

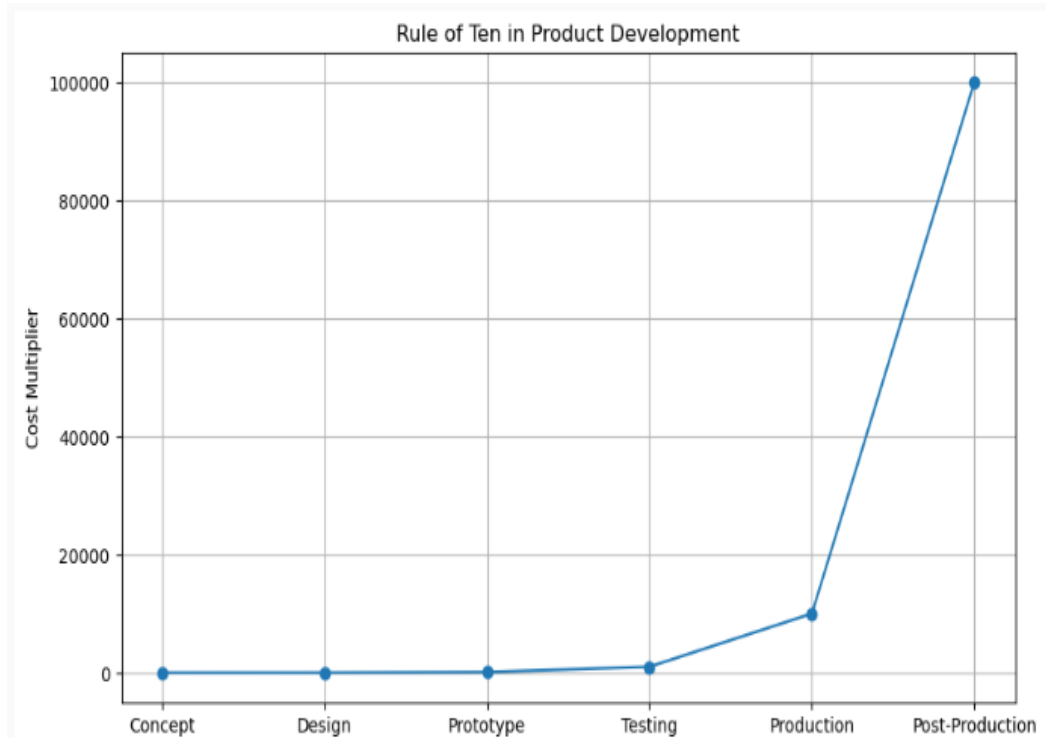
Quality of Requirements

Part I: Overview and focus on the aspect language quality

Know problem: Most requirements are hidden beneath the surface



Troubleshooting Costs



Rule of Ten:

$$C_{fix} = C_{base} \times 10_{nphases}$$

Where *nphases* is the number of phases between error creation and correction.

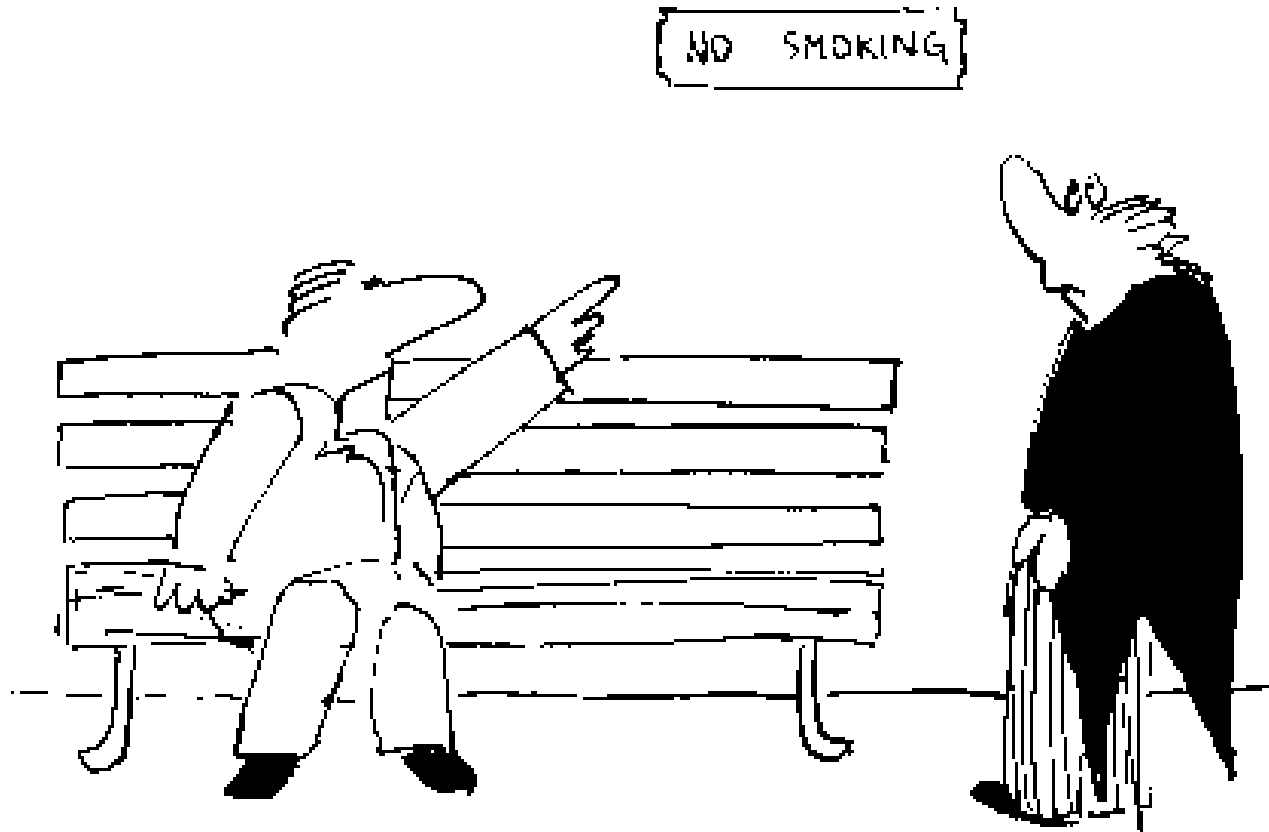
Quality from various angles



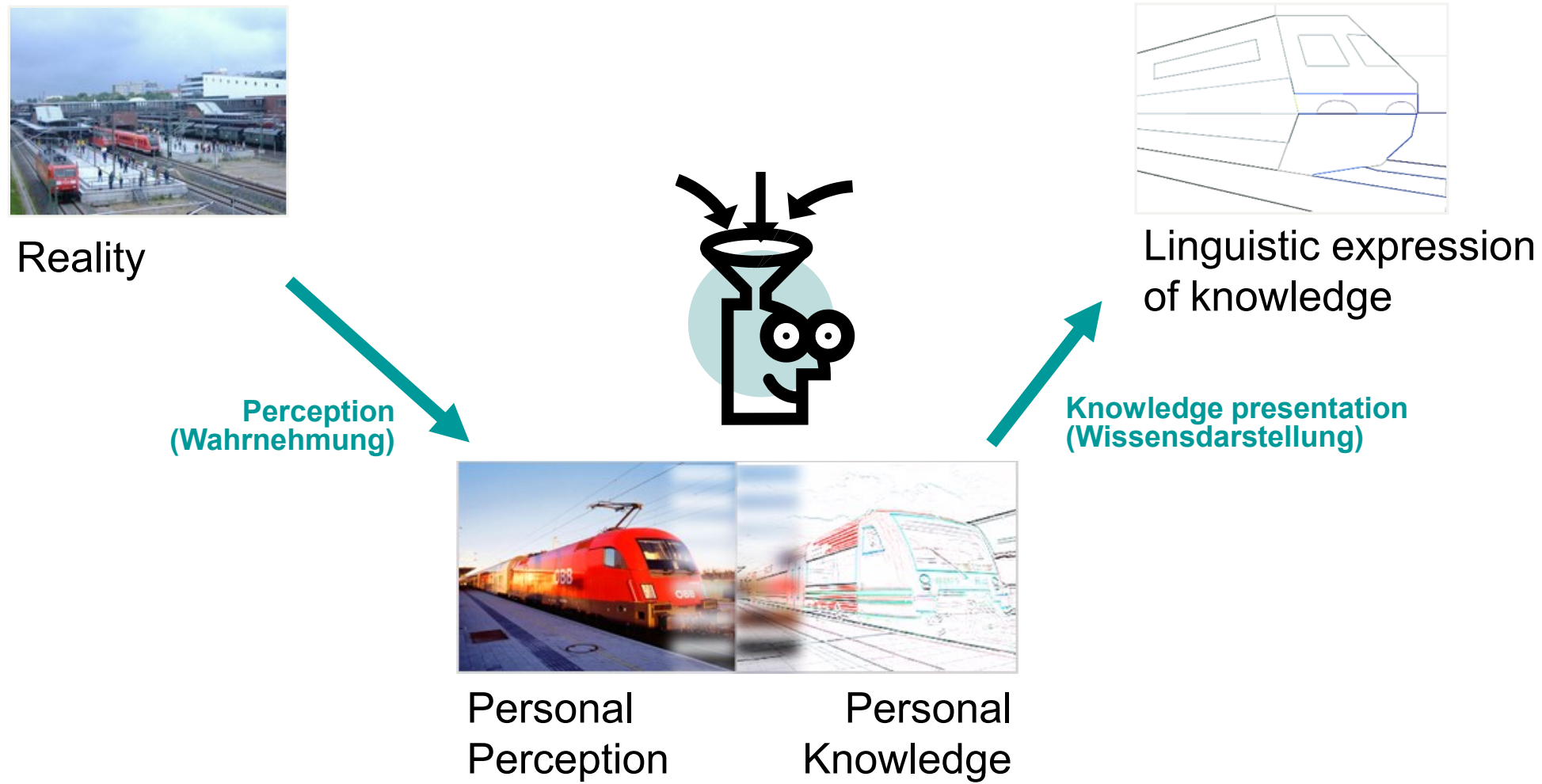
Quality from various angles



Really understanding each other is the exception rather than the rule

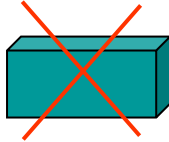


Representation transformations (Darstellungstransformationen)

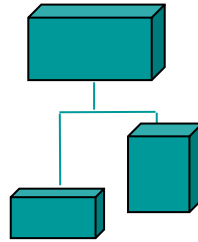


Representation transformations (Darstellungstransformationen)

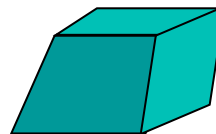
- Deletion



- Generalization



- Distortion (Verzerrung)



see Bandler and Grinder

1. Unambiguous – avoiding ambiguous terms, and so vague statements

| Modal verbs | Universal qualifiers | Filler | Universal quantifiers | Vague place statements | Vague time statements |
|-------------|----------------------|-----------|-----------------------|------------------------|-----------------------|
| should | improved | however | absolute | here | circa |
| could | better | just | usually | there | in the future |
| might | faster | even | generally | anywhere | soon |
| may | superior | certainly | basically | nowhere | many times |
| ought to | robust | surely | Exquisite | ahead | at times |
| | good | of course | always | behind | meanwhile |
| | sufficient | but | never | | shortly after |
| | efficiently | | none | | sometimes |
| | optimized | | all | | |
| | acceptable | | normally | | |
| | practicable | | ideally | | |
| | user-friendly | | fast | | |

1. Unambiguous – avoiding ambiguous terms, and so vague statements - in German

| Verallgemeinerung | Ungenaue Ortsangaben | Ungenaue Zeitangaben | Modalverben | Eigenschaftswörter | Füllwörter |
|-------------------|----------------------|----------------------|-------------|---------------------|-------------|
| absolut | außen | anfangs | Darf | beste | aber |
| meistens | Innen | aktuell | Dürfen | besser | halt |
| Im Allgemeinen | Hier | bisweilen | Kann | manche | doch |
| Generell | Dort | ca. | Können | Schnell | durchaus |
| grundsätzlich | Da | damals | könnte | Schlecht | eben |
| äußerst | Links | währenddessen | Möchte | Gut | denn |
| außerordentlich | Rechts | demnächst | Mögen | enorm | ehedem |
| immer | Vorne/vor | bald | Müsste | Schwer | bestimmt |
| bei weitem | Hinter/Hinter | ab und zu | | schön | Sicher |
| jederzeit | Überall | beinahe | | leicht | sicherlich |
| Besonders | nirgends | danach | | langsam | |
| Nie/stets | Irgendwo | einmal | | Groß / klein | hoffentlich |
| etliche | nirgends | manchmal/häufig | | Einfach / schwierig | |

2. Clear harmonized sentence structure: User Story Format

How does the user story format look like

As a **{ROLE}**

I can / want to **{ACTIVITY}**

so that **{BENEFIT / VALUE}**

The User Story's goal describes what the user wants to achieve.

It is written in user's language and from user's perspective, not from system's perspective

Example:

As the system operator, I can see on the device without any activity why my protective device has tripped.

Why does this format appear?

- Focus on customer value
- Enhance communication between PRM and R&D
- Enable quick feedback cycles
- Enables value-driven development

Benefits in Agile Developments

- Better prioritization possible
- Easier effort estimation
- Clear Definition of Done
- Improved iteration planning

Hints for usage of the Role-Activity-Benefit-Format

Take it simply as starter sentence of your requirement.

Write it as if the system already existed.
Present tense

You can reuse the format for test cases

User Story Format

In case of a condition, put it at the beginning. When ...

If there is not enough space for that long sentence, create a title like <Verb as noun + goal> and the whole sentence on top of the description.

Example: Creating new users

This User Story Format can be used for all level of requirements

3. Defined Terms

- One term = One meaning
- Clear definitions
- Elimination of synonyms

↓ Reduced Misunderstandings

↑ Communication Efficiency

↑ Project Clarity

↑ Documentation Quality

The requirements specification looks as if it had been written by one author.

A Glossary can be helpful.

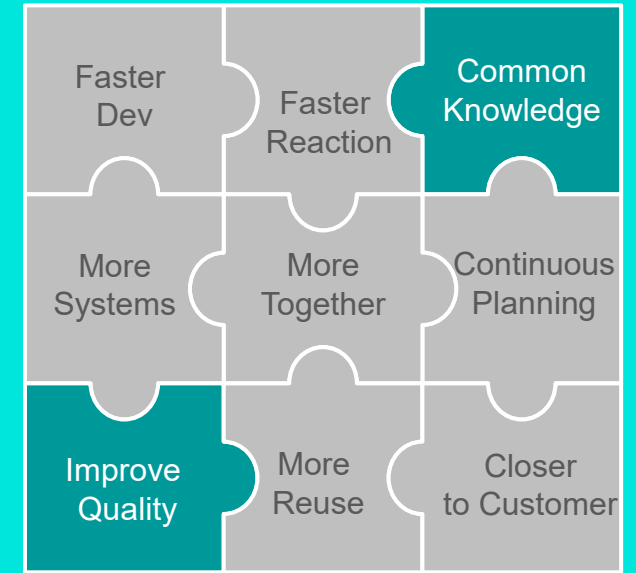
4. Other rules

- Avoid passive voice
- Double check if plural is needed
- Avoid “Not”
- “And” and “Or” can be unclear
- Avoid “etc.”
- Avoid “/”

Ambiguity_{Terms} → 0

Short Checklist – Part I

- ☐ Pattern used: As a {ROLE}, I can
 {ACTIVITY}, so that {BENEFIT / VALUE}
- ☐ Present Tense used
- ☐ The sentence is simple
- ☐ Terms are defined
- ☐ No vague qualifiers or quantifiers



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Q&A