

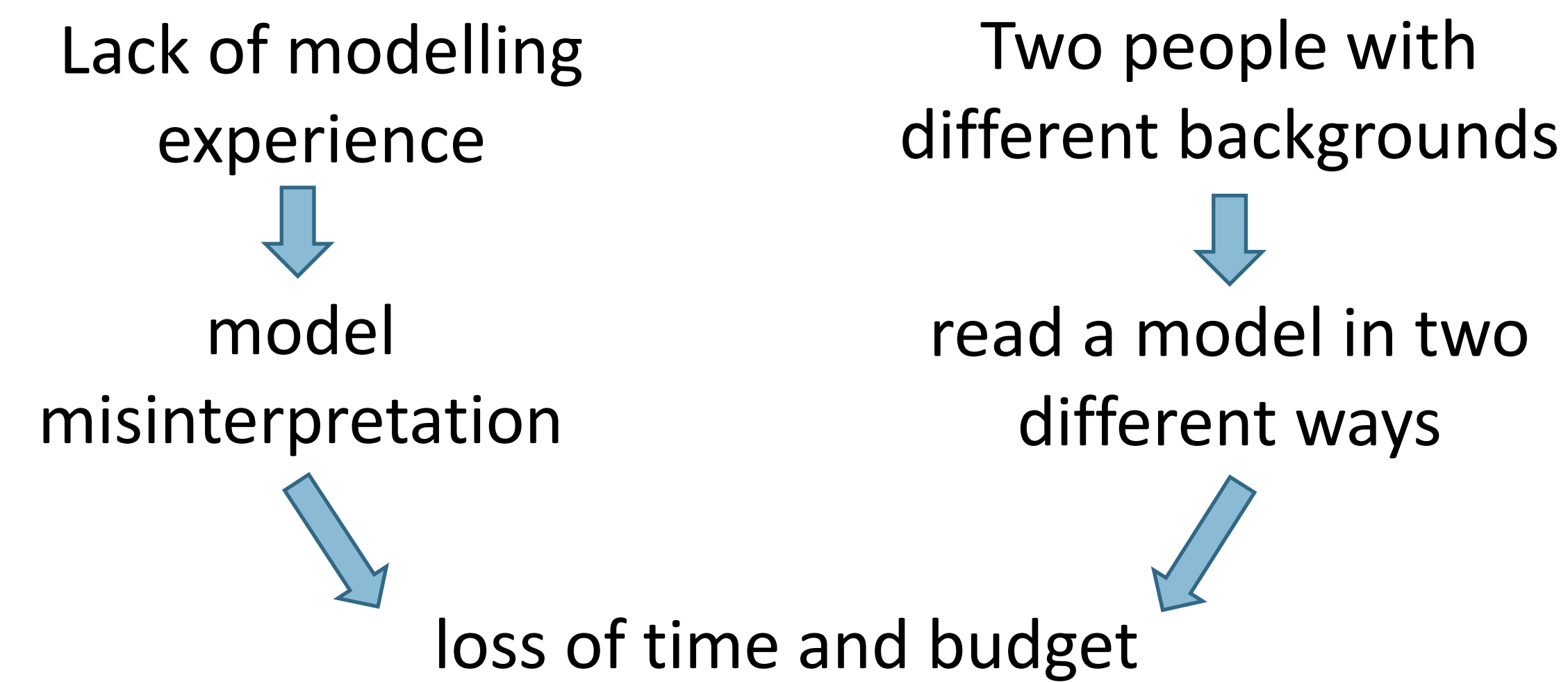
# Multi-stakeholder modeling with 3D and VR

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## PROBLEM STATEMENT

Not all stakeholders may fully understand modeling notations aspects.



Need to produce representational forms in order to:

- achieve a common understanding
- increase a pragmatic quality of the models

## GOALS AND OBJECTIVES

The paper proposes to use VR to navigate in 3D representation of the model and hence improve the perceptivity.

**Goal:** assess possible visual characteristics that can be added to MERODE notation and compare its 3D representation in VR with those of 2D to assess its advantages and disadvantages

**Objectives:**

1. Investigate the work related to the visual representation of modeling notations and, in particular, 3D representation in VR
2. Choose a research methodology and develop and assess a design concept for 3D diagrams representation
3. Develop a prototype of a model using Unity and Blender software
4. Conduct an experiment to test a prototype in order to compare a performance of 2D and 3D models
5. Process and analyze the experiment results
6. Interpret the finding of the research

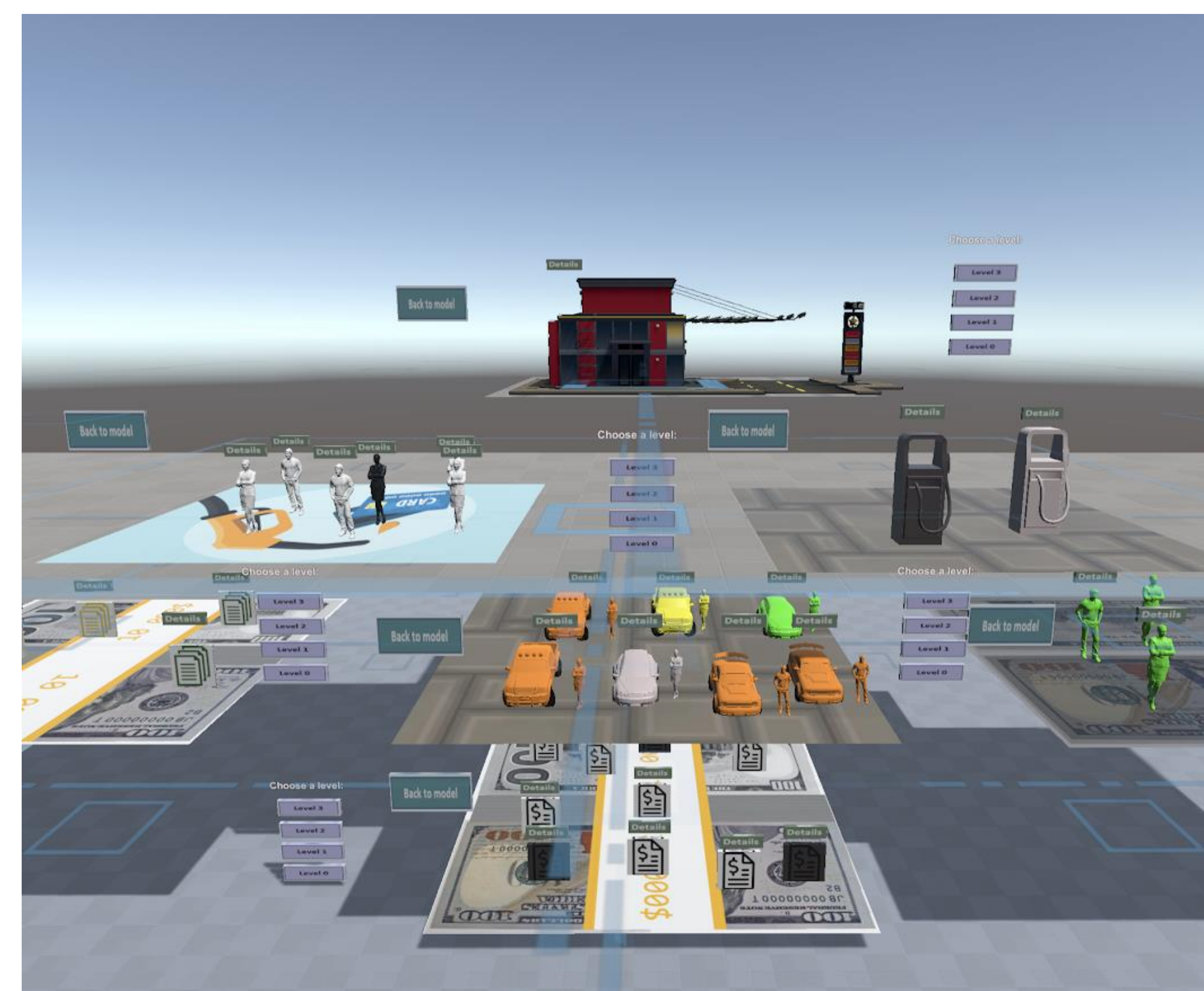
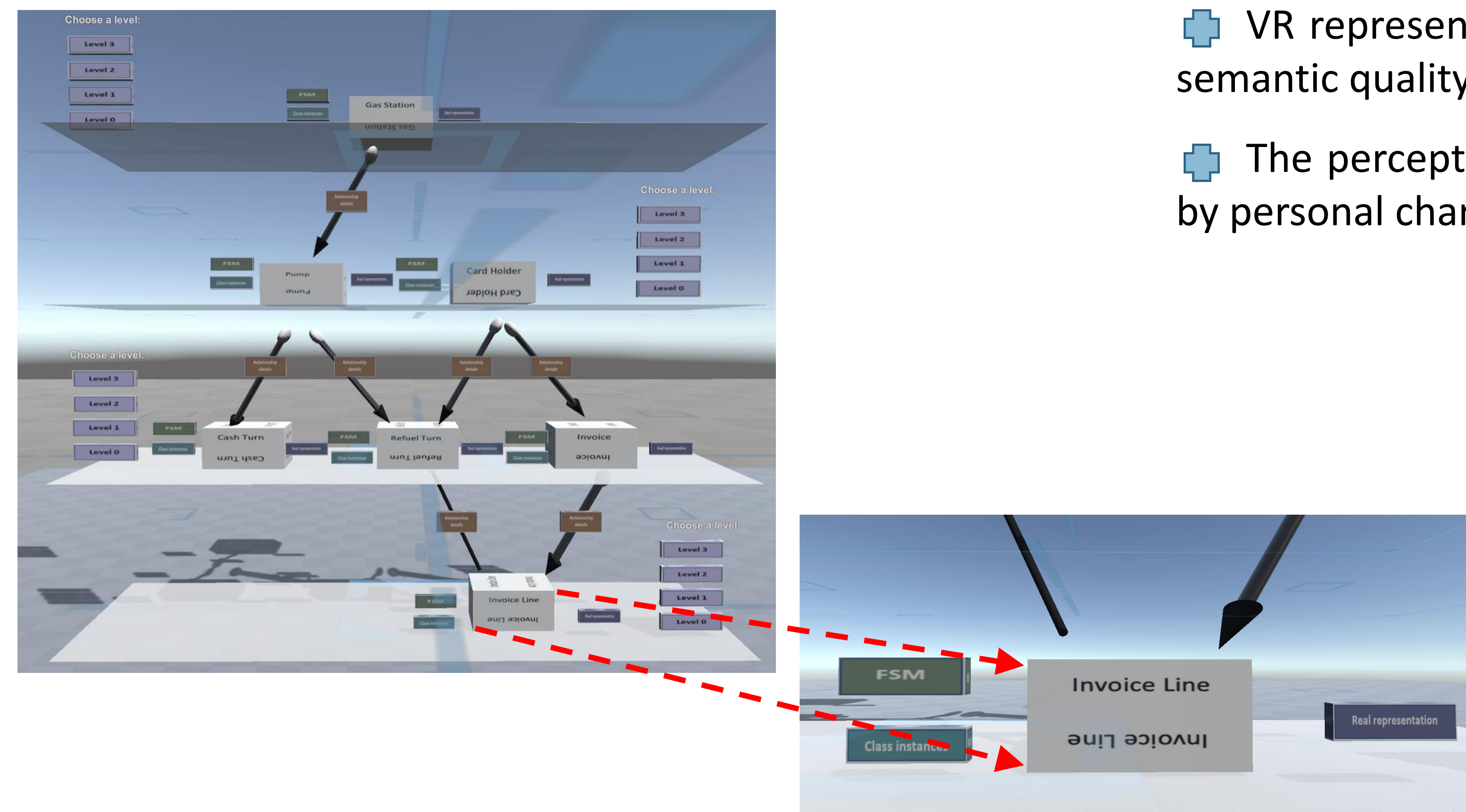
## METHODOLOGY

The design science framework is used as the base for the methodology in the study.

**Artifact:** The VR model prototype consisted of :

- EDG (Existence Dependency Graph) model
- Instances model.

A user can navigate both within the models and between them. Interaction is realised by the means of pointers and teleportation. Prototype includes buttons, text, planes and 3D objects.



## EXPERIMENT

Nine people with different backgrounds, VR and IT experience and education

Questions on the model in MERODE notation in 2D (on paper) and in 3D (in a VR environment).

## RESULTS

Validated hypothesis:

- ✚ VR representation improves the understanding of the modeling notation (MERODE).
- ✚ VR representation improves the readers ability to assess the semantic quality of a model (using MERODE notation)
- ✚ The perceptions of paper-based and VR models are affected by personal characteristics

How much 3D score differs from 2D score (in percentage)

VR Experience

Yes	40%	4%
No	55%	5%
	Low	High
	Modelling Experience	

## FUTURE RESEARCH

The research can be further expanded in the following ways:

- The prototype can be improved and deployed in production to allow modelers to create and read 3D conceptual models in VR
- More visual characteristics can be examined and added to the notation in order to enhance its quality