

# Teaching Requirements Engineering with Virtual Stakeholders without Software Engineering Knowledge

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- Requirements engineering important to success of software engineering projects
- SE students tend to be **solution oriented** but not **problem oriented**
- SE students **not sensed** to importance of RE
- Teaching RE successfully requires a **realistic experience** to students
- Experience the need for RE methods by **experiencing the problems** these methods try to solve first hand

- What is a realistic experience?
  1. **semantic gap** during **elicitation (G1)**
  2. **consistency issues** when **synthesizing** information gathered during an interview (**G2**)
  3. **usual problems** when **validating** requirements due to inappropriate presentations (**G3**)
- How to create a realistic experience?
  1. **realistic stakeholders** with **real needs**
  2. **realistic sessions** (elicitation, specification, validation)
  3. **Authentic environment**

- What do we need for a realistic experience?
- Real stakeholders form real companies
  - Not feasible in teaching RE because they have **real needs** and, thus, want **real values**
  - Not replicable!
- Students without SE knowledge as **virtual stakeholders?**

	<b>PRO</b>	<b>CONTRA</b>
	uncomplicated	no needs
	easy to motivate	no stakes in results
	no SE experts	no authenticity
	replicable	

Hypothesis: teaching RE successfully with moderate costs and efforts by employing virtual stakeholders without SE knowledge

# Agenda

1. Preparing Virtual Stakeholders
2. Teaching Requirements Engineering
3. Evaluation
4. Lessons Learned

# Preparing Virtual Stakeholders

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# Preparing Virtual Stakeholders

- We need **multiple** virtual stakeholders which
  1. have the same needs
  2. are authentic -- can play a role convincing
- Casted 9 out of 200 non-faculty students to enact as virtual stakeholder for 36 SE students
- Conducted a 3 hours **preparation session** with all virtual stakeholders:
  1. briefly explain RE and our goals
  2. explaining the case study (online supermarket)
  3. interactive development of scenarios of their role as stakeholder

# Teaching Requirements Engineering

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- Teaching RE embedded into a SE course
  - SE students are 2nd semester undergraduates
- Implementation
  - **Lecture:** modeling software systems with UML
  - **Project:** modeling real-world scenarios
- Current issues
  - Predefined assignment
  - No elicitation and validation sessions

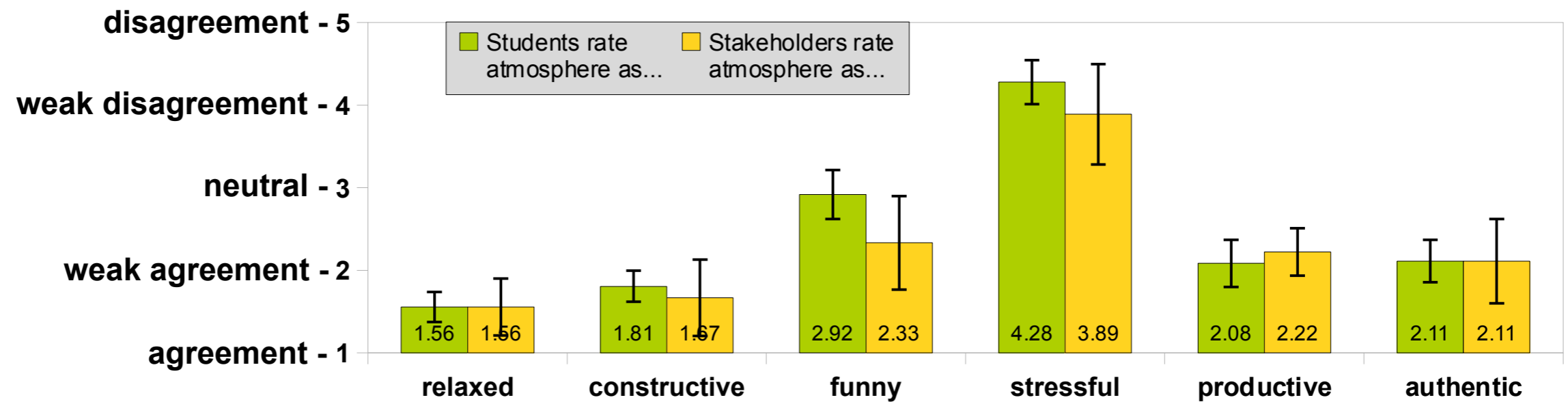
- Integrated explicit requirements **elicitation**, **specification** and **validation** sessions into the project
- “... predefined assignment is incomplete ... one role of the client’s company was forgotten”
- 4 students per project group (9 groups) have participated in the sessions
  - 1h elicitation
  - 2h specification
  - 1h validation

