

Class 2006/2007

Experimentation

- Frequently asked questions

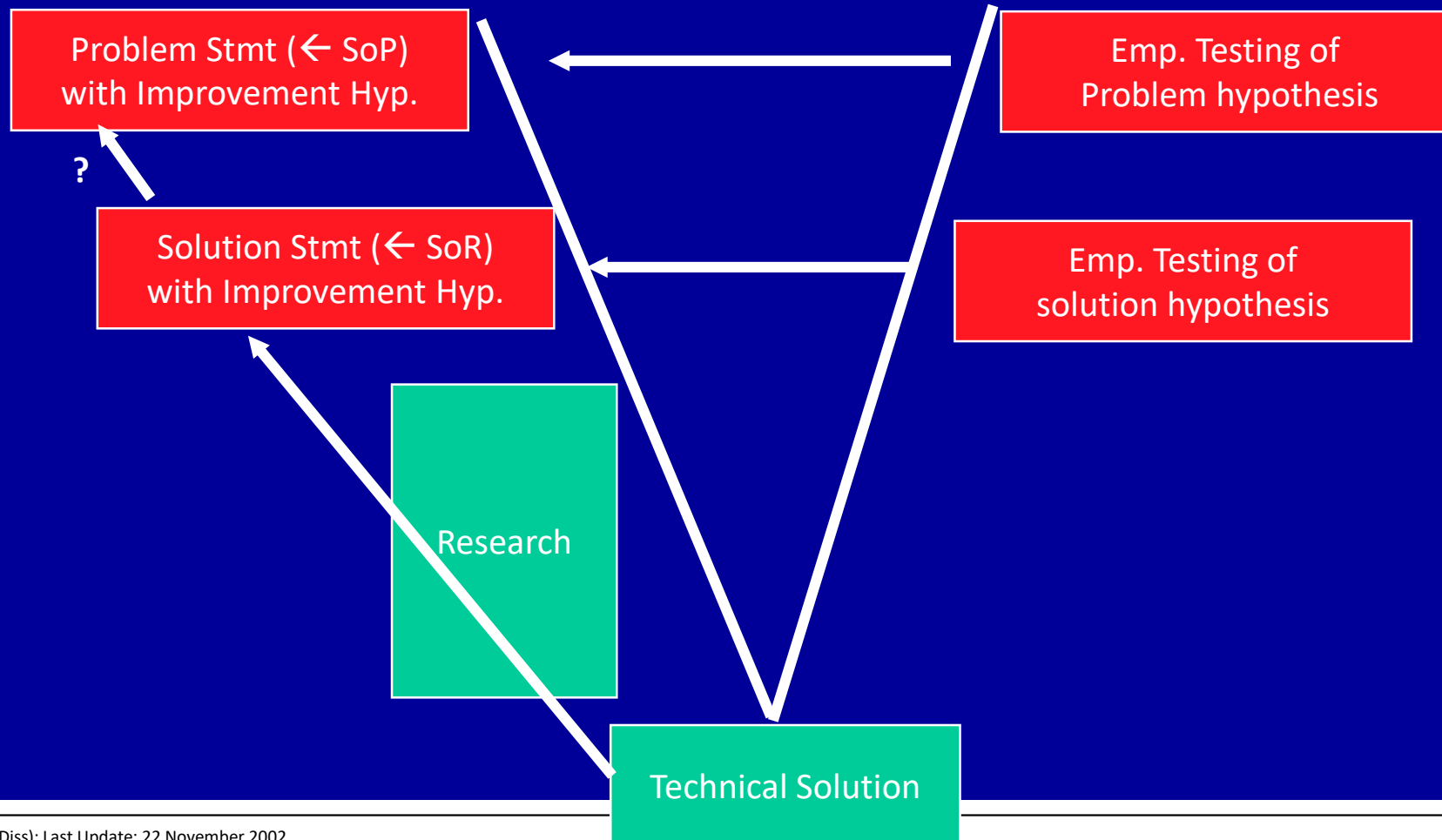
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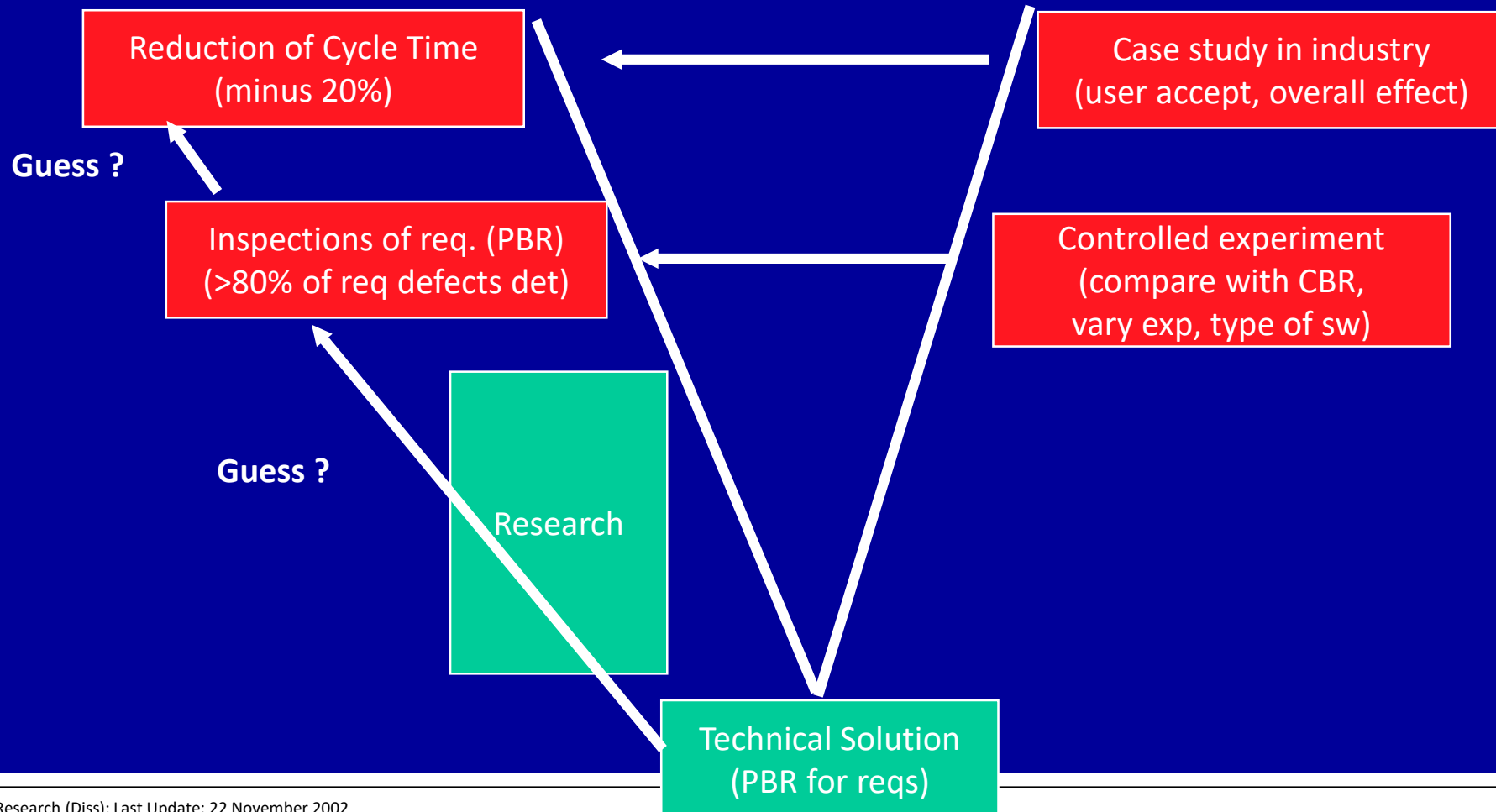
Experimentation

