# Planning for the Unknown

## Lessons learned from ten months of non-participant exploratory observations in the industry

POLYTECHNIQUE MONTRÉAL

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# Industrial Context

- Large private Canadian telecom company (5000+ employees).
- Software development supports main business processes.
- Culture of control → Processes mainly waterfall-based.
- Nonetheless, company favors face-to-face communications.
  - multiple offices close downtown,
  - teams collocated as much as possible.

# Project Studied

- Development of a work order management system.
  - mobile support, city routes, database management, clients' billing, etc.
- Many code dependencies.
  - need to contact many colleagues, inside and outside the company.
- Software development since the '70s.
  - large amount of legacy code.
- Team with extensive software development experience, but who where new to the company.
- Observation of the last ten months of a two year project.
  - late development, testing, deployment.

# Methodology – Choosing the type of study

- First contact with the company.
- Major issues, in order of appearance:
  1. Champions identification through personal contacts with insiders.
  2. Official presentation of the project to the upper management.
  3. Management agreement on a strict condition of minimal interference.
     - non-participant approach chosen.
  4. Access limited to weekly one-hour all-hands status meetings.
     - meeting content unknown → exploratory approach chosen.
  5. Requests for access to artefacts ignored or denied.

- Pretty standard issues, already reported in the literature…

# State of the literature

- Many lessons learned:
  - Wohlin's ten challenges (2013), Witschey et al.'s nine challenges (2013), etc.
- Many best practices:
  - Grünbacher and Rabiser's success factors (2013), Eldh's considerations (2013), Etc.
- Many publications:
  - "Empirical Software Engineering", "Workshop on Conducting Empirical Studies in Industry", etc.
- We think it is time to start thinking about **process templates** for empirical studies in software engineering.

A process template example :

# Non-participant Exploratory Study Process

## I. Planning activities.

1. Find champion(s):
   - ➢ To sell the study to management, to support during the study.
2. Build a preliminary study design:
   - ➢ Through discussions with the champions.
3. Sell the study to upper management:
   - ➢ The better you sell, the more you can do.
4. Plan alternatives:
   - ➢ The data might not be what you expect, or might be unavailable.
5. Choose the right project:
   - ➢ In a stable, non-rushing phase.

A process template example :

# Non-participant Exploratory Study Process

## II. Study activities.

1. Collect data:
   - Collect as much as possible until it is clear what will be worthwhile.
2. Perform preliminary analyzes:
   - Check if the data collected is adequate.
     a. Identify recurring occurrences.
     b. Evaluate their potential impacts.
     c. Try to match these occurrences in the literature.
     d. Report the most frequent occurrences with largest potential impact.
3. Build up trust and respect:
   - Provide feedbacks to the team with reports.
4. Correct the study design:
   - Make changes in order to collect adequate data.

A process template example :

# Non-participant Exploratory Study Process

## III. Post-mortem activities.

1. Report solved problems to the industry:
   - ➢ To foster trust and open the door to future studies.
2. Report new and emerging problems to academia:
   - ➢ To open new research avenues.

1.1 Find Champions
1.2 Preliminary Study Design
1.3 Sell the Study
1.4 Plan Alternatives
1.5 Choose the Project
2.1 Collect Data
2.2 Preliminary Analyzes
2.3 Build Trust and Respect
2.4 Correct Study Design
3.1 Report to Industry
3.2 Report to Academia