

# Applying Critical Realism to Software Project Retrospectives

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## I would like to have a discussion about how Critical Realism can be used when doing retrospectives/postmortems in software development projects.

To start with, please summarize how the ontological theory of Critical Realism can be used to create a methodology for doing software development project retrospectives.

Critical Realism, as a philosophical approach, can provide a valuable lens for conducting retrospectives or postmortems in software development projects. At its core, Critical Realism recognizes the existence of an objective reality while acknowledging that our understanding of this reality is shaped by our subjective experiences, perspectives, and social constructions.

The ontological theory of Critical Realism proposes a stratified view of reality, consisting of three domains: the empirical (what we experience), the actual (events that occur regardless of our experience), and the real (underlying structures and mechanisms that generate events). This stratified ontology can be applied to the context of software development projects to create a methodology for retrospectives that considers multiple levels of reality.

1. **Empirical Domain:** In a retrospective, the empirical domain encompasses the observable events, outcomes, and experiences of the project team members. This includes factors such as project deliverables, team interactions, stakeholder feedback, and any tangible artifacts or data generated during the project.
2. **Actual Domain:** The actual domain represents the events and processes that occurred during the project, regardless of whether they were directly observed or experienced by the team members. This includes factors such as decision-making processes, communication patterns, resource allocation, and any external influences that may have impacted the project.
3. **Real Domain:** The real domain encompasses the underlying structures, mechanisms, and causal factors that shaped the events and outcomes of the project. These may include organizational culture, team dynamics, project management practices, technological constraints, and any other hidden or unobservable factors that played a role in shaping the project's trajectory.

By considering these three domains, a Critical Realism-based methodology for retrospectives can encourage a deeper exploration of the project's reality, moving beyond surface-level observations and empirical data. The retrospective process would involve:

1. Identifying and analyzing empirical observations and experiences (empirical domain).
2. Reconstructing and examining the actual events and processes that occurred (actual domain).
3. Exploring and uncovering the underlying structures, mechanisms, and causal factors that shaped the project (real domain).

This multi-layered approach can lead to a more comprehensive understanding of the project's successes, challenges, and areas for improvement. It encourages team members to go beyond surface-level explanations and delve into the deeper structures and mechanisms that influenced the project's outcomes.

By embracing the principles of Critical Realism, retrospectives can foster a more holistic and nuanced understanding of software development projects, leading to actionable insights and recommendations for future projects.

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## Lets imagine a SW team has the following simple development methodology:

1. The SW team has a monthly development cycle.
2. These are the following stages in the month:
  1. Week 1 of the month: Planning
  2. Weeks 2 & 3 of the month: Implementation
  3. Week 4 of the month: Deliver (to the Customer)

Further imagine that we are performing a retrospective where in the prior month the team was asked in the middle of weeks 2 & 3 (implementation) that they needed to work on something other than what was planned. The reason given is that what should be worked on was always planned for that Customer in the year. Again and unfortunately,

during the mid-implementation weeks it was discovered that a feature that was planned to the Customer for the year wasn't being worked on and needed to be added.

To start this analysis, how might Critical Realism help us identify focuses such as:

1. When in the month to focus on
2. Where in the development process to focus on
3. Who in the development team to focus on
4. The areas where people and process interact both positively and negatively

Critical Realism can provide a valuable framework for analyzing the given scenario and identifying the areas of focus for the retrospective. Here's how the principles of Critical Realism can help us determine the focal points:

### 1. When in the month to focus on

- **Empirical Domain:** Examine the observable events and experiences during the specific weeks (e.g., weeks 2 and 3) when the unplanned change occurred.
- **Actual Domain:** Investigate the actual sequence of events, decisions, and communication that led to the unplanned change during the implementation phase.
- **Real Domain:** Explore the underlying structures, mechanisms, and causal factors that contributed to the need for the unplanned change, such as project management practices, customer communication processes, or prioritization strategies.

### 2. Where in the development process to focus on

- **Empirical Domain:** Analyze the tangible artifacts, documentation, and outcomes related to the planning, implementation, and delivery stages of the development process.
- **Actual Domain:** Examine the actual events, activities, and interactions that occurred during the planning, implementation, and delivery phases, even if they were not directly observed.
- **Real Domain:** Investigate the underlying structures, mechanisms, and causal factors that influenced the development process, such as requirements gathering practices, communication channels, or resource allocation strategies.

### 3. Who in the development team to focus on

- **Empirical Domain:** Consider the observable experiences, actions, and interactions of individual team members or specific roles within the team.
- **Actual Domain:** Analyze the actual roles, responsibilities, and contributions of team members, even if they were not directly observed or documented.
- **Real Domain:** Explore the underlying structures, mechanisms, and causal factors that shaped team dynamics, decision-making processes, or individual behaviors, such as team culture, leadership styles, or skill sets.

### 4. The areas where people and process interact both positively and negatively

- **Empirical Domain:** Examine the observable interactions, communication patterns, and collaborations between team members and the development processes.
- **Actual Domain:** Investigate the actual events, activities, and interactions that occurred between people and processes, even if they were not directly observed or documented.
- **Real Domain:** Explore the underlying structures, mechanisms, and causal factors that influenced the interactions between people and processes, such as organizational culture, communication channels, or process maturity levels.

By applying the Critical Realism lens, the retrospective can delve into the multiple layers of reality, considering not only the observable events and experiences but also the underlying structures and mechanisms that shaped the project's outcomes. This multi-faceted approach can provide a more comprehensive understanding of the challenges faced and identify areas for improvement in terms of processes, team dynamics, and organizational factors.

It's important to note that the retrospective should involve diverse perspectives from different team members and stakeholders to capture a more holistic view of the empirical, actual, and real domains. Additionally, the retrospective should aim to uncover both positive and negative interactions between people and processes, as these insights can inform future improvements and adjustments.

**Recall that Critical Realism includes a theory of human organization or world called Critical Naturalism. How might Critical Naturalism help us understand the sociology of humans and teams and how it will help us understand how human as the actors in human created processes might have unfolded during the stressful implementation weeks.**

Critical Naturalism, as part of the Critical Realism framework, provides a valuable lens for understanding the sociological aspects of human behavior, organizations, and teams. In the context of the retrospective scenario, Critical Naturalism can help us understand how human actors, as participants in human-created processes, might have influenced the events during the stressful implementation weeks.

Critical Naturalism recognizes that human beings are intrinsically social beings, shaped by their social environments, cultural contexts, and interpersonal interactions. It acknowledges that human actions and behaviors are influenced by both individual agency and social structures, and that these factors are intricately intertwined.

In the context of the retrospective, Critical Naturalism can help us explore the following aspects:

1. **Social Structures and Norms:** Examine the social structures, norms, and cultural factors that influenced the team's behavior and decision-making processes during the implementation weeks. This includes understanding the organizational culture, team dynamics, power dynamics, and any implicit or explicit expectations that shaped the team's actions.
2. **Individual Agency and Roles:** Investigate how individual team members exercised their agency, made decisions, and responded to the stressful situation during the implementation weeks. This includes exploring their roles, responsibilities, and the extent to which they felt empowered or constrained by the social structures and norms.
3. **Interpersonal Interactions and Communication:** Analyze the interpersonal interactions, communication patterns, and collaborative efforts among team members during the implementation weeks. This includes understanding how social relationships, trust, and communication channels influenced the team's ability to respond to the unplanned change.
4. **Socio-Cultural Influences:** Explore the broader socio-cultural factors, such as societal norms, industry practices, or external stakeholder expectations, that may have influenced the team's behavior and decision-making processes during the implementation weeks.

By applying the lens of Critical Naturalism, the retrospective can uncover the complex interplay between human agency, social structures, and cultural factors that shaped the team's actions and responses during the stressful implementation weeks. This understanding can shed light on potential areas for improvement, such as fostering a more supportive organizational culture, enhancing communication channels, or empowering team members to make informed decisions.

Additionally, Critical Naturalism encourages a critical examination of the taken-for-granted assumptions, power dynamics, and social structures that may have contributed to the challenges faced during the implementation weeks. This can lead to insights for promoting more inclusive, collaborative, and equitable practices within the team and the organization.

By considering both the human actors and the social contexts in which they operate, Critical Naturalism can provide a holistic understanding of the sociological factors that influenced the team's actions and decisions during the retrospective period.

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**So, lets be concrete. Where can Critical Realism and Critical Naturalism help us:**

1. Investigate the previously mentioned difficult time in a software development team
2. Understand how the processes might have constrained the perspectives of different people or different roles

Adding Critical Naturalism to this discussion, please amend your previous response to the prompt asking for details regarding the when, where and who during this time.

Please detail where and how Critical Naturalism can be used and improve doing retrospectives.

Sure, let me incorporate the insights from Critical Naturalism to provide a more comprehensive perspective on how Critical Realism can be applied to investigate the difficult time faced by the software development team and understand the constraints and perspectives of different people and roles.

## **1. When in the month to focus on**

- Critical Naturalism can help us understand the social dynamics, team norms, and power structures that may have influenced the team's behavior and decision-making during the specific weeks (e.g., weeks 2 and 3) when the unplanned change occurred.

- It can shed light on how the team's sense of urgency, stress levels, and communication patterns may have been shaped by the organizational culture, team roles, and interpersonal relationships during that time.

## 2. Where in the development process to focus on

- Critical Naturalism can help us explore how the team's adherence to the development process (planning, implementation, delivery) may have been influenced by social structures, norms, and individual agency.
- It can provide insights into how the team's decision-making processes, communication channels, and collaborative efforts during the different stages were shaped by the organizational culture, team dynamics, and power dynamics.

## 3. Who in the development team to focus on

- Critical Naturalism can help us understand how different team roles, responsibilities, and individual agency may have influenced the team's response to the unplanned change.
- It can shed light on how power dynamics, social relationships, and cultural factors shaped the decision-making processes, communication patterns, and collaborative efforts of different team members or roles.

## 4. The areas where people and process interact both positively and negatively

- Critical Naturalism can help us investigate how the team's social interactions, communication patterns, and collaborative efforts intersected with the development processes during the stressful implementation weeks.
- It can provide insights into how the team's ability to navigate the processes was influenced by factors such as trust, interpersonal dynamics, and the team's collective agency.
- Additionally, it can help us understand how the team's adherence to the processes may have been shaped by the organizational culture, team norms, and external stakeholder expectations.

By incorporating the lens of Critical Naturalism, the retrospective can delve deeper into the sociological factors that influenced the team's behavior, decision-making processes, and interactions during the difficult time. It can help uncover the underlying social structures, norms, power dynamics, and cultural factors that may have constrained or enabled the team's perspectives and actions.

Specifically, Critical Naturalism can help in the following ways:

1. **Identifying social and cultural barriers:** It can reveal any implicit biases, assumptions, or cultural norms that may have hindered effective communication, collaboration, or decision-making within the team or with external stakeholders.
2. **Examining power dynamics:** It can shed light on how power dynamics, hierarchies, and role expectations within the team or organization may have influenced the team's ability to respond effectively to the unplanned change.
3. **Understanding team dynamics:** It can provide insights into the team's interpersonal relationships, trust levels, and collective agency, which may have shaped the team's ability to navigate the stressful situation.
4. **Exploring individual agency:** It can help understand how individual team members exercised their agency, made decisions, and responded to the constraints or opportunities within the social structures and cultural contexts.

By combining the insights from Critical Realism's stratified ontology and Critical Naturalism's focus on sociological factors, the retrospective can develop a more comprehensive understanding of the complex interplay between processes, people, and social structures that influenced the team's actions and outcomes during the difficult time.

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## Please imagine you are an investigator that uses Critical Realism and Critical Naturalism when doing retrospectives and root cause analyses.

Imagine you are investigating a failure in a software development team to implement a Customer feature. What sorts of questions might you ask when interviewing the following people in the team:

1. A software developer
2. A software architect
3. A software manager

As an investigator using the principles of Critical Realism and Critical Naturalism for conducting retrospectives and root cause analyses, I would ask the following types of questions when interviewing different team members to understand the failure in implementing the customer feature:

## Software Developer

- **Empirical Domain:**
  - Can you describe your experience during the implementation phase of the customer feature?
  - What specific challenges or obstacles did you encounter while working on the feature?
  - How did you collaborate with other team members during the implementation process?
- **Actual Domain**
  - Can you walk me through the sequence of events and activities that took place during the implementation phase?
  - Were there any decisions or actions taken by others that affected your ability to work on the feature?
  - Did you observe any communication breakdowns or misalignments within the team?
- **Real Domain**
  - What do you think were the underlying reasons or factors that contributed to the failure to implement the feature?
  - How did the organizational culture, team dynamics, or project management practices influence your work on the feature?
  - Were there any constraints or pressures (e.g., time, resources, skills) that hindered your ability to complete the implementation?

### Critical Naturalism

- How did your role and responsibilities within the team shape your experience during the implementation phase?
- Did you feel empowered or constrained in your ability to make decisions or raise concerns?
- How did the interpersonal dynamics and communication patterns within the team affect your ability to work effectively on the feature?

## Software Architect

- **Empirical Domain**
  - Can you describe your involvement in the architectural design and planning for the customer feature?
  - What specific challenges or concerns did you identify during the planning or implementation phases?
  - How did you communicate and collaborate with the development team during the implementation process?
- **Actual Domain**
  - Can you walk me through the decision-making processes and activities related to the architecture and implementation of the feature?
  - Were there any events or actions taken by others that affected the architectural direction or implementation strategy?
  - Did you observe any misalignments between the architectural vision and the actual implementation?
- **Real Domain**
  - What do you think were the underlying factors or constraints that contributed to the failure to implement the feature successfully?
  - How did the organization's technical practices, tooling, or infrastructure influence the implementation process?
  - Were there any gaps in knowledge, skills, or resources that hindered the architectural implementation of the feature?

### Critical Naturalism

- How did your role as the software architect shape your perspective and decision-making during the implementation process?
- Did you feel that your architectural guidance and recommendations were adequately considered and followed by the team?
- How did the communication channels and power dynamics within the team influence your ability to guide the implementation effectively?

## Software Manager

- **Empirical Domain**
  - Can you describe the project planning and management processes related to the implementation of the customer feature?
  - What specific challenges or issues did you observe during the implementation phase?
  - How did you monitor and communicate with the team during the implementation process?
- **Actual Domain**
  - Can you walk me through the timeline of events, decisions, and actions taken during the implementation phase?
  - Were there any external factors or stakeholder expectations that influenced the implementation process?
  - Did you observe any gaps or breakdowns in the project management practices or communication channels?
- **Real Domain**
  - What do you think were the underlying organizational, cultural, or process-related factors that contributed to the failure to implement the feature?

- How did the project management methodologies, resource allocation, or prioritization strategies influence the implementation process?
- Were there any constraints or limitations (e.g., time, budget, skills) that hindered the successful implementation of the feature?

### Critical Naturalism

- How did your role as a manager shape your perspective and decision-making during the implementation process?
- Did you feel that you had sufficient authority or influence to address issues or concerns raised by the team?
- How did the organizational culture, power dynamics, and communication patterns within the team and organization influence your ability to effectively manage the implementation process?

By asking these types of questions, I would aim to uncover not only the observable events and experiences but also the underlying structures, mechanisms, and social factors that contributed to the failure in implementing the customer feature. The insights gained from both Critical Realism and Critical Naturalism would enable a more comprehensive understanding of the root causes and potential areas for improvement across processes, technical aspects, and socio-cultural factors within the team and organization.

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**Using the previous set of questions as a guide to interviewing members of the software team that had an issue releasing to their Customers, please imagine an interview between yourself as the investigator and each of the 3 roles:**

1. Software Developer
2. Software Architect
3. Software Manager

Sure, let's imagine hypothetical interview scenarios where I, as the investigator using Critical Realism and Critical Naturalism, am interviewing members of the software team that failed to implement the customer feature:

### Interview with a Software Developer

**Investigator:** Can you walk me through the sequence of events and activities that took place during the implementation phase of the customer feature?

**Developer:** Well, we started working on the feature during the second and third weeks of our monthly cycle. But midway through the implementation, we were informed that another critical feature had to be prioritized for the customer's deadline.

**Investigator:** How did that change in priorities affect your ability to work on the originally planned feature?

**Developer:** It was quite disruptive. We had to put our work on hold and shift our focus to the other feature. There was a lot of confusion and frustration within the team, as we felt like we didn't have a clear understanding of the priorities.

**Investigator:** Did you feel empowered or constrained in your ability to raise concerns or make decisions during this process?

**Developer:** To be honest, I felt a bit constrained. Our team dynamic is generally quite hierarchical, and decisions often come top-down from management. It's not always easy to voice concerns or push back, especially when there's a sense of urgency from higher-ups.

**Investigator:** How did the interpersonal dynamics and communication patterns within the team affect your ability to work effectively on the feature?

**Developer:** Communication was definitely a challenge. There were some silos and miscommunication between team members, which made it difficult to coordinate our efforts effectively. I think some of the underlying issues stemmed from trust and collaboration challenges within the team.

### Interview with a Software Architect

**Investigator:** Can you describe your involvement in the architectural design and planning for the customer feature?

**Architect:** I worked closely with the product team and stakeholders to gather requirements and design the architecture for the feature. We had a solid plan in place that aligned with our technical roadmap and architectural principles.

**Investigator:** Did you observe any misalignments between the architectural vision and the actual implementation during the process?

**Architect:** Yes, unfortunately. When the priorities shifted midway, some of the architectural decisions and implementations had to be compromised or rushed. This led to technical debt and potential risks down the line.

**Investigator:** How did the communication channels and power dynamics within the team influence your ability to guide the implementation effectively?

**Architect:** Communication was a challenge, as you mentioned earlier. Sometimes my architectural guidance wasn't effectively communicated or prioritized by the development team. There were also instances where management decisions overruled architectural recommendations due to time constraints or other pressures.

**Investigator:** Did you feel that your architectural guidance and recommendations were adequately considered and followed by the team?

**Architect:** Not always. There were times when I felt my input wasn't given sufficient weight or consideration, especially when it conflicted with other priorities or constraints imposed by management or stakeholders.

## Interview with a Software Manager

**Investigator:** Can you walk me through the timeline of events, decisions, and actions taken during the implementation phase of the customer feature?

**Manager:** Sure. We had initially planned and allocated resources for the customer feature during our monthly cycle. However, midway through the implementation, we received feedback from the customer that another feature had become a higher priority for their upcoming release.

**Investigator:** Were there any external factors or stakeholder expectations that influenced the implementation process?

**Manager:** Absolutely. The customer's changing priorities and tight deadlines played a significant role in our decision to pivot and reprioritize the work. We felt pressure to accommodate their needs and meet their expectations.

**Investigator:** Did you observe any gaps or breakdowns in the project management practices or communication channels during this process?

**Manager:** In retrospect, our communication and coordination could have been better. There were some breakdowns in aligning the team, managing expectations, and clearly communicating the changes in priorities. This led to confusion and frustration among the team members.

**Investigator:** How did the organizational culture, power dynamics, and communication patterns within the team and organization influence your ability to effectively manage the implementation process?

**Manager:** The organizational culture definitely played a role. We have a tendency to be quite reactive to customer demands, which can sometimes lead to knee-jerk decisions and lack of alignment across teams. Additionally, the power dynamics and hierarchical structure made it challenging to have open discussions and challenge decisions when needed.

These hypothetical interviews aim to capture the perspectives and experiences of different team members, while also exploring the underlying structures, mechanisms, and social factors that contributed to the failure in implementing the customer feature. By applying the principles of Critical Realism and Critical Naturalism, the interviews delve into the empirical, actual, and real domains, as well as the sociological aspects of team dynamics, communication patterns, and organizational culture.