# Probing into the Decision Ranking Method: A Brief Overview of the Case Study Protocol and Some **Very** Preliminary Results From the Pilot

Vinicius Durelli

Drop me a line: ✉ vinicius.durelli@gmail.com

# Outline

# Rationale for the Study

- The ideas/steps/elements have not been empirically evaluated;
- It was employed to evaluate architectures as a whole;
- Complexity should be broken down into more manageable, abstract concepts.

So the rationale is threefold:

1. Is the ranking method effective?
2. How hard it is to carry out the method?
3. What are the main inhibitors of the method?

# Goal

According to the GQM goal definition template:

**Analyze** our decision ranking method

**for the purpose of** evaluation

**with respect to its** effectiveness, effort, and inhibitors

**from the point of view of** the researcher

**in the context of** a graduate course: novice architects, i.e., students, evaluating competing architectural decisions.

# The Three RQs that Drive the Case Study

The goals were framed as the following RQs:

**$RQ_1$:**

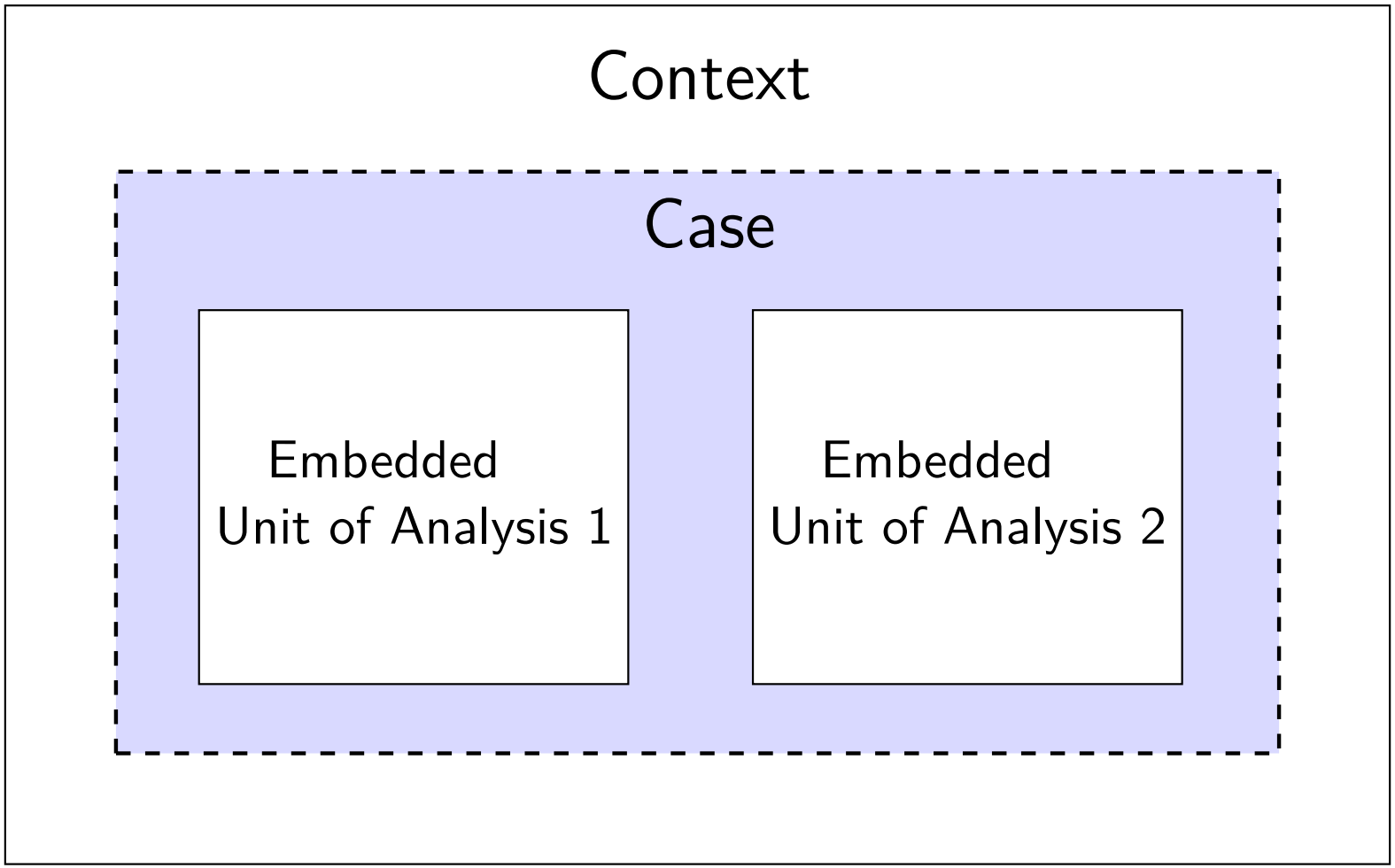
How **effective** is our decision ranking method at ranking architectural decisions?