# Evaluation

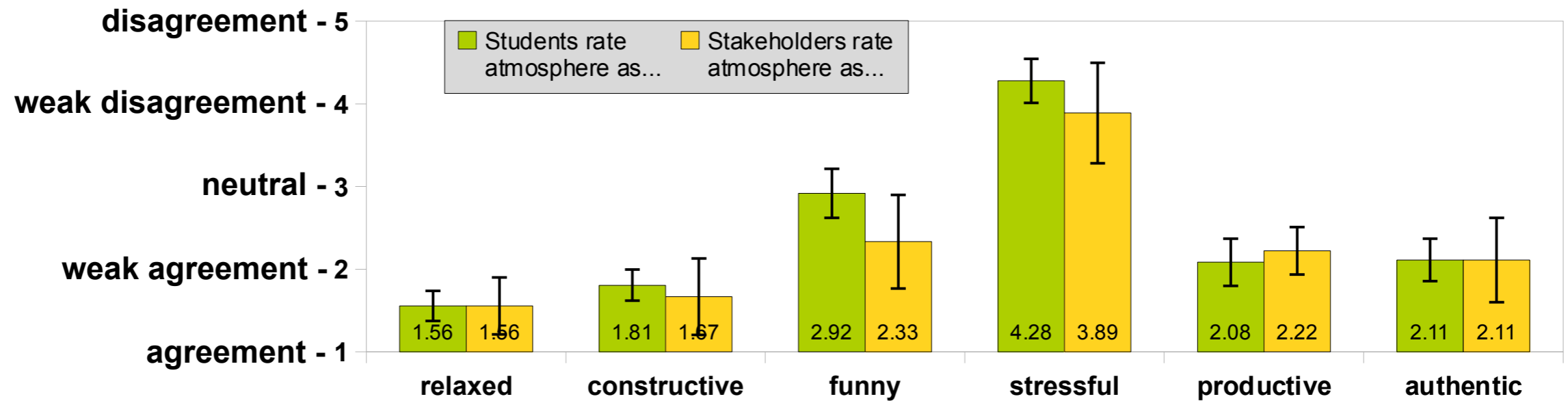
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- Data foundation
  - Questionnaires after each part of a session (for students and stakeholders)
  - Visual recordings of each session
- Efforts and costs?
  - Low efforts because ...
    - ... students are very flexible
    - ... one preparation session for all virtual stakeholders
  - Whole setup was possible with a funding of 1.200 €