- FAQ „What is the purpose of experimentation as part of my MS/PhD thesis?“



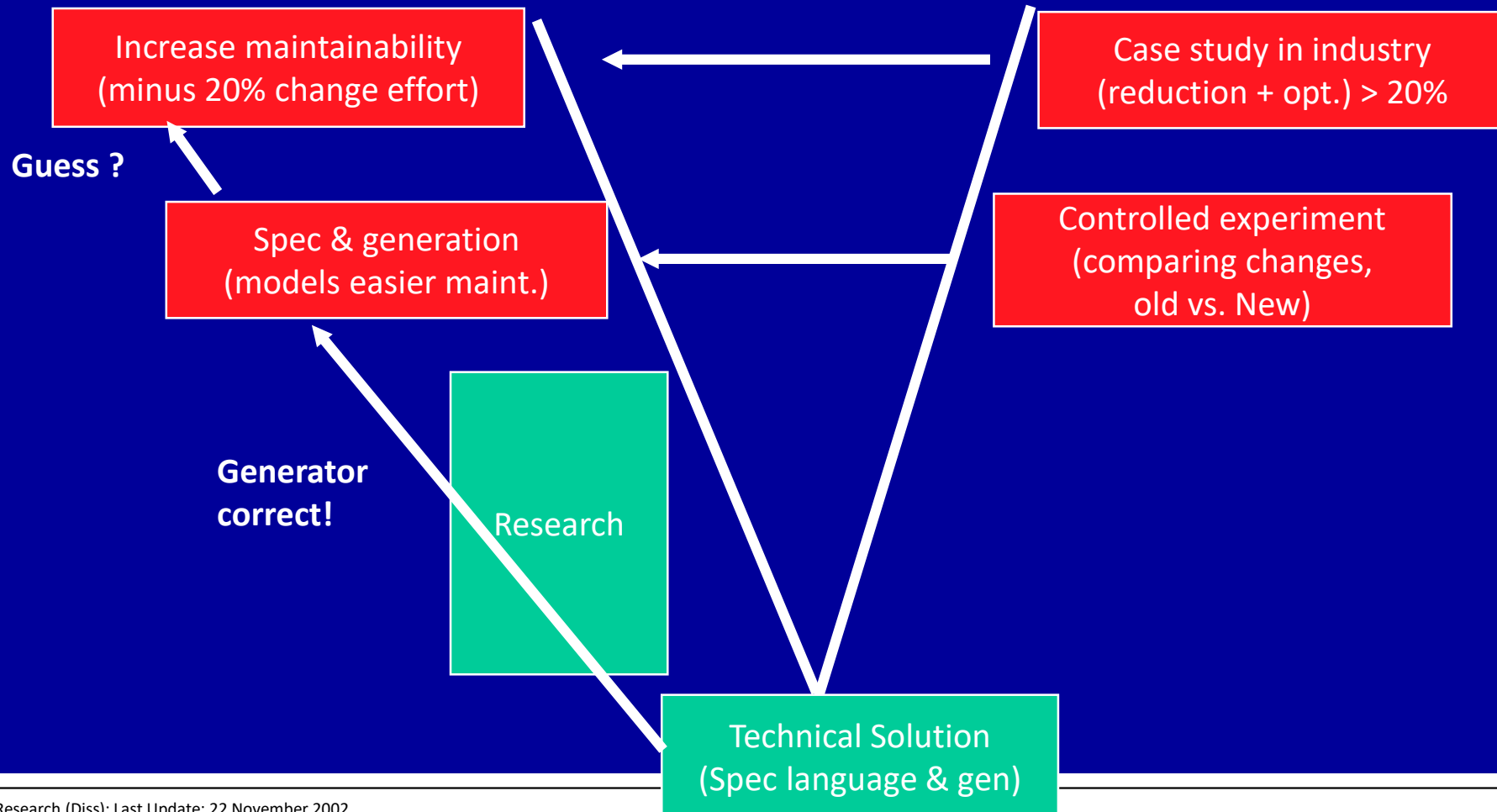
Experimentation

- FAQ „What is the purpose of experimentation as part of my MS/PhD thesis?“



Experimentation

- FAQ „What is the purpose of experimentation as part of my PhD thesis?“



Experimentation

- **FAQ: Why experimentation?**
- **Answer: Scientific validation (where formal verification is not possible) of scientific contributions wrt. hypotheses!**

- **FAQ: Do we always need some form of experimentation?**
- **Answer: YES, even formal methods where testing of solution hypothesis can be done analytically, the contribution to the problem solution hypothesis is non-deterministic (due to humans)!**



Experimentation

- **FAQ: Which forms of experimentation exist?**
- **Answer: Multiple forms**
 - **Controlled experiments (quantitative)**
 - Object is small
 - Subjects assigned randomly
 - Independent variables (context) is explicitly controlled or fixed
 - Cause-effect conclusions possible
 - Cost is high
 - **Case studies (quantitative & qualitative)**
 - Objects can be large
 - Subjects pre-assigned (in projects)
 - Independent variables not under control
 - Cause—effect conclusions impossible (require high rate of repetition)
 - Cost is low
 - **Surveys (quantitative & qualitative)**
 - Typically retrospective



Experimentation

- **FAQ: What is the goal of an experiment?**
- **Answer: Gain insights, not confirm my expectation! This requires to avoid biases as much as possible!**



Experimentation

- **FAQ: How do we avoid bias?**
- **Answer:**
 - **Important to avoid biases**
 - I train my method better than the old one!
 - I provide incentives, expectations
 - **Important to have experimental hypotheses and designs checked by 3rd party (prior to execution)**
 - @ IESE: Use Competence Center Experimentation as Clearing House!
 - **Important to have data interpretation checked by 3rd party to avoid over-interpretation!**
 - @ IESE: dito!



Experimentation

- **FAQ: What constitutes a sound experiment?**
- **Answer:**
 - **Precise hypothesis**
 - **Appropriate design (necessary control, avoidance of bias)**
 - **Appropriate Data analysis & interpretation**
 - **Partially confirmed results (& follow-up hypotheses)**
 - **Partially rejected results (& cause analysis & follow-up hypotheses)**



Experimentation

- **FAQ: Where can I learn the basics?**
- **Answer: Lecture „Empirical Model Building & Methods“ (Rombach, TU KL, Winter Semester)**