**$RQ_2$:**

What is the **effort** needed to evaluate decisions using our decision ranking method?

**$RQ_3$:**

What are the **inhibitors** associated with our decision ranking method?


Context
Case
Embedded
Unit of Analysis 1
Embedded
Unit of Analysis 2

# Concepts and Measures

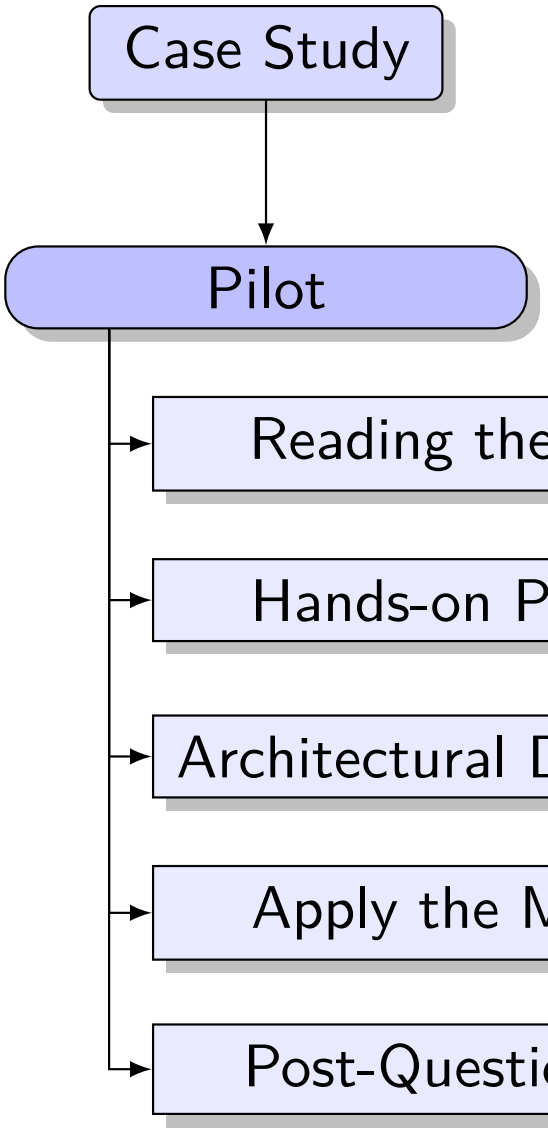
## Turning Abstractions Into Variables

Before you study something quantitatively, you have to define it.

| Concept | Scale Type | Range |
|---|---|---|
| Effectiveness (**RQ**$_1$) | Ratio | Amount of optimal decisions correctly rated as such by the method's outcome (according to domain experts). |
| Effort (**RQ**$_2$) | Ordinal | Five point Likert-scale: the scale goes from **strenuous** to **effortless**. |
| Inhibitors (**RQ**$_3$) | – | Open question(s). |

Table: Overview of the concepts and measures in this case study.

# Breaking Down the Case Study/Pilot

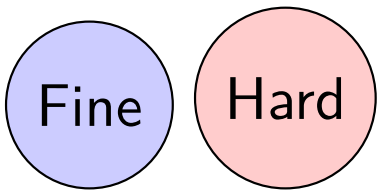



- Reading the paper in **1h**;
- Hands-on practice in **45m**;
- Skim through the AD in **30m**;
- **1h and 30m** to apply the method;
- Fill out questionnaire.

# Steps of the Proposed Ranking Method

The proposed decision ranking method encompasses **seven steps**:

1. Segmentation and Identification of QAs;
2. Fixation of Acceptable Ranges for QAs;
3. Normalization;
4. Creation of Desirability Curves for QAs;
5. Determination of the Weights of QAs;
6. Computation of Cumulative Scores; and
7. Selection of the Design Decision.



# Taking a Look at the Post-Questionnaire (1)

1.1 What do you think about the following steps of the decision ranking method in terms of the effort required to carry them out?

Fixation of acceptable ranges for QAs/forces (Step ❷)

Strenuous ☐ ☐ ☐ ☐ ☑ Effortless

Normalization of the acceptable ranges (Step ❸)

Strenuous ☐ ☐ ☐ ☑ ☐ Effortless

Creation of desirability ranges for QAs/forces (Step ❹)

Strenuous ☐ ☐ ☐ ☐ ☐ Effortless

# Taking a Look at the Post-Questionnaire (2)

1.1 What do you think about the following steps of the decision ranking method in terms of the effort required to carry them out?

Determination of the weight of each QA/force (Step ❺)

Strenuous ☐ ☑ ☐ ☐ ☐ Effortless

Computation of cumulative scores (Step ❻)

Strenuous ☐ ☐ ☐ ☐ ☑ Effortless

Selection of the design decision (Step ❼)

Strenuous ☐ ☐ ☐ ☐ ☑ Effortless

# Taking a Look at the Post-Questionnaire (3)

1.2 How do you rate the overall effort required to carry out the decision ranking method?

Strenuous ☐ ☐ ☑ ☐ ☐ Effortless

1.3 The results made it easy for me to better evaluate the trade-offs among the decisions and their architectural implications?

Strongly agree ☐ ☐ ☑ ☐ ☐ Strongly disagree

# Taking a Look at the Post-Questionnaire (4)

## Free-form Questions

2.1 What are the major strengths of the decisions ranking method?

**R.** ❝Structured way to identify relative priorities of forces.❞

2.2 What are the major drawbacks of the decision ranking method?

**R.** ❝[...] coming up with HE decisions is not as trivial and already requires that the weight of the forces is known [...]❞

❝ I am wondering if stakeholders could come up with HE decisions why do they need to rank forces in the first place?❞

❝ [...] this method requires more effort if more than three forces need to be considered. It seems that it does not scale that well.❞

# Taking a Look at the Post-Questionnaire (5)

## Free-form Questions

2.3 Do you have any comments regarding the practical difficulties of applying the decision ranking method?

**R.** “[...] it seems as if this method produces the best result if it is performed by a group of people (of the same stakeholder group)

[...] but we couldn’t try this scenario in the pilot.”