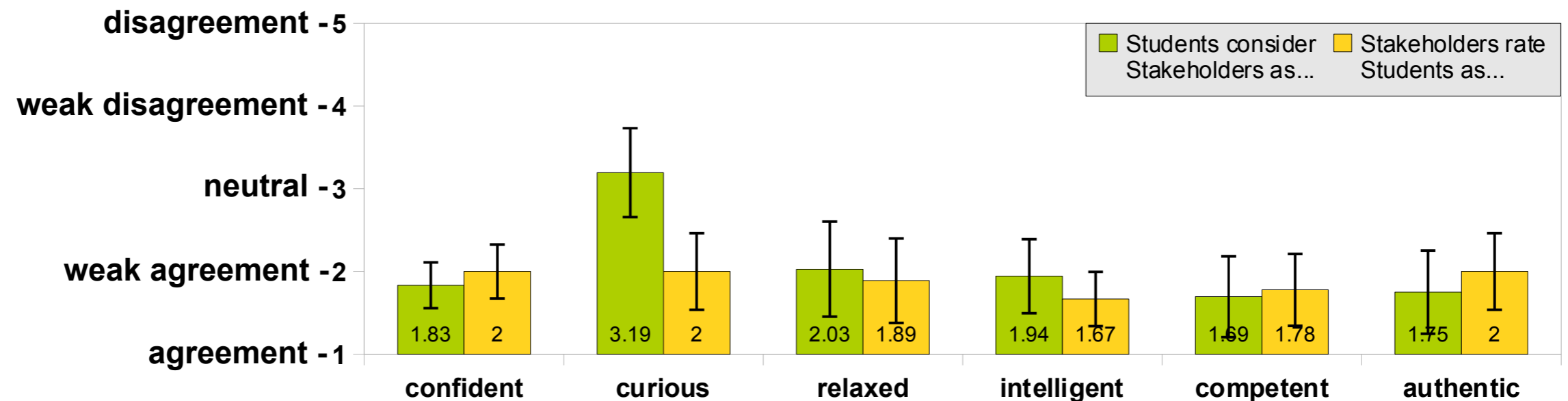
- Atmosphere



## • Atmosphere



## • Mutual assessment



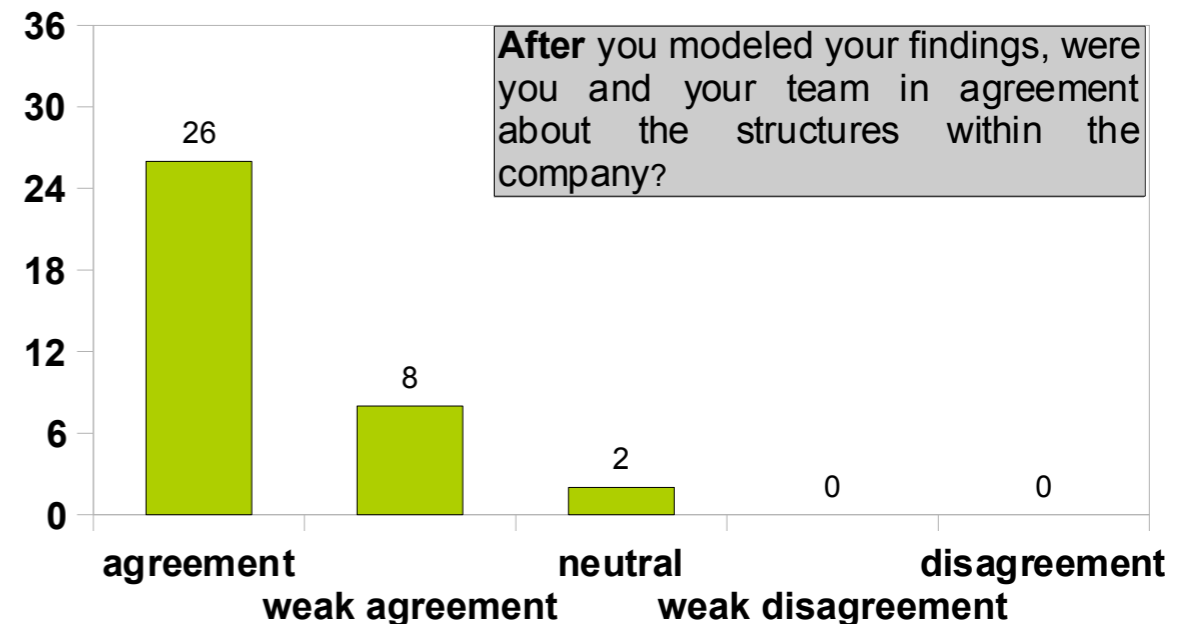
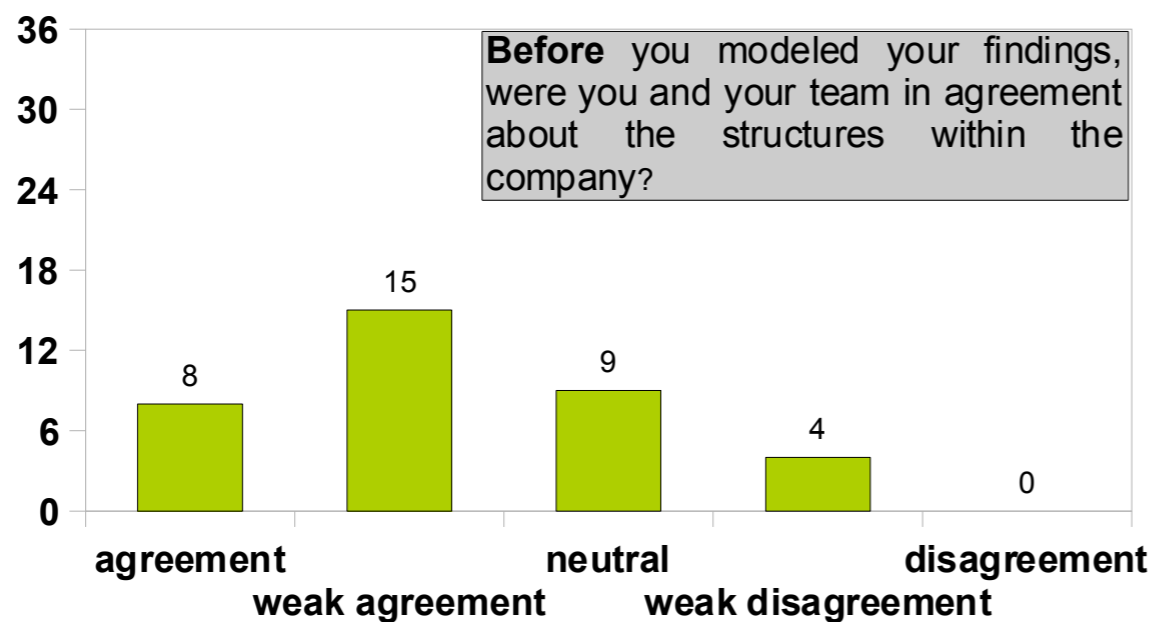
- Did students experience a **semantic gap** during **elicitation (G1)**?
- Students that were „leading“ the interview had to reformulate their questions several times
- All stakeholders perceived that questions were asked multiple times
- Not recognized by students just writing down

