Difficulty Factors of Obtaining Access for Empirical Studies in Industry

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Motivation

• **Empirical Studies in Industry:**
  – We have methodological knowledge about *study design, data collection and analysis*
  – But: *Getting access* to a suitable research context (e.g. permission to collect data) is difficult.

• **Idea:** Provide a “checklist”
  – of difficulties from *company’s perspective*
  – to help *choosing* a suitable study design
Our Research Question

“What factors influence the difficulty of obtaining access to a suitable industrial context?”

**Difficult**, rather than **effort**
- High effort does not guarantee overcoming difficulty
Structure of this talk

1. Overview: The Difficulty Factors

2. Validation:
   Two cases from our own research
   – Pair Programming
   – Agile Offsharing
The Difficulty Factors

Three categories:

1. **Scope Factors**
   - Number/diversity of participants, effort, time extent, loss of confidentiality, ...

2. **Problematic Intervention Effects**
   - Distraction/complication, need to learn, schedule/quality risk, ...

3. **Helpful Intervention Effects**
   - Insights, capability/tooling improvement, image benefits, ...

*see paper for details*
Case 1: Pair Programming

• **Idea:** understand how pair programming works, describe behavioral (anti-)patterns
• GT-based qualitative analysis:
  – Voluntary in-vivo session recordings (screen, webcam, audio)
  – Reflective discussion the day after the recording
  – In-depth analysis during the following months
Case 2: Agile Offshoring

- **Idea**: Employ distributed pair programming (DPP) as a regular practice for distributed teams
  - Feel as “one team”
  - Avoid requirements misunderstanding

- **Action-research mode**:
  - Accompany whole team for whole project duration, support decision-making
The Scope Factors

Numbers:
+ Only two participants

Loss of confidentiality:
- Screen recordings
+ Voluntary sessions

Technology constraints:
- DPP tool support for team’s IT ecosystem

Numbers:
- Whole team
Problematic Intervention Effects

Schedule & Quality risk, Need to learn:
+ little, work as usual

Schedule & Quality risk, Need to learn:
- Whole arrangement is new
- DPP tool and practice are new
Helpful Intervention Effects

Insights & Capability Improvement:
+ Reflective discussion the day after the recording

Insights & Capability Improvement:
+ Action Research mode

Additionally:
+ Having must-pay-for formats (workshops, consulting)
Case Comparison: *Actual* Difficulties

**Sometimes:**
- Distraction
- Loss of confidentiality

**Regularly:**
- Insights expected

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**So far:** 10 comp., 45+ rec.

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**Although:**
- Improved capability
- Little quality risk/distraction
- Paid tool development, would pay for workshop

**Still:**
- Schedule risk, #participants

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**So far:** None worked out yet
Conclusion

• “Difficulty Factors”: Taxonomy of
  – 6 scope factors
  – 5 problematic intervention effects
  – 7 helpful intervention (side-) effects

• Initial validation for two of our own research strands

• No quantification
  – The anti-difficulties need to outweigh the difficulties from the industry’s partner point of view

• Further work
  – Systematic application of the Factors during the design phase
  – Include Factors (i.e. their strength) in research articles?
  – Catalog of procedures for coping with each factor
Thank you!
Used Images

https://openclipart.org/detail/19011/world-map

http://www.iconarchive.com/show/windows-8-icons-by-icons8/Programming-Bug-icon.html

https://www.iconfinder.com/icons/111043/lock_open_icon
https://www.iconfinder.com/icons/1432/abc_chalkboard_edutainment_learn_package_school_icon
https://www.iconfinder.com/icons/298852/puzzle_icon
https://www.iconfinder.com/icons/134157/cashier_currency_dollar_money_icon
https://www.iconfinder.com/icons/465064/audio_information_media_multimedia_sound_speaker_volume_icon
https://www.iconfinder.com/icons/309064/browser_globe_international_internet_web_world_icon
Backup slides
Scope Factors

• Factors having to do with the size of the study

**Practitioner Effort**
  • The lesser the better

**Loss of Confidentiality**
  • No planned exposition
  • Mechanisms to minimize unplanned exposition

**Required Technology**
  • Two or more choices for each factor (e.g. IDE, programming language)

**Number of Participants**
  • Fewer people for longer time frames
  • Exception: five minute surveys

**Diversity of Roles**
  • Different roles might call for different ways of convincing them

**Time Extent**
  • Shorter time frames → fewer unexpected events to wreck schedule
Problematic Intervention Effects

- Factors influencing the company’s work in a problematic way (even if unplanned)

  **Schedule Risk**
  - Allow company to withdraw from study quickly without losing work

  **Quality Risk**
  - Any negative impact should be obvious early on and easy to fix

  **Distraction**
  - Non-invasive data collection
  - High degrees of voluntariness and informedness about research procedures

  **Complication**
  - Being flexible to work-around steps that are perceived as complications

  **Need to Learn**
  - Bring evidence for actual learning effort/possible enjoyment
Helpful Intervention Effects

- Factors influencing the company’s work in a good way

**Action Research Mode**
- Joint problem solving → company has more control
- Lower required level of competence (i.e. need to understand issues in advance)

**Must-pay-for Activities**
- Offer training/consulting → having a price as service quality proxy

**Capability Improvement Expected**
- Quantitative measurements of benefits
- Special case for technology-oriented partners: Tooling Improvement Expected

**Insights Expected**
- Emphasize various kinds of possible insights from study execution or study results

**Image Benefits**
- Being named as research partner, e.g. for hiring young talent

**Altruistic Benefits**