

# Conceptual Framework of Empathy in Software Engineering

## MEANING

### Cognitive empathy

Refers to understanding, perspective taking, and embodiment.

- **Understanding** is the capacity to understand another person's thoughts, needs, feelings, problems, and experiences.
- **Perspective taking** is taking into account, imagining or seeing another's perspective.
- **Embodiment** is the capacity to put oneself in someone else's shoes or in another's place.

### Compassionate empathy

Means caring for the team and the needs of clients, customers, users, and future maintainers.

### Emotional empathy

When one can feel another person's emotions or share the emotional state of others.

## PRATICES AND EFFECTS

### Understanding the stakeholders

Refers to understanding what stakeholders need, think or feel.

Effects		
+Communication	+Software quality	-Blame
+Trust	+Productivity	
+Feedback	+Problem solving	
+Happiness	+Work culture	
+Work environment	+Self-development	
+Professional growth	+Human connections	
+Collaboration	+Collaboration	
+Inclusion	+Employee retention	

### Considering different perspectives

Means being able to take the perspective of the stakeholders.

Effects		
+Communication	+Collaboration	-Stress
+Trust	+Work culture	-Blame
+Software quality	+Team	
+Happiness	+Productivity	
+Self-development	+Professional growth	
+Problem solving	+Work environment	
+Inclusion		

### Adopting good programming practices

Refers to choosing good variable names, simple code and design, maintaining a consistent architecture, adopting single responsibility, fixing what is possible, using abstractions, modularisation, documenting and adding comments to the code.

Effects		
+Communication	+Confidence	
+Respect	+Team	
+Software quality	+Collaboration	
+Developers' onboarding	+Productivity	
	+Work culture	

### Being compassionate

Means being polite, respectful and kind to other stakeholders. Showing compassion towards others. Communicating with kindness in a nonviolent way. Compassionate coding in a meaningful way.

Effects		
+Communication	+Human connections	-Blame
+Trust	+Motivation	-Frustration
+Software quality	+Work culture	
+Collaboration	+Team	
+Team success	+Productivity	
+Work environment		

### Running tests

Refers to testing the software.

Effects		
+Communication	+Confidence	
+Compassion	+Team	
+Software quality	+Work culture	
+Pride	+Professional growth	

### Actively listening

Means actively listening to the needs of the stakeholders and asking meaningful questions.

Effects		
+Communication	+Collaboration	-Blame
+Trust	+Feedback	
+Self-development	+Work culture	
+Morale	+Productivity	
	+Work environment	

### Being mindful

Means being mindful of interactions with any of the stakeholders.

Effects		
+Collaboration	+Self-development	
+Leadership	+Psychological safety	
+Software quality	+Motivation	
+Trust	+Team	
+Professional growth	+Employee retention	
+Work environment		

### Accepting and giving feedback

Means being open to receiving feedback and providing positive, specific, constructive and actionable feedback to the stakeholders.

Effects		
+Trust	+Work environment	
+Respect	+Human connections	
+Software quality	+Collaboration	
+Work culture	+Productivity	
	+Feedback	

### Being open

Means communicating honestly and sharing knowledge with team members.

Effects		
+Communication	+Human connections	
+Respect	+Pride	
+Trust	+Productivity	
+Motivation	+Professional growth	
+Psychological safety	+Software quality	

### Being patient

Means staying calm under pressure, slowing down, offering empathy, and proceeding calmly.

Effects		
+Trust	+Software quality	-Anxiety
+Employee retention	+Work environment	-Stress
+Communication	+Feedback	-Blame
+Professional growth	+Productivity	

### Taking care

Means taking care of the stakeholders.

Effects		
+Trust	+Leadership	-Stress
+Work environment	+Human connections	-Burnout
+Professional growth	+Productivity	
	+Work culture	

### Admitting failures

Refers to admitting being wrong, accepting mistakes, and creating a continuous learning culture where failures are seen as learning opportunities.

Effects		
+Trust	+Software quality	-Anxiety
+Employee retention	+Productivity	-Stress

### Embodying the stakeholders

Means getting in their shoes.

Effects		
+Communication		
+Leadership		
+Software quality		

### Reviewing the code

Means reviewing the code before submitting it.

Effects		
+Software quality	+Communication	
+Respect	+Collaboration	
+Productivity		

### Being supportive

Means offering support to other colleagues and team members.

Effects		
+Work culture		
+Trust		
+Employee retention		

## FRAMEWORK GUIDE

### Concepts

**Meaning:** software practitioners mention three facets of empathy: cognitive empathy, compassion, and emotional empathy.

**Practices:** how to practice empathy in software engineering, according to the practitioners' perception.

**Effects:** the expected effects of practicing empathy in software engineering.

### Navigation



### Elements



# MEANING

## Cognitive empathy

Refers to understanding, perspective taking, and embodiment.

- **Understanding** is the capacity to understand another person's thoughts, needs, feelings, problems, and experiences.
- **Perspective taking** is taking into account. Imagining or seeing another's perspective.
- **Embodiment** is the capacity to put oneself in someone else's shoes or in another's place.

## Compassionate empathy

Means caring for the team and the needs of clients, customers, users, and future maintainers.

## Emotional empathy

When one can feel another person's emotions or share the emotional state of others.

# PRATICES AND EFFECTS

## Understanding the stakeholders

Refers to understanding what stakeholders need, think or feel.

### Effects

+Communication	+Software quality	-Blame
+Trust	+Productivity	
+Feedback	+Problem solving	
+Happiness	+Work culture	
+Work environment	+Self-development	
+Professional growth	+Human connections	
+Inclusion	+Collaboration	
	+Employee retention	

Caption:  
+Positive effect  
-Reductive effect

## Considering differences

Means being able to take the perspective of others.

### Effects

+Communication	+Collaboration
+Trust	+Work culture
+Software quality	+Team
+Happiness	+Productivity
+Self-development	+Professional growth
+Problem solving	+Work environment
+Inclusion	

## Actively listening

Means actively listening to the needs of the stakeholders and asking meaningful questions.

### Effects

+Communication	+Collaboration	-Blame
+Trust	+Feedback	
+Self-development	+Work culture	
+Morale	+Productivity	
	+Work environment	

Caption:  
+Positive effect  
-Reductive effect

## Being mindful

Means being mindful of the stakeholders' needs.

### Effects

+Collaboration	+Self-development
+Leadership	+Psychological safety
+Software quality	+Motivation
+Trust	+Team
+Professional growth	+Employee retention
+Work environment	

## Taking care

Means taking care of the stakeholders.

### Effects

+Trust	+Leadership	-Stress
+Work environment	+Human connections	-Burnout
+Professional growth	+Productivity	
	+Work culture	

Caption:  
+Positive effect  
-Reductive effect

## Admitting mistakes

Refers to admitting being wrong and creating a continuous learning culture seen as learning from mistakes.

### Effects

+Trust	+Software quality
+Employee retention	+Productivity

# Cognitive empathy

Refers to understanding, perspective taking, and embodiment.

---

- **Understanding** is the capacity to understand another person's thoughts, needs, feelings, problems, and experiences.
- **Perspective taking** is taking into account. Imagining or seeing another's perspective.
- **Embodiment** is the capacity to put oneself in someone else's shoes or in another's place.

# Compassionate empathy

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Means caring for the team and the needs of clients, customers, users, and future maintainers.

# Emotional empathy

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When one can feel another person's emotions or share the emotional state of others.

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## MEANING

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## PRATICES AND EFFECTS

### Understanding the stakeholders

Refers to understanding what stakeholders need, think or feel.

Effects		
+Communication	+Software quality	-Blame
+Trust	+Productivity	
+Feedback	+Problem solving	
+Happiness	+Work culture	
+Work environment	+Self-development	
+Professional growth	+Human connections	
+Collaboration	+Collaboration	
+Inclusion	+Employee retention	

### Considering different perspectives

Means being able to take the perspective of the stakeholders.

Effects		
+Communication	+Collaboration	-Stress
+Trust	+Work culture	-Blame
+Software quality	+Team	
+Happiness	+Productivity	
+Self-development	+Professional growth	
+Problem solving	+Work environment	
+Inclusion		

### Adopting good programming practices

Refers to choosing good variable names, simple code and design, maintaining a consistent architecture, adopting single responsibility, fixing what is possible, using abstractions, modularisation, documenting and adding comments to the code.

Effects		
+Communication	+Confidence	
+Respect	+Team	
+Software quality	+Collaboration	
+Developers' onboarding	+Productivity	
	+Work culture	

### Being compassionate

Means being polite, respectful and kind to other stakeholders. Showing compassion towards others. Communicating with kindness in a nonviolent way. Compassionate coding in a meaningful way.

Effects		
+Communication	+Human connections	-Blame
+Trust	+Motivation	-Frustration
+Software quality	+Work culture	
+Collaboration	+Team	
+Team success	+Productivity	
+Work environment		

### Running tests

Refers to testing the software.

Effects		
+Communication	+Confidence	
+Compassion	+Team	
+Software quality	+Work culture	
+Pride	+Professional growth	

### Actively listening

Means actively listening to the needs of the stakeholders and asking meaningful questions.

Effects		
+Communication	+Collaboration	-Blame
+Trust	+Feedback	
+Self-development	+Work culture	
+Morale	+Productivity	
	+Work environment	

### Being mindful

Means being mindful of interactions with any of the stakeholders.

Effects		
+Collaboration	+Self-development	
+Leadership	+Psychological safety	
+Software quality	+Motivation	
+Trust	+Team	
+Professional growth	+Employee retention	
+Work environment		

### Accepting and giving feedback

Means being open to receiving feedback and providing positive, specific, constructive and actionable feedback to the stakeholders.

Effects		
+Trust	+Work environment	
+Respect	+Human connections	
+Software quality	+Collaboration	
+Work culture	+Productivity	
	+Feedback	

### Being open

Means communicating honestly and sharing knowledge with team members.

Effects		
+Communication	+Human connections	
+Respect	+Pride	
+Trust	+Productivity	
+Motivation	+Professional growth	
+Psychological safety	+Software quality	

### Being patient

Means staying calm under pressure, slowing down, offering empathy, and proceeding calmly.

Effects		
+Trust	+Software quality	-Anxiety
+Employee retention	+Work environment	-Stress
+Communication	+Feedback	-Blame
+Professional growth	+Productivity	

### Taking care

Means taking care of the stakeholders.

Effects		
+Trust	+Leadership	-Stress
+Work environment	+Human connections	-Burnout
+Professional growth	+Productivity	
	+Work culture	

### Admitting failures

Refers to admitting being wrong, accepting mistakes, and creating a continuous learning culture where failures are seen as learning opportunities.

Effects		
+Trust	+Software quality	-Anxiety
+Employee retention	+Productivity	-Stress

### Embodying the stakeholders

Means getting in their shoes.

Effects		
+Communication		
+Leadership		
+Software quality		

### Reviewing the code

Means reviewing the code before submitting it.

Effects		
+Software quality	+Communication	
+Respect	+Collaboration	
+Productivity		

### Being supportive

Means offering support to other colleagues and team members.

Effects		
+Work culture		
+Trust		
+Employee retention		

## FRAMEWORK GUIDE

### Concepts

**Meaning:** software practitