

Quality Management and Experimental
Software Engineering

Report from survey research:
**What kind of “wastes” are the most common and
most harmful in software development projects?**

Authors

Bartosz Paulewicz 127263

Burak Can Koçak 146959

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1. Introduction

This report presents design and summarizes results of the survey research “**What kind of “wastes” are the most common and most harmful in software development projects?**”. The survey research was a part of the project realized in the frame of Quality Management and Experimental Software Engineering classes at Poznan University of Technology.

2. Objectives

Research questions

- **RQ1:** What kinds of "waste" in software development are the most common?
- **RQ2:** What kinds of "waste" in software development are the most harmful?
- **RQ3:** Is there a relationship between frequency / harm of a “waste” and work experience?

Hypothesis

- **H1:** Opinions on frequency and harm of a “waste” are related to kind (programming language and role) of work experience
- **H2:** Opinions on frequency and harm of a “waste” are related to amount (length and level) of work experience

Scope

The scope of our survey was to ask (as many as possible) people working in software projects, either professionally or in university projects.

3. Design

We designed our study as a cross-sectional as we think that this approach fits our research questions the best. A big advantage of a cross-sectional study is that it's fairly easy and quick to both conduct and gather the results. We decided to administer the survey to the participants in the way of self-administered, online questionnaires.

4. Instrument

Our idea for the instrument was to create a survey on Google Forms as it's the most convenient and popular approach nowadays. Link to the survey on Google Forms: https://docs.google.com/forms/d/1OqUA8RYgZe0b8pPqrQZ_e4ml1H4hFOJ3NlbcotC5wDY/edit?usp=sharing

Questions

Q1: What is your name?

Justification: This question allows us to identify who already filled our survey

Type of response: Open

Q2: What is the main programming language you use in the chosen project?

Justification: This question supports RQ3

Type of response: Open

Q3: What is your main role in the chosen project?

Justification: This question supports RQ3

Type of response: Single choice from the list of most popular roles in projects

Roles: Frontend Developer, Backend Developer, Fullstack Developer, PM, DevOps

There is also an option to add your own role

Q4: What is your level of work experience in a such or similar role?

Justification: This question supports RQ3

Type of response: 5-steps scale from Junior to Senior

Q5: How long (in months) is your work experience in a such or similar role in general?

Justification: This question supports RQ3

Type of response: Open

Q6: How long (in months) is your work experience in the chosen project?

Justification: This question supports RQ3

Type of response: Open

Q7: How common are those task-related "wastes" in the chosen project?

Justification: This question supports RQ1 and RQ3

Type of response: Matrix of (single-per-row) choices where each row is a kind of "waste" and each column is a degree of how common is that "waste"

Columns: 5-steps scale from "Doesn't happen" to "Very common"

Rows: List of some task-related "wastes" that might be found in projects

"Wastes":

- Unclearly defined tasks
- Focusing on unneeded tasks
- Leaving tasks uncompleted
- Poorly executed tasks
- Avoiding specific tasks

Q8: How harmful are those task-related "wastes" in the chosen project?

Justification: This question supports RQ2 and RQ3

Type of response: Matrix of (single-per-row) choices where each row is a kind of "waste" and each column is a degree of how harmful is that "waste"

Columns: 5-steps scale from "Not harmful" to "Very harmful"

Rows: the same as in Q8

Q9: How common are those information-related "wastes" in the chosen project?

Justification: This question supports RQ1 and RQ3

Type of response: Matrix of (single-per-row) choices where each row is a kind of "waste" and each column is a degree of how common is that "waste"

Columns: 5-steps scale from "Doesn't happen" to "Very common"

Rows: List of some information-related "wastes" that might be found in projects

"Wastes":

- Issues with documentation
- Wrong introduction of new team members
- Too frequent meetings
- Too long meetings
- Bad flow of information inside team
- Language-specific communication issues

Q10: How harmful are those information-related "wastes" in the chosen project?

Justification: This question supports RQ2 and RQ3

Type of response: Matrix of (single-per-row) choices where each row is a kind of "waste" and each column is a degree of how harmful is that "waste"

Columns: 5-steps scale from "Not harmful" to "Very harmful"

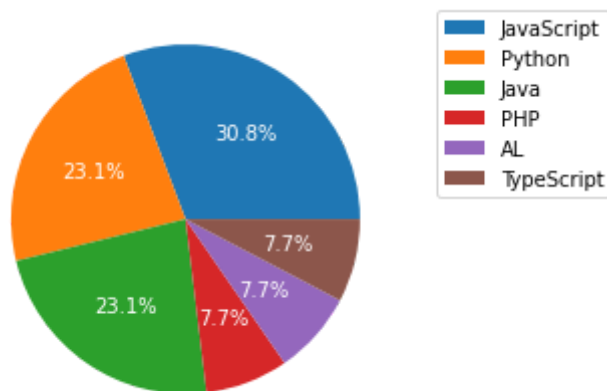
Rows: the same as in Q10

5. Executing the study

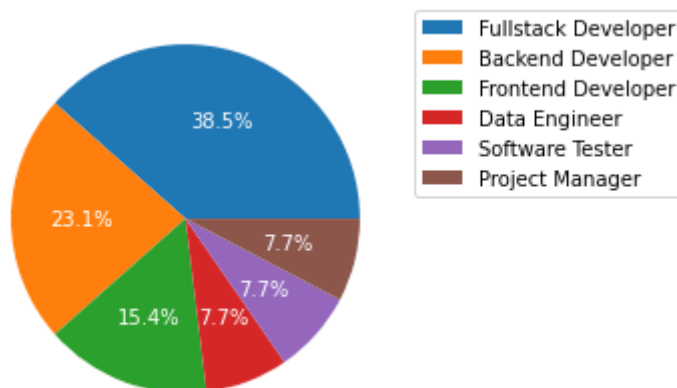
Data was collected during the period between **18.02.21** and **24.02.21**. Respondents were students from our university group. In total there were **13 respondents**.

6. Analysis

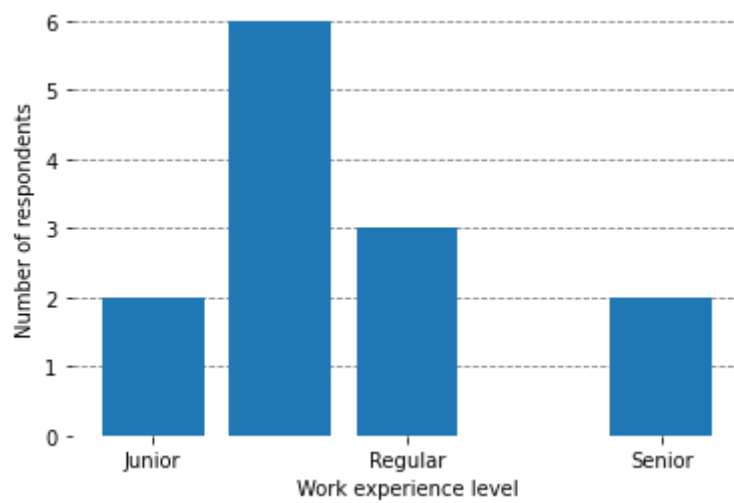
Q2: Main programming languages used in chosen projects



