

**Universidade do Minho**  
Escola de Engenharia

# Métodos Quantitativos e Qualitativos na Engenharia (M2QE)

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# Quantitative and Qualitative Methods in Engineering (QQME)



Guimarães, 3 de outubro de 2013  
Escola de Engenharia, Campus de Azurém

# Some definitions...

**Method:** the set of rational and systematic activities that promote the achievement of objectives, tracing the path to be followed by detecting possible errors and assisting in the decision making of the researcher.

(Lakatos and Marconi, 2001)

**Quantitative:** characterized by the use of quantification in terms of data acquisition and on their treatment by using statistical techniques.

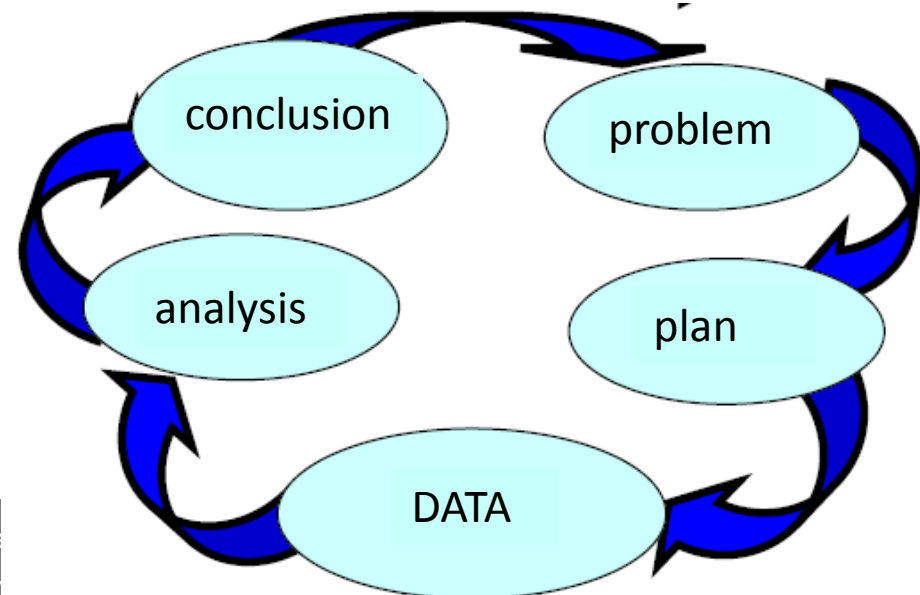
**Qualitative:** involves interpretive approaches and naturalistic affairs. The qualitative researcher studies the problem in their natural environment, trying to interpret phenomena, according to the meaning that people attribute to it.

(Denzin and Lincoln, 1994)

# Objective

To give the students the opportunity to advance their knowledge and technical skills in their research to plan, implement, analyze and decide.

The approach of this curricular unit focuses on the procedures and techniques applied to research in Engineering.



# Why...



We could say that statistics helps us to understand the variability of systems by data acquisition, analysis, and implementation of a solution in the context of decision-making processes.



# Learning outcomes

- To identify quantitative and qualitative data in the context of Engineering;
- To identify types of quantitative and qualitative research;
- To know the advantages and disadvantages of quantitative and qualitative methods;
- To decide the suitability of different methods;
- To know and use computer tools to support the analysis;
- To present and write the research results.

# Syllabus

- Block 1: Block for homogenization of knowledge in statistics and statistical inference
- Block 2: Techniques of design of experiments
- Block 3: Techniques of causality
- Block 4: Techniques for analyzing qualitative data

# Methodology

- **TEACHING:**

Expository and active (active learning).

Participative exposure, group dynamics, self-assessment exercises and discussions among the participants, with the use of the statistical techniques and software.

- **EVALUATION:**

Group dynamics in the classroom (presentation and discussion of scientific papers in class); report (group work).

Individual oral presentation and assessment test.

# Teaching Team (Equipa Docente)



**Block 3**  
Ana Cristina Braga  
MSc in Probability and Statistics  
PhD in Applied Statistics  
Research in biostatistics, bioinformatics  
and applied statistics  
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**Block 1**  
Cristina Rodrigues  
MSc in Management Science  
PhD in Numerical Methods and Statistics  
Current research interests: structural  
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reliability  
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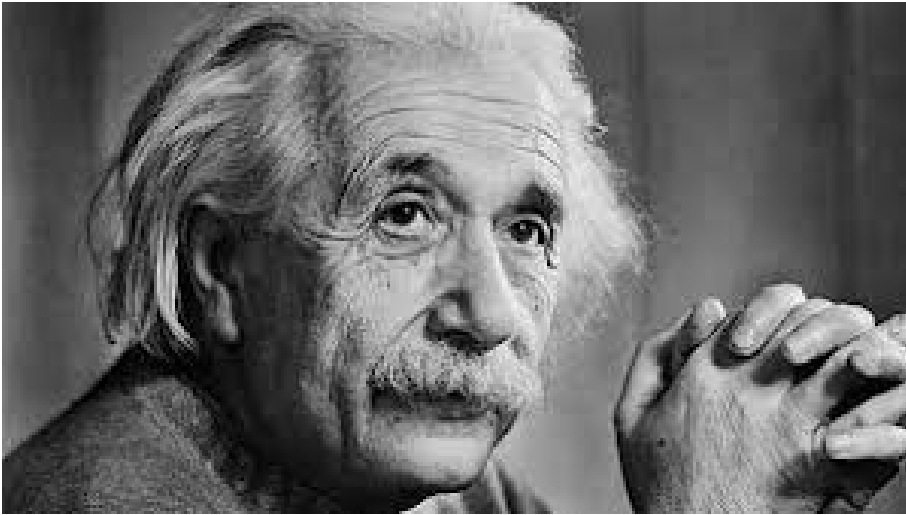
**Block 4**  
Celina Pinto Leão  
MSc in Industrial Mathematics  
PhD in Engineering Science  
Current research interests: statistical  
techniques in engineering; new methodologies  
in learning process of numerical methods and  
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**Block 2**  
Lino Costa  
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Research in optimization and applied  
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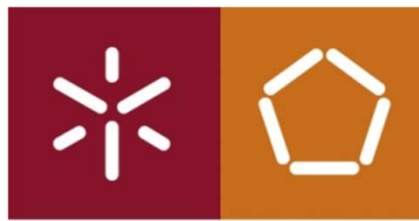


# Our principal objective...



Albert Einstein

“Everything should be made as simple as possible, but not simpler.”



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