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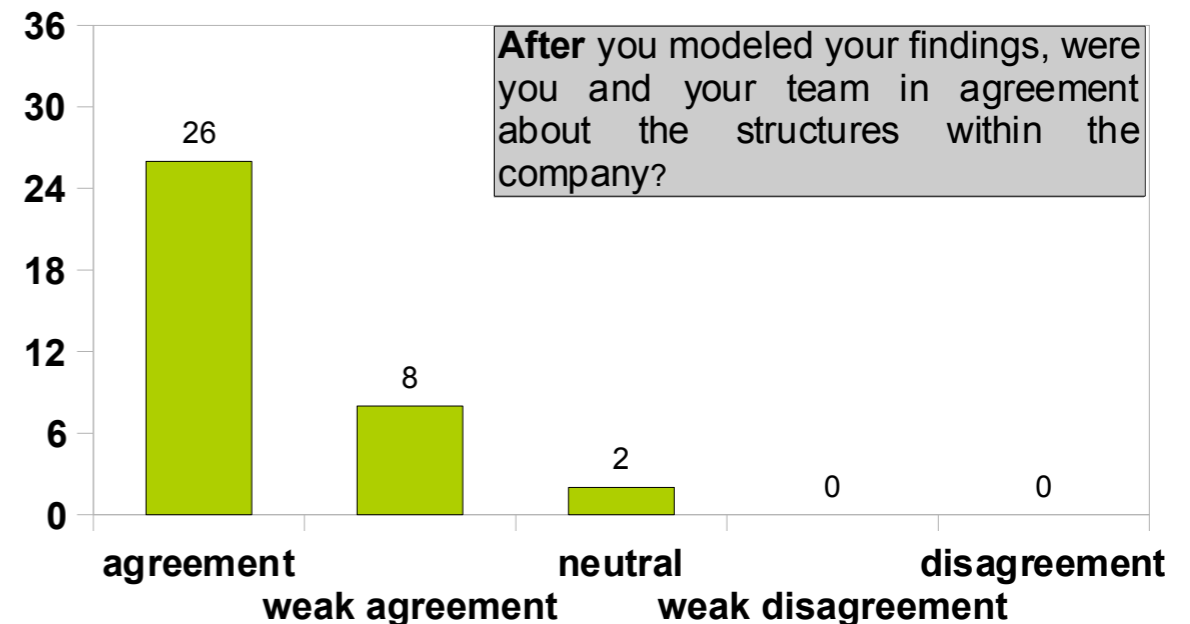
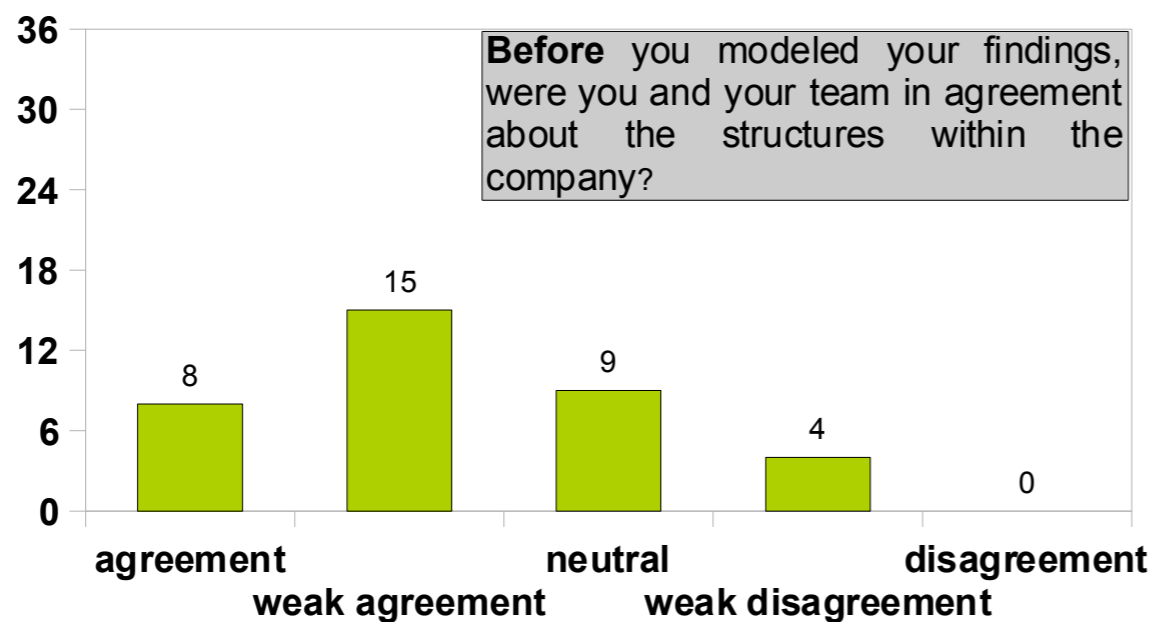
**Result:** at least several students experienced a semantic gap



- Did students experience **consistency issues** when **synthesizing** information gathered during an interview (G2)?
- Perceived a process of agreement when talking about their inconsistent individual views



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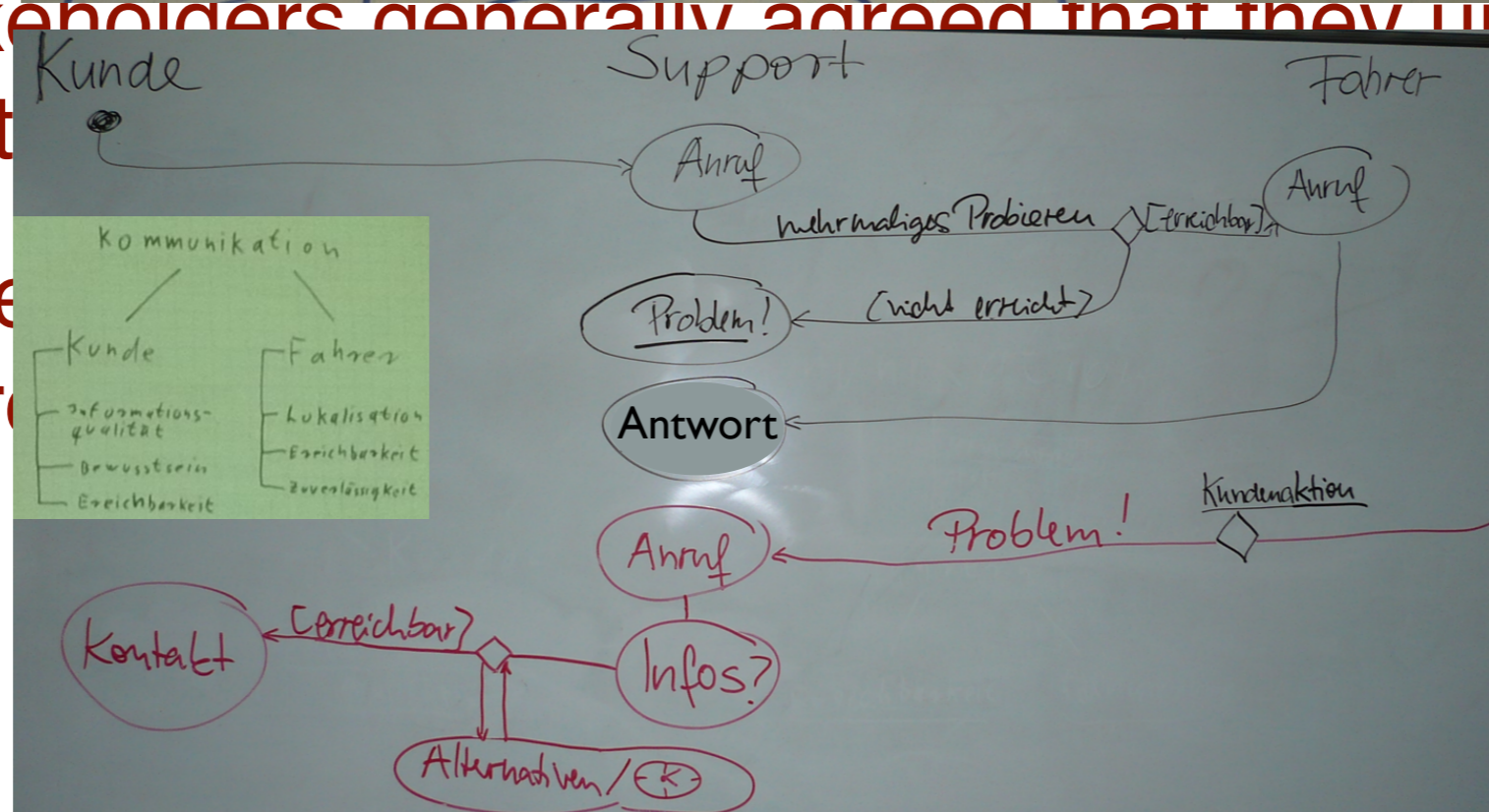
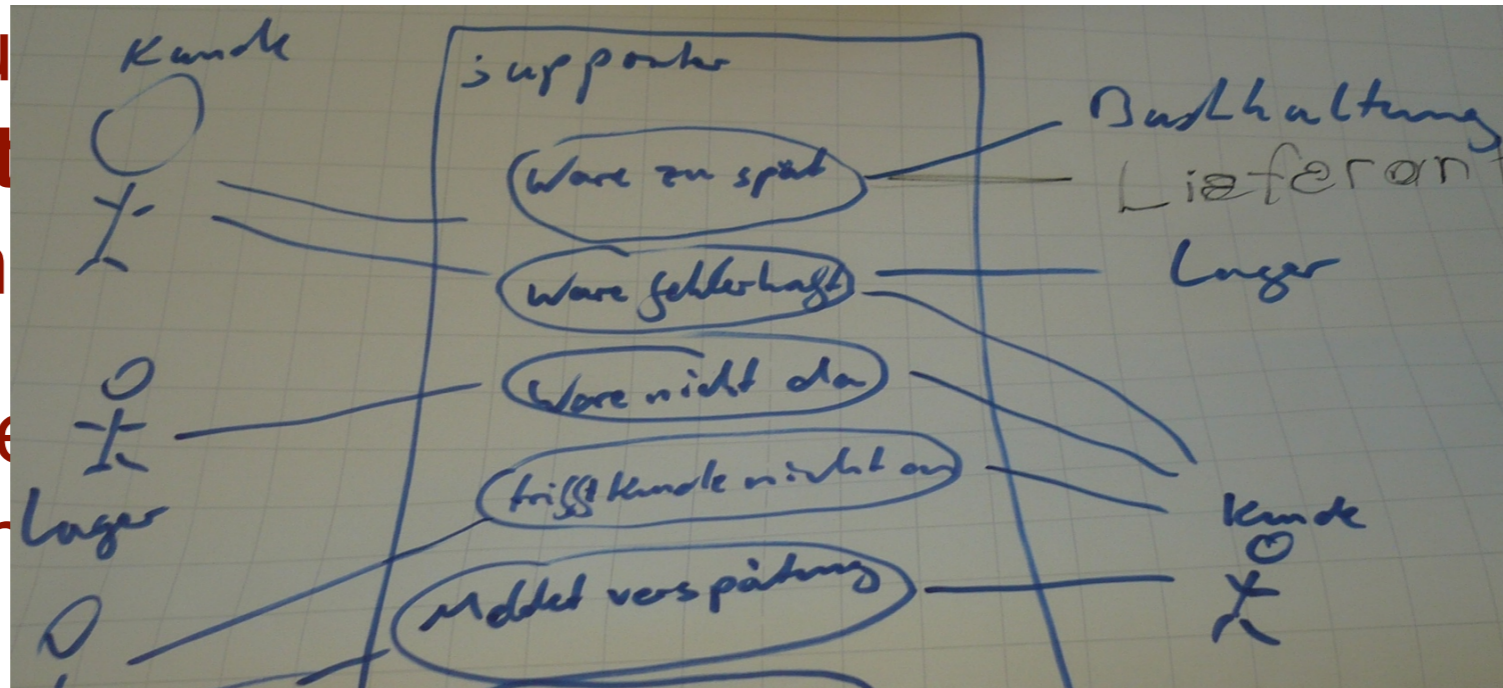