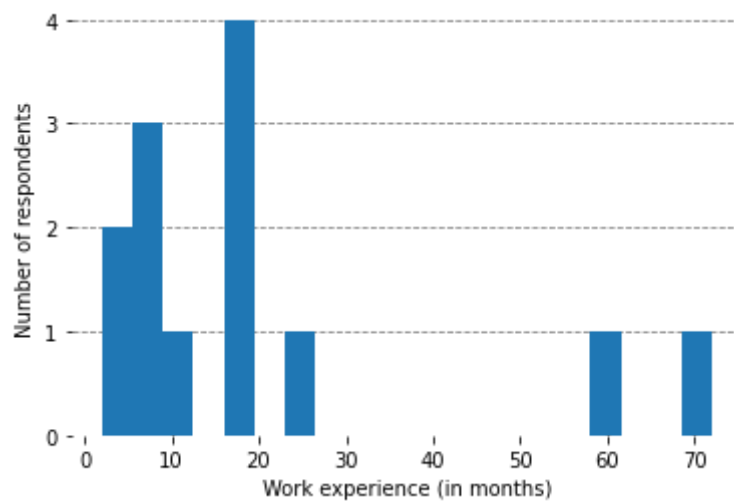
Q3: Main roles in the chosen projects



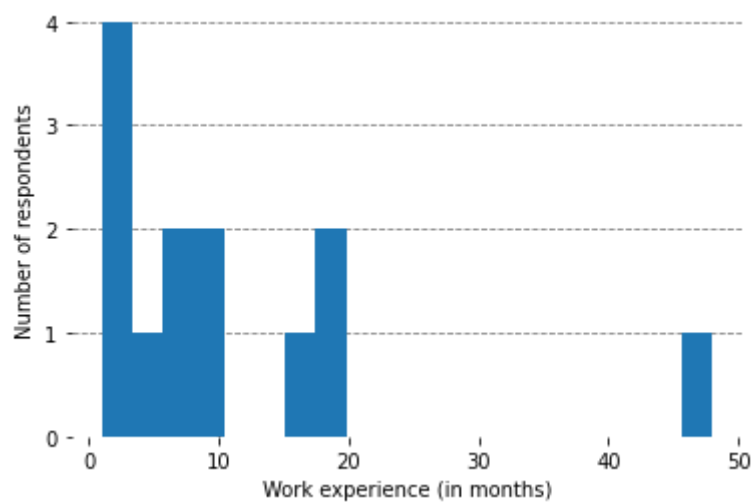
Q4: Work experience level in a such or similar role



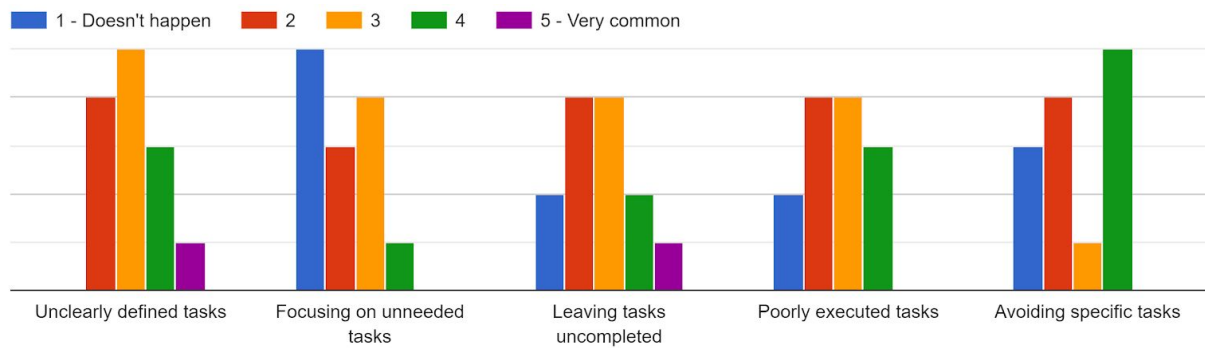
Q5: Work experience (in months) in a such or similar role



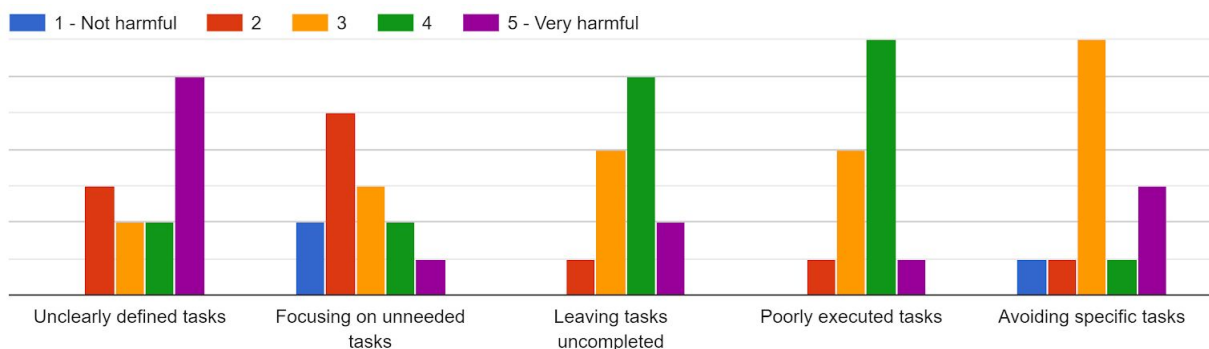
Q6: Work experience (in months) in the chosen projects



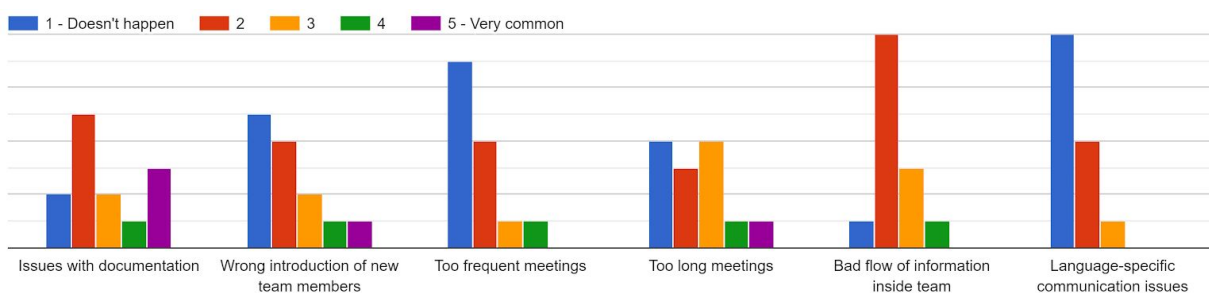
Q7: Frequency of task-related "wastes" in the chosen projects



