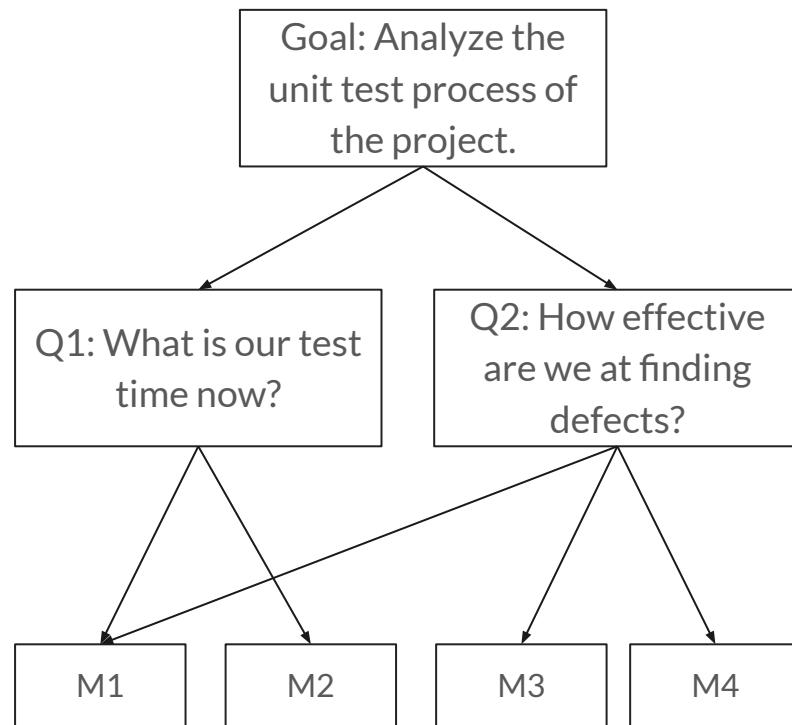
M8: Blood pressure readings

GQM - Example

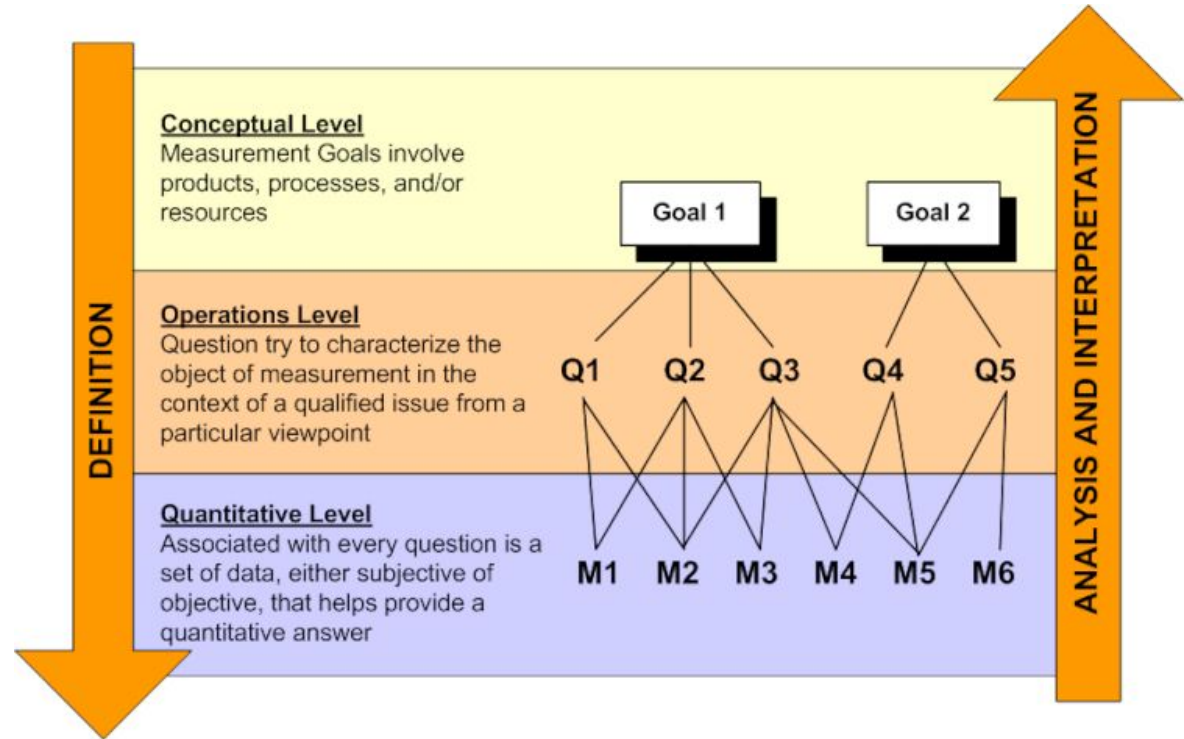
Goal: Analyze the unit test process of the project.

Questions:

1. What is the current test time?
 - a. M1: Number of tests run per week
 - b. M2: Time for each test (pass)
2. How effective are we at finding defects?
 - a. M1: Number of tests run per week
 - b. M3: Number of tests that find a defect and stop
 - c. M4: Number of defects found in unit test
3.etc



GQM Paradigm





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}

Object
Purpose
Focus
View point
Environment

Goal definition template – Example

Analyze the unit test process

for the purpose of understanding

with respect to the impact of adding additional tests

from the viewpoint of the project manager

in the context of project A

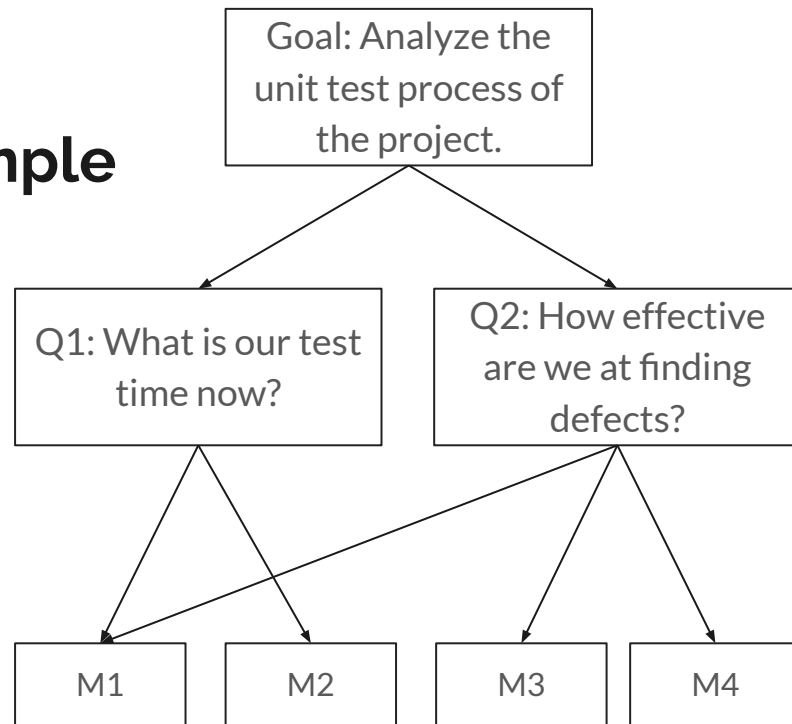
Object – unit test process

Purpose – understand

Focus – impact of adding additional tests

View point – project manager

Environment – Project A





Example of goal definition template

Architects of Health Watcher software wants to see if it can be more extensible by evaluating its architectural components within the product enhancement period over the next three years.

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

- 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?