**Result:** consistency issues were experienced by the students

- Did students experience **usual problems** when **validating** requirements because of inappropriate presentations (**G3**)?
- Students did not think that their formal models were technical (UML)
- Stakeholders generally agreed that they understood what the students presented
- Depends highly on individual capacity of stakeholders to provide critical feedback

# Evaluation

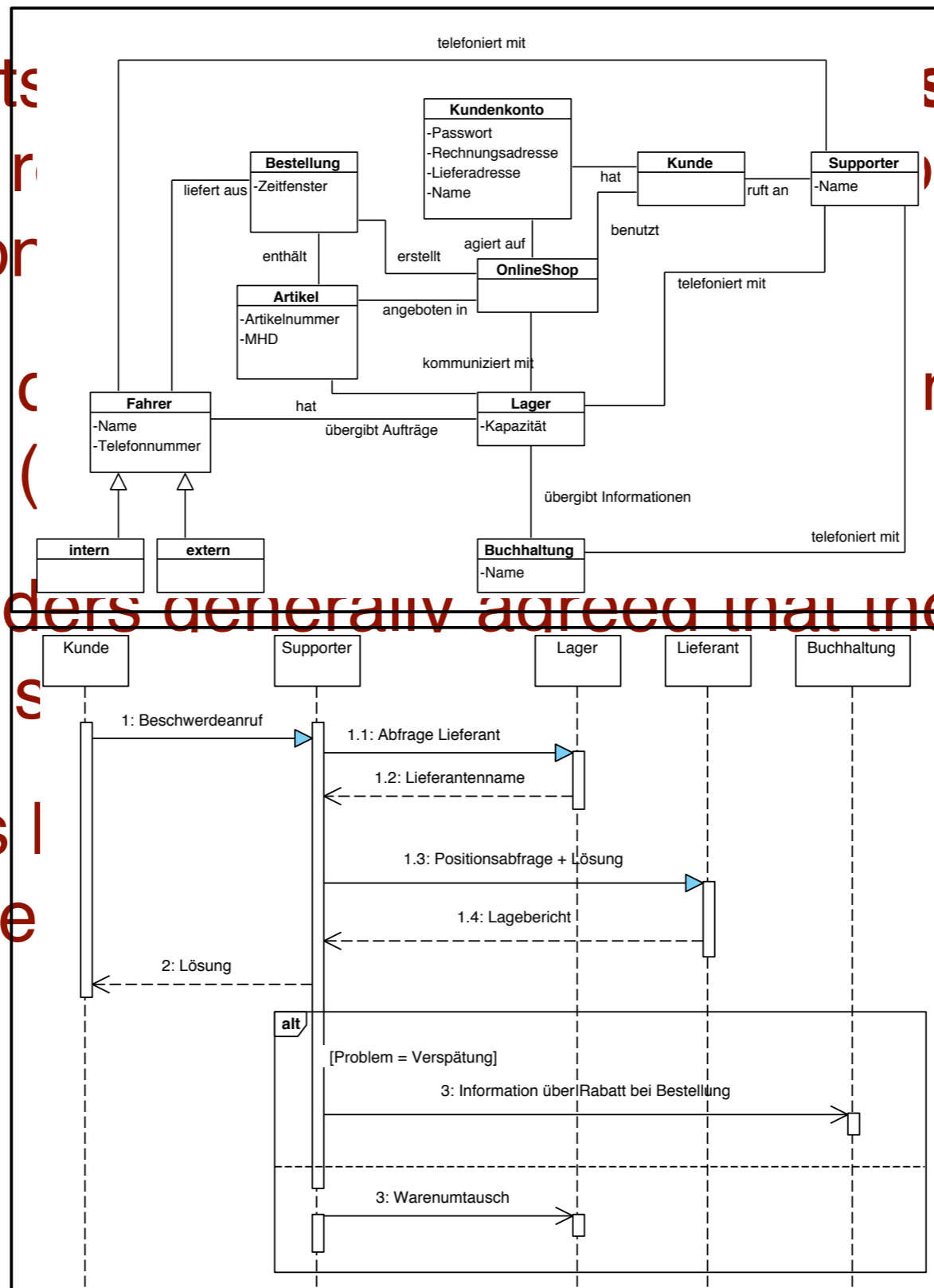
- Did students validate their requirements presentation?
- Student technical models were
- Stakeholders generally agreed that they understood what
- Dependencies to provide



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# Evaluation

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s when appropriate models were understood of stakeholders

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**Result:** we could not clearly observe that students indeed experienced problems when validating requirements

# Lessons learned

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# Lessons learned

- Give feedback to students immediately
  - What has happened and what is important
  - They might miss the point
- More iterations of the sessions with more time in-between
- More time for preparing virtual stakeholders
- Introduce virtual stakeholders with different roles in a company
- ... <many more>