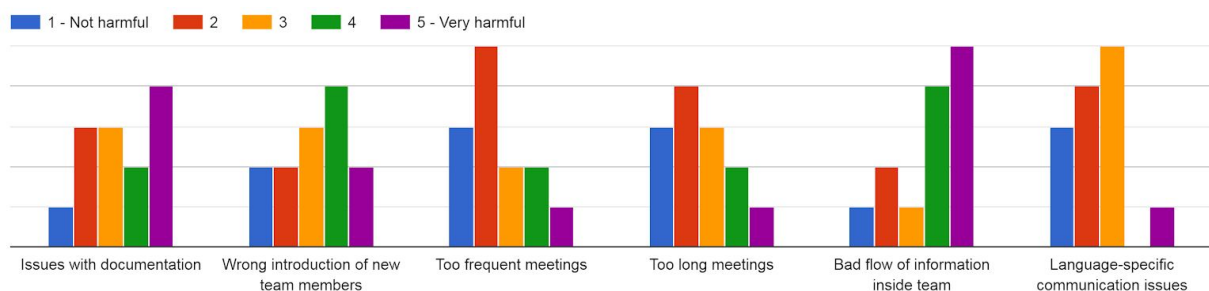
Q8: Harmfulness of task-related "wastes" in the chosen projects