To answer Q1

- Coupling metrics
- Cohesion metrics

To answer Q2

- Component size
- Interface complexity

Goal definition template - Examples

	Examples	Example definition
Object	process, product, other experience model, etc.	Analyze the system test process
Purpose	characterize, evaluate, predict, motivate, improve, etc.	for the purpose of evaluation
Focus	cost, correctness, defect removal, changes, reliability, user friendliness, etc.	with respect to defect slippage
Viewpoint	user, customer, manager, developer, corporation, etc	from the point of view of the corporation
Context	problem factors, people factors, resource factors, process factors, etc.	in the context of organization XY



Practice

Scenario: The manager of the development organization X wants to evaluate the productivity of the project teams in X.

1. Using the GQM template, define a measurement goal for the scenario given above.
2. Formulate questions derived from the defined goal.
3. Specify the required metrics.

GQM - Example

Goal	Purpose Issue Object (process) Viewpoint	Improve the timeliness of change request processing from the project manager's viewpoint
Question	Q1	What is the current change request processing speed?
Metrics	M1	Average cycle time
	M2	Standard deviation
	M3	% cases outside of the upper limit
Question	Q2	Is the (documented) change request process actually performed?
Metrics	M4	Subjective rating by the project manager
	M5	% of exceptions identified during reviews
Question	Q3	What is the deviation of the actual change request processing time from the estimated one?
Metrics	M6	$\frac{\text{Current average cycle time} - \text{Estimated average cycle time}}{\text{Current average cycle time}} * 100$
	M7	Subjective evaluation by the project manager
Question	Q4	Is the performance of the process improving?
Metrics	M8	$\frac{\text{Current average cycle time}}{\text{Baseline average cycle time}} * 100$
Question	Q5	Is the current performance satisfactory from the viewpoint of the project manager?
Metrics	M7	Subjective evaluation by the project manager
Question	Q6	Is the performance visibly improving?
Metrics	M8	$\frac{\text{Current average cycle time}}{\text{Baseline average cycle time}} * 100$

SMART is a well-established tool that you can use to plan and achieve your goals

How to define right goals?



Breakdown of a SMART Goal Example

Not SMART Goal: improve customer satisfaction.

SMART Goal: Improve customer satisfaction ratings by 15% in the next six months through more training and feedback mechanisms.

Specific

Outcome	Improve customer satisfaction
How	Through training and feedback mechanisms

Breakdown of a SMART Goal Example

SMART Goal: Improve customer satisfaction ratings by 15% in the next six months through more training and feedback mechanisms.

Measurable

Metric	Customer satisfaction ratings
Target value	15% improvement

Breakdown of a SMART Goal Example

SMART Goal: Improve customer satisfaction ratings by 15% in the next six months through more training and feedback mechanisms.

Achievable

Feasibility	Considering the selected measures (more training and feedback mechanisms), it's a realistic goal.
Resources and strategies	Depending on the current state of the company's training and feedback systems, resources may include new training materials, hiring external trainers, implementing a new feedback collection system, or improving current feedback channels.



Breakdown of a SMART Goal Example

SMART Goal: Improve customer satisfaction ratings by 15% in the next six months through more training and feedback mechanisms.

Relevant

Significance	Satisfaction is a crucial issue in the realm of customer service. It directly affects customer retention, word-of-mouth marketing, and the company's overall brand reputation.
Alignment	This goal aligns with the broader company objectives of attaining a higher degree of customer loyalty. It can potentially reduce customer churn and improve the overall brand image.

Breakdown of a SMART Goal Example

SMART Goal: Improve customer satisfaction ratings by 15% in the next six months through more training and feedback mechanisms.

Time-bound

Duration	Set to 6 months.
Rationale	Half a year is an ample time frame for the implementation of new training, the collection of feedback, iterative improvements, and finally, the measurement of the intended tangible difference in satisfaction ratings.

SMART GOALS TEMPLATE

 S M A R T	Specific	<ul style="list-style-type: none"> • Who is involved? • What do I want to achieve? • When do I need to achieve this? • Why is the goal important? 	
	Measurable	<ul style="list-style-type: none"> • How will I measure my progress? • How will I know if my goal is achieved? 	
	Achievable	<ul style="list-style-type: none"> • Will it be clear when the goal is complete? • Is it reasonable to complete the goal in the time allotted? 	
	Relevant	<ul style="list-style-type: none"> • Is this goal related to my overall success (or the success of my business/organization) 	
	Time-Bound	<ul style="list-style-type: none"> • How long should it take to accomplish this goal? • When will I check in on whether or not the goal has been completed? • Am I ready to start work on the goal? 	

SMART Goal - Practice

An E-commerce company's IT dept has expertise in server optimization and code refinement and aims to improve website load times by 20% over the next three months by optimizing server resources and refining code

Specific	Improve website load times by 20%.
Measurable	Measure success using the percentage of improvement in load times.
Achievable	This company's IT department has in-house expertise in terms of server optimization and code refinement, making the goal achievable.
Relevant	The company's staff works primarily online, so website speed is critical for increased productivity.
Time-bound	Achieve this goal over the next three months.



SMART Goal - Examples

Grow the number of monthly users of our mobile app by optimizing our app-store listing and creating targeted social media campaigns.

Specific

SMART Goal - Examples

Increase the number of monthly users of our mobile app by 1,000 by optimizing our app-store listing and creating targeted social media campaigns for four social media platforms: Facebook, Twitter, Instagram, and LinkedIn.

Specific

Measurable

SMART Goal - Examples

Increase the number of monthly users of our mobile app by 1,000 by optimizing our app-store listing and creating targeted social media campaigns for four social media platforms: Facebook, Twitter, and Instagram, and LinkedIn.

Specific

Measurable

Achievable



SMART Goal - Examples

Increase the number of monthly users of our mobile app by 1,000 by optimizing our app-store listing and creating targeted social media campaigns for four social media platforms: Facebook, Twitter, and Instagram. Since mobile users tend to use our product longer, growing our app usage will ultimately increase profitability.

Specific

Measurable

Achievable

Relevant



SMART Goal - Examples

Grow the number of monthly users of Techfirm's mobile app by 1,000 within Q1 of 2022. This will be accomplished by optimizing our app-store listing and creating targeted social media campaigns, which will begin running in February 2022, on three social media platforms: Facebook, Twitter, and Instagram. Since mobile is our primary point of conversion for paid-customer signups, growing our app usage will ultimately increase sales.

Specific**Measurable****Achievable****Relevant****Time-bound**



SMART Goal vs. GQM

Goal: Increase website traffic

- **Specific:** Increase the number of unique visitors to the website.
- **Measurable:** Achieve a 25% increase in unique visitors.
- **Achievable:** Utilize targeted digital marketing campaigns and optimize website SEO.
- **Relevant:** More traffic can lead to higher sales conversion rates.
- **Time-bound:** Accomplish this within the next 4 months.

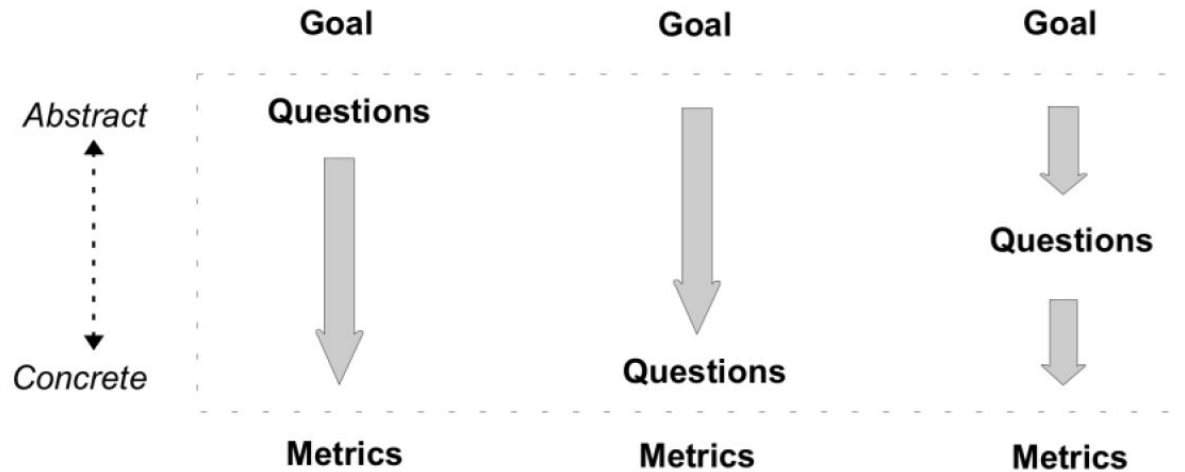


SMART Goal vs. GQM

Goal: Analyze the website statistics for the purpose of increasing unique users with respect to website traffic from the viewpoint of website manager in the context of an ecommerce website launched in 2021.

- **Question 1:** How many unique visitors are we getting currently?
 - **Metric:** Track the current number of unique visitors using Google Analytics.
- **Question 2:** What channels are driving traffic to our website?
 - **Metric:** Analyze traffic sources (organic search, social media, email marketing).
- **Question 3:** What is the conversion rate of visitors from different traffic sources?
 - **Metric:** Measure the number of conversions (sign-ups, sales) per source of traffic.

GQM Question



1. Question definitions
too global

2. Question definitions
too detailed

3. Usable question
definitions

GQM Question - Examples

Goal: To evaluate the effectiveness of the company's social media marketing strategy in increasing brand awareness.

How has the social media marketing strategy impacted overall brand awareness?

(abstract)

How many new followers have been gained on social media platforms since implementing the marketing strategy?

(concrete)

What is the correlation between social media engagement rates and overall brand awareness, and how has this changed since implementing the marketing strategy?

(balanced)

GQM Question - Examples

Goal: To assess the impact of the company's website redesign on user experience.

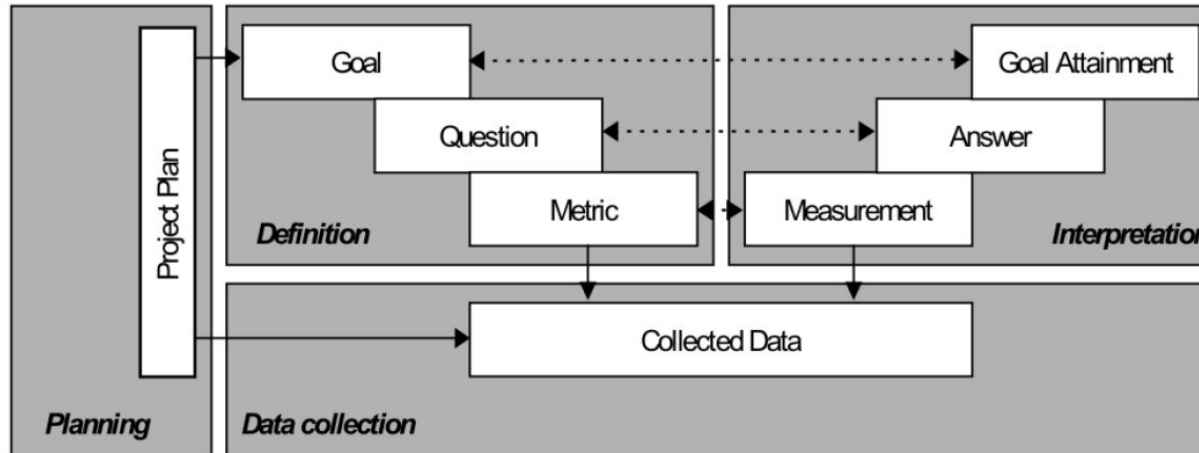
How many users have provided feedback on the new website design?	(concrete)
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How effective has the website redesign been on user experience?	(abstract)
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What is the average time spent on the website and bounce rate, and how have these metrics changed since implementing the website redesign?	(balanced)
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GQM Phases

- Planning
- Definition
- Data collection
- Interpretation



References

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- https://www.researchgate.net/publication/301789255_U-QASAR_Methodology_Handbook

Attendance

<https://baam.duckdns.org>

Questions?