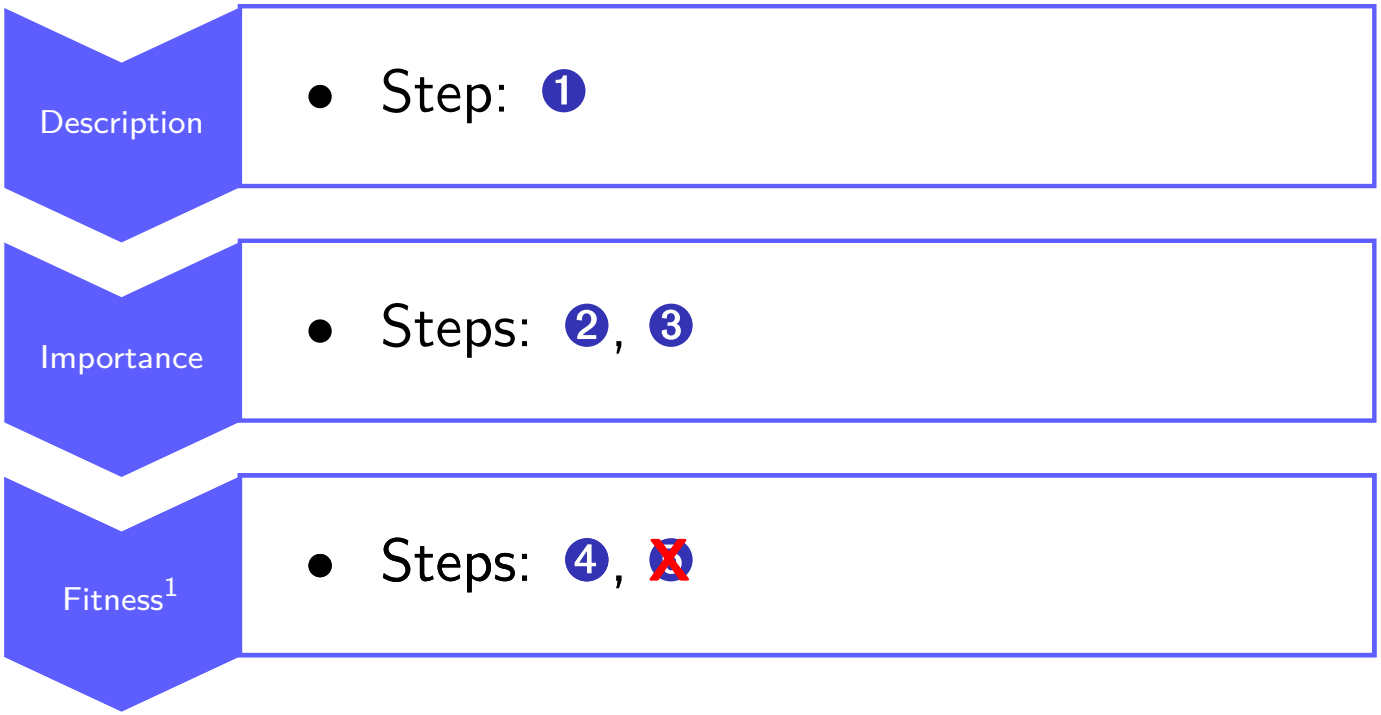
# Interpreting the Results: The HE Seems to be the Problem...

Characterization schema: commonalities and variabilities


[1] Fulfillment.

# Interpreting the Results: The HE Seems to be the Problem...

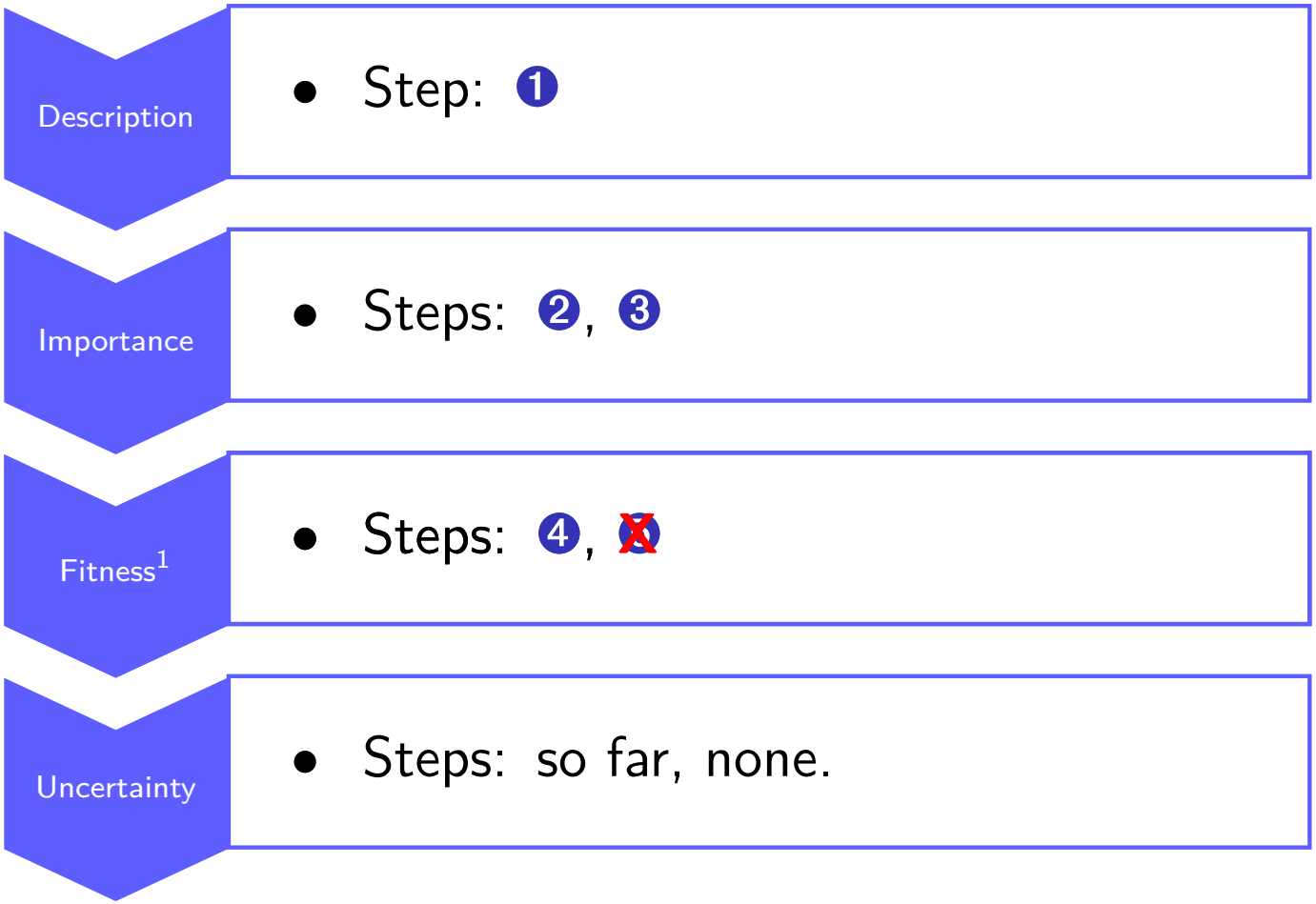
Characterization schema: commonalities and variabilities




[1] Fulfillment.

# Interpreting the Results: The HE Seems to be the Problem...

Characterization schema: commonalities and variabilities




[1] Fulfillment.

# Concluding Remarks...

- Provides a systematic way to ponder about decisions;
- **Quantitative overview** of how each decision performs on important QAs/forces;
- **Downside:** highly **"mathy"**, **cumbersome**;
- **Future:** Replace the HE method and carry out an **empirical study** to evaluate how well the ranking method works for graduate students.

# “What a Long, Strange Trip It’s Been”[2]

[2] **What a Long, Strange Trip It’s Been**, by Grateful Dead, is arguably one of the most famous lines in rock and roll. This snippet has entitled several books and articles since the song’s release. Since it evokes a lifespan of constant changes, I believe it fits perfectly to describe my stay here.

# “What a Long, Strange Trip It’s Been”[2]

# **Thank you!** ☺

[2] **What a Long, Strange Trip It’s Been**, by Grateful Dead, is arguably one of the most famous lines in rock and roll. This snippet has entitled several books and articles since the song’s release. Since it evokes a lifespan of constant changes, I believe it fits perfectly to describe my stay here.