Q9: Frequency of information-related "wastes" in the chosen projects



Q9: Harmfulness of information-related "wastes" in the chosen projects

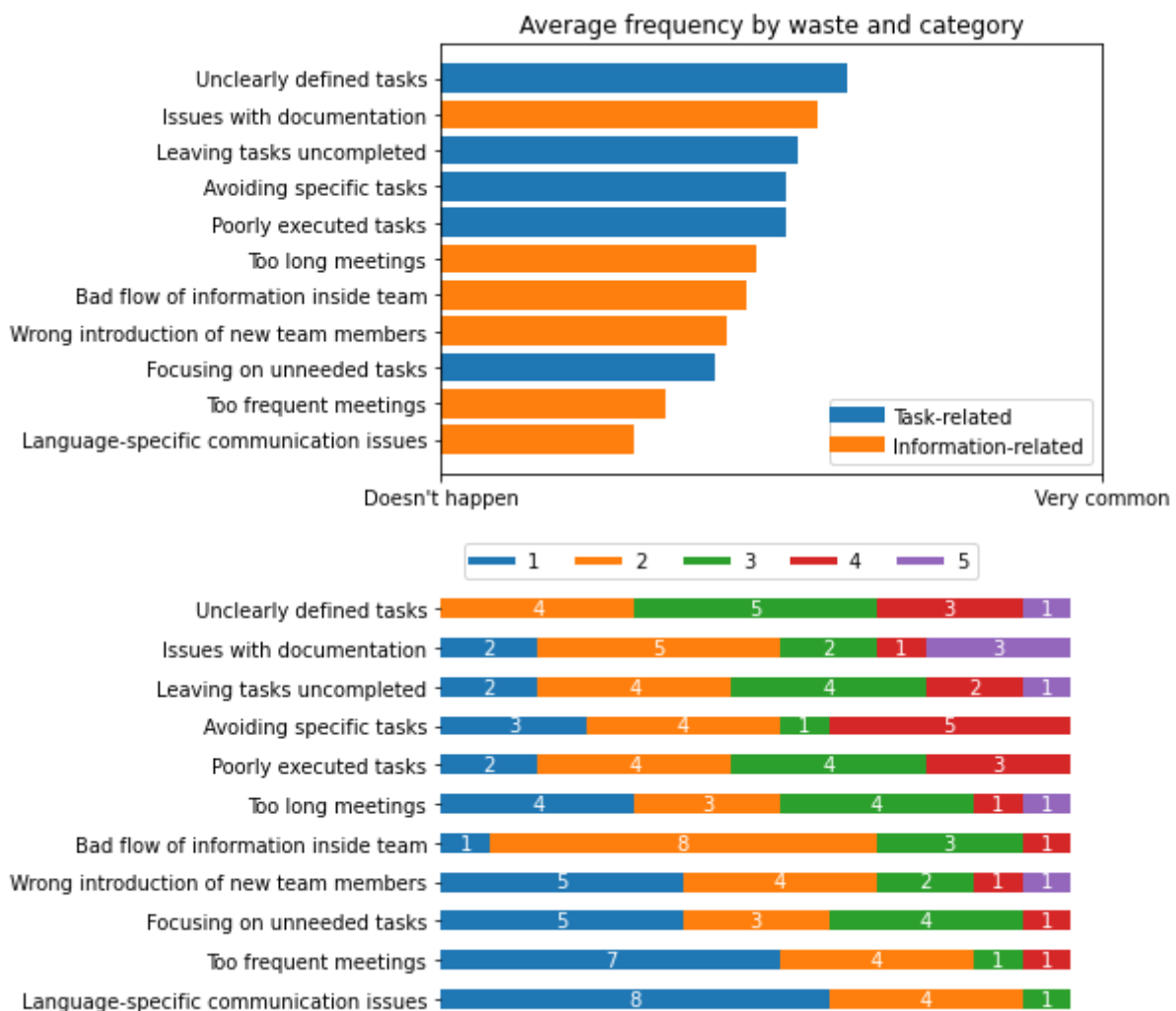


7. Threats to validity

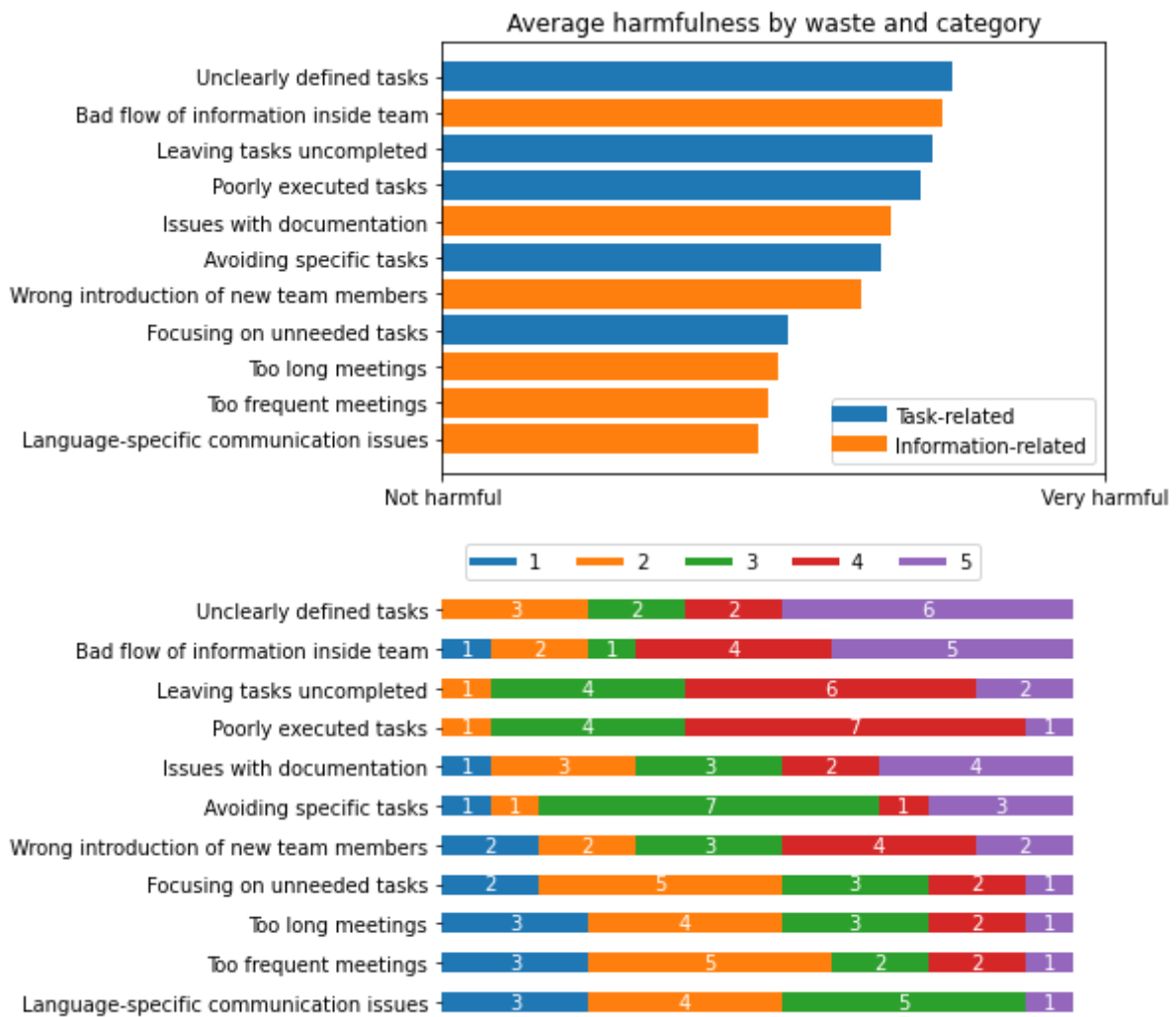
- Our university group is specific because a big part of our studies is about participating in projects from an architecture and management perspective (and not development) - maybe people from different Master specializations would answer differently.
- Our university group is specific because most of us work as developers - maybe people working in other roles would answer differently.

8. Conclusions

RQ1: We found out that those kinds of waste are the most common



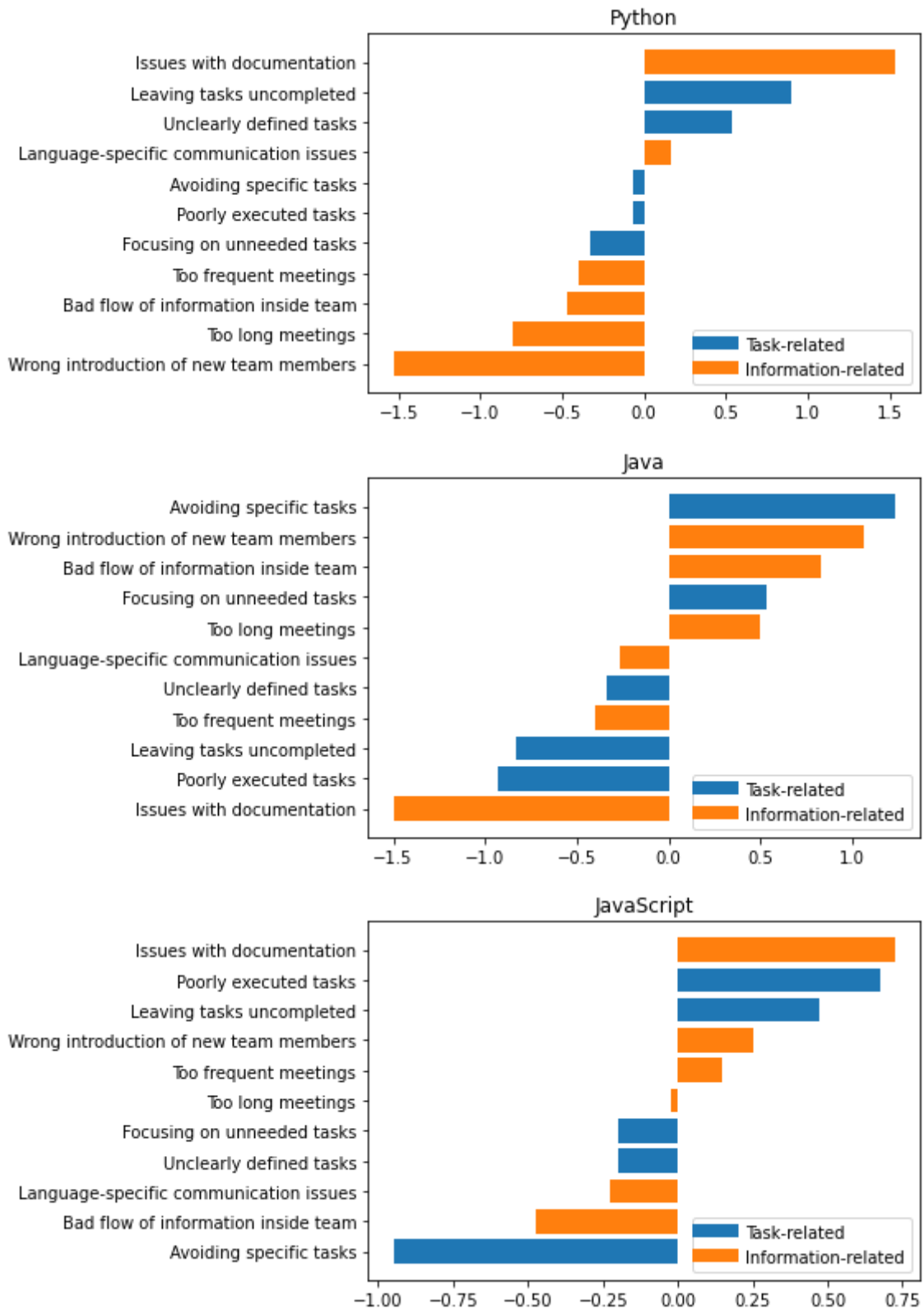
RQ2: We found out that those kinds of waste are the most harmful



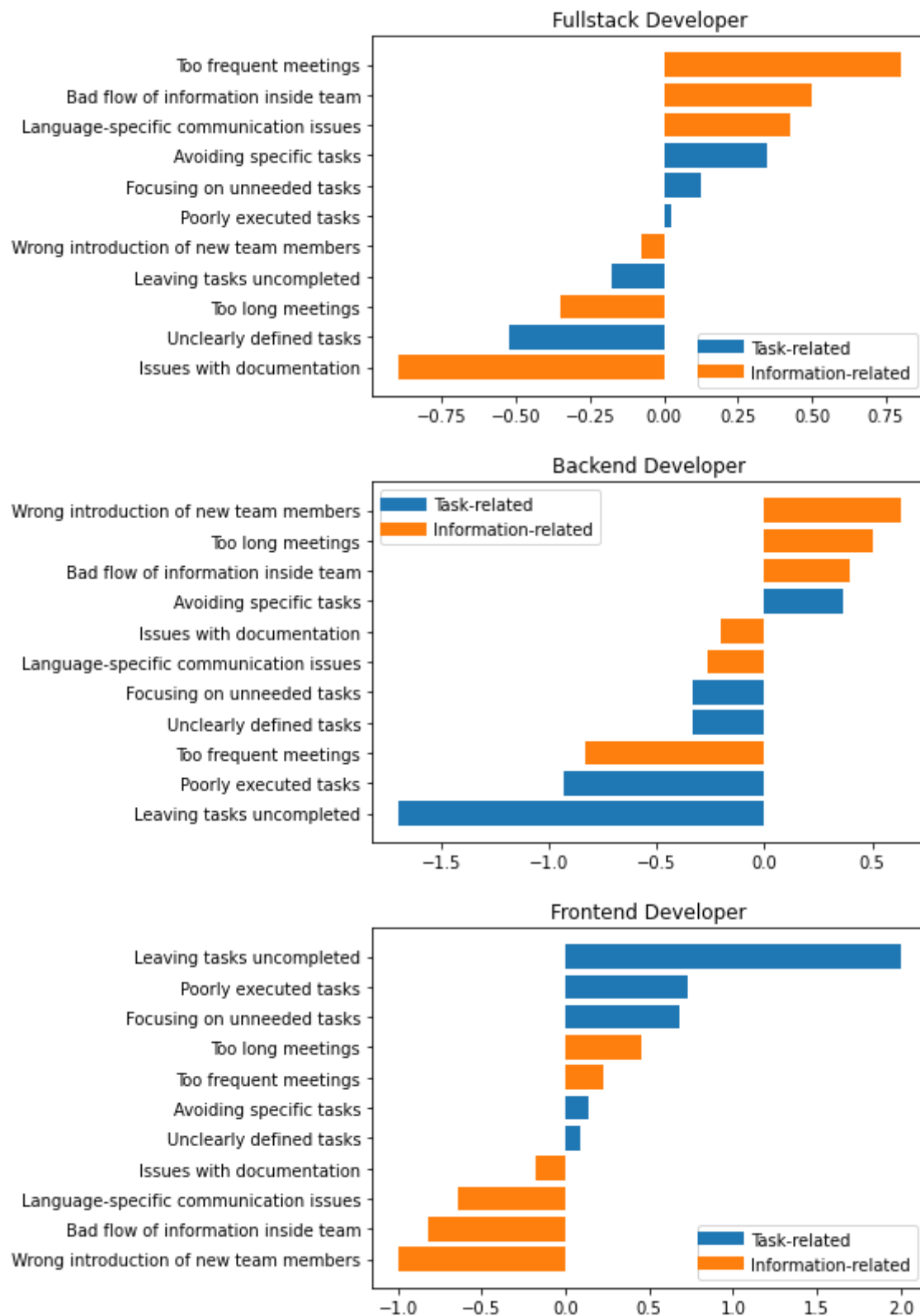
RQ3: We found out that those kinds of "waste" in software development are related to those features

Frequency-wise

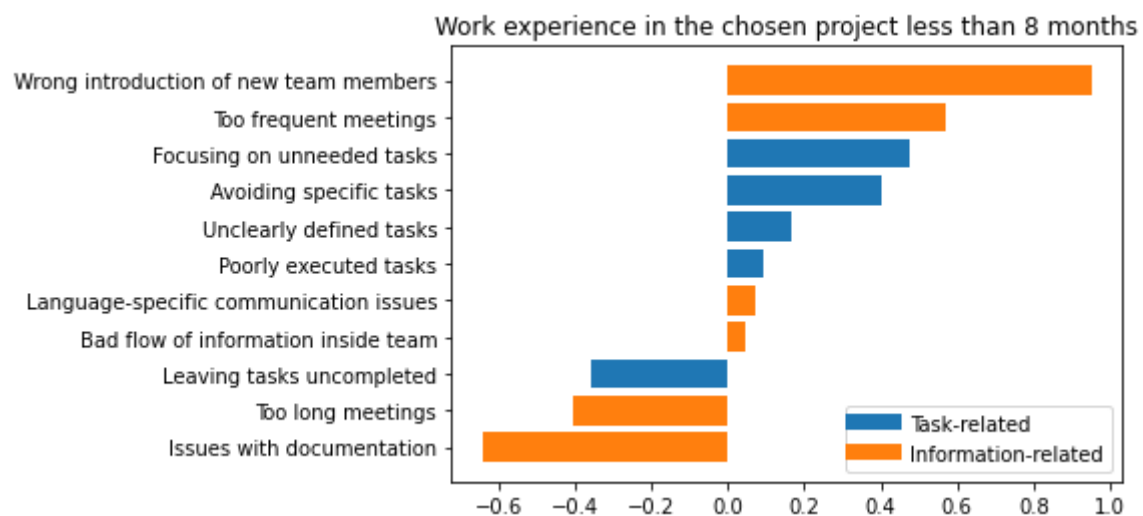
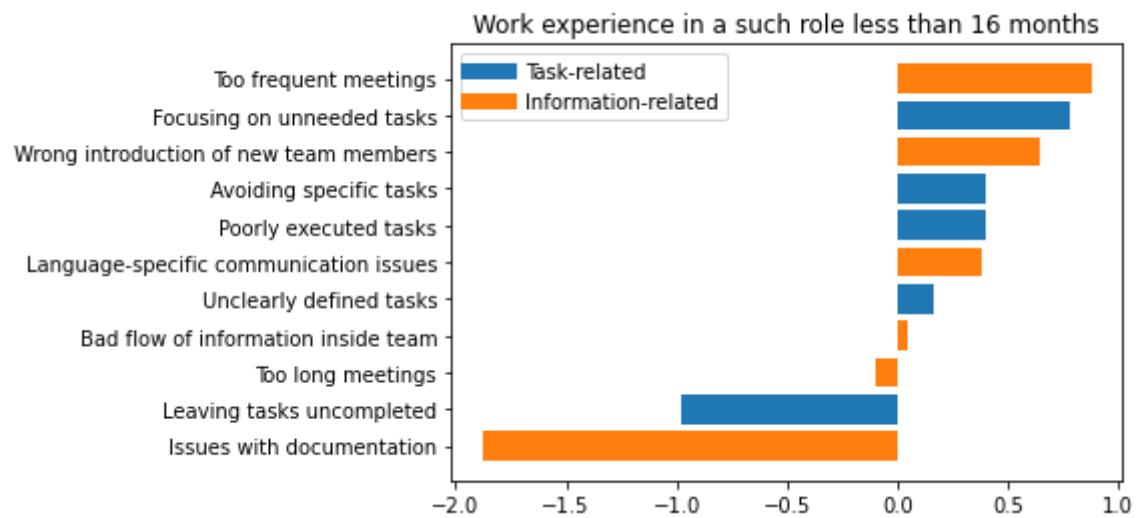
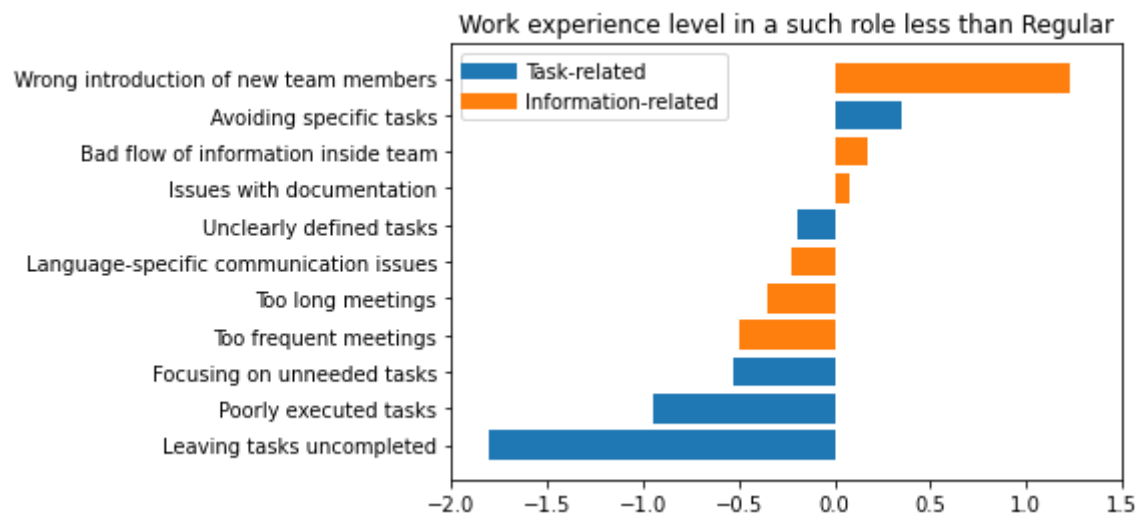
Programming language



Role

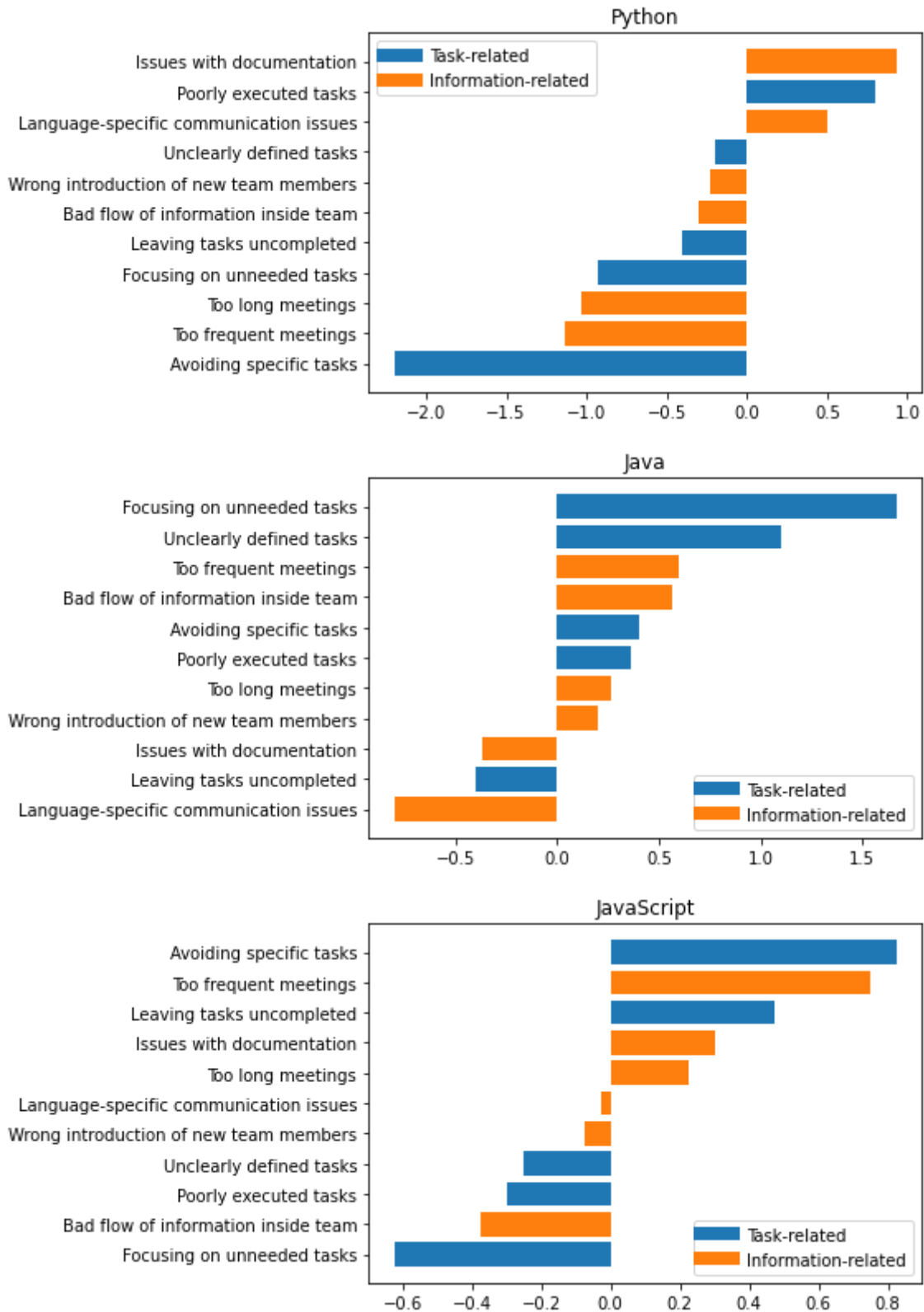


Work experience

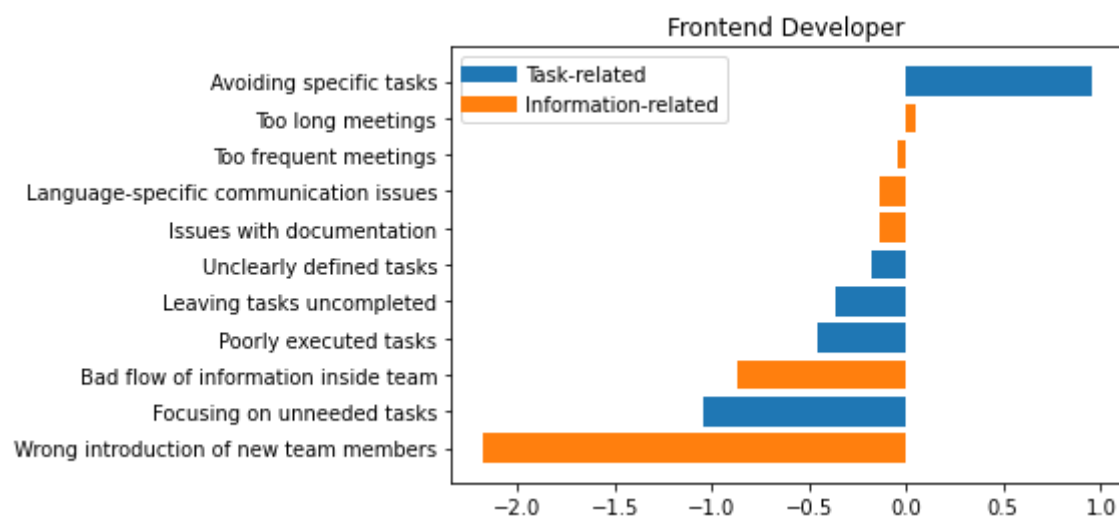
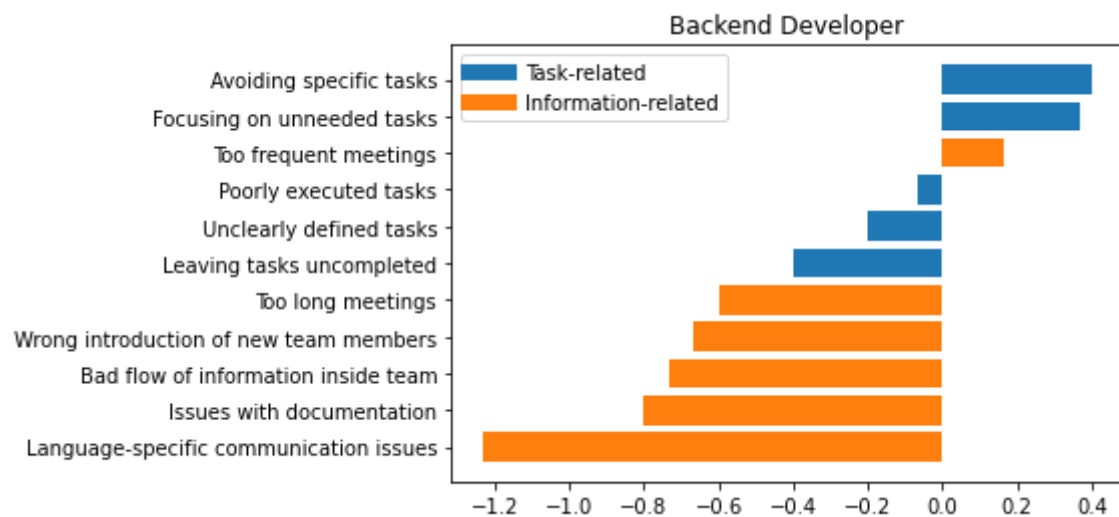
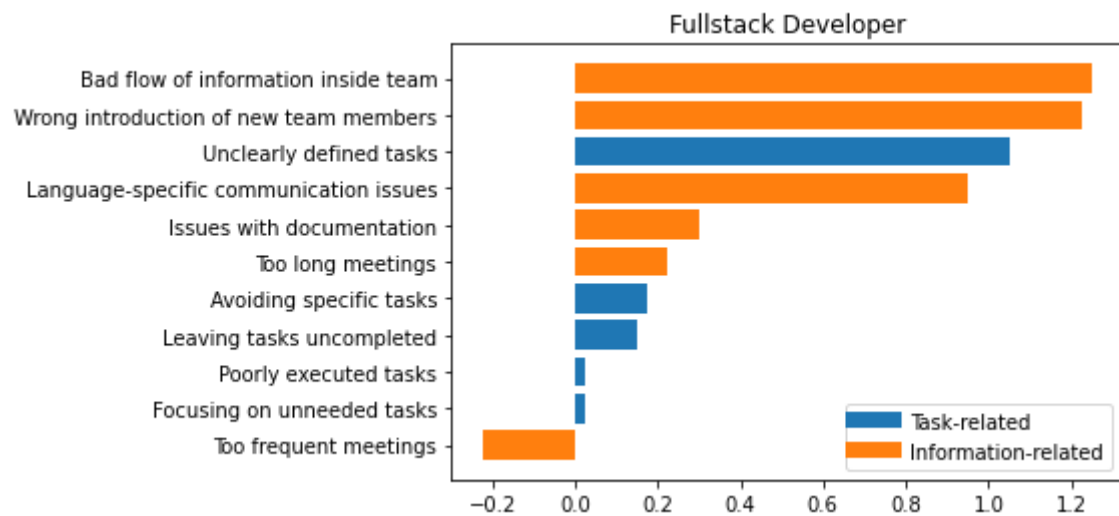


Harmfulness-wise

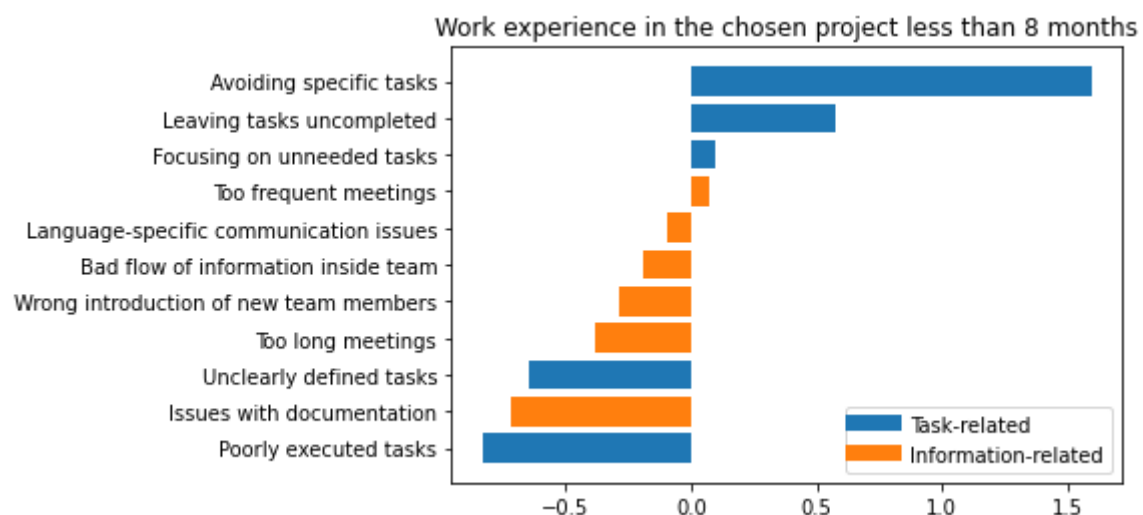
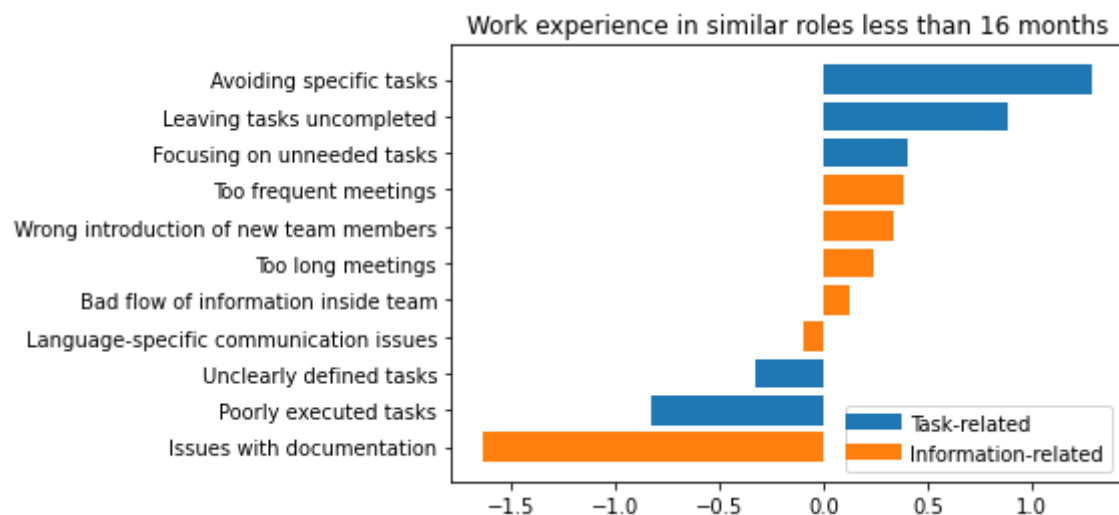
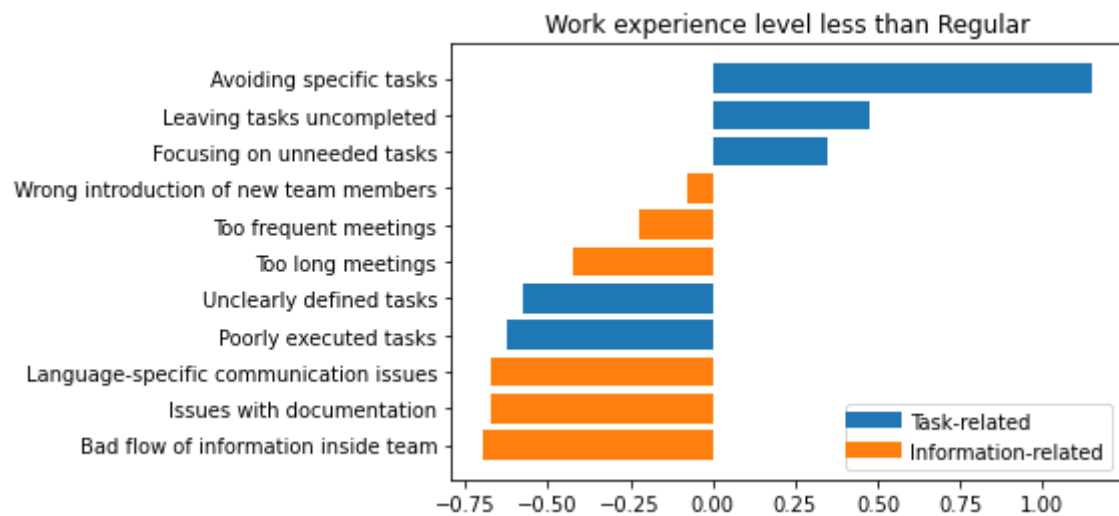
Programming language



Role

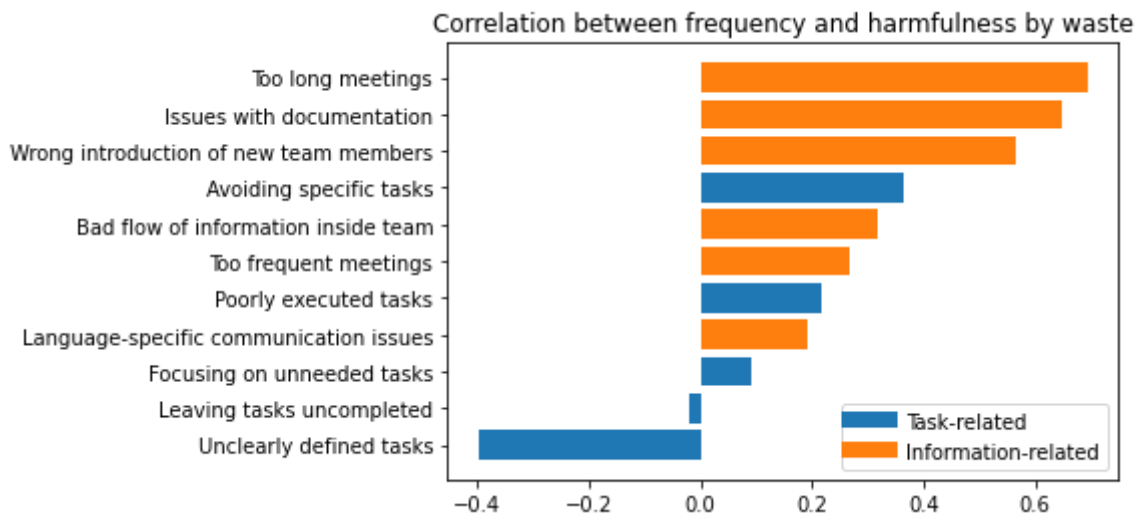
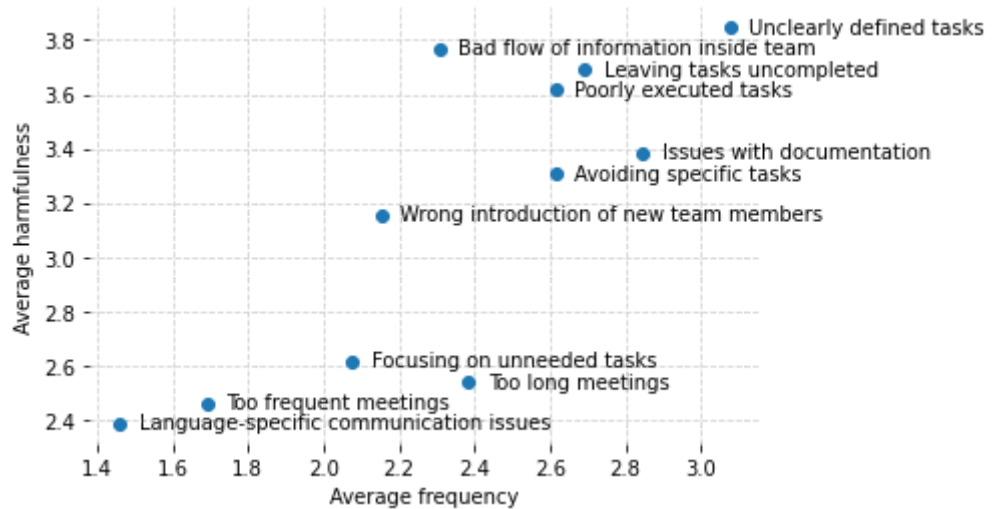


Work experience



Additional findings

Relationships between frequency and harmfulness of a waste



Correlations between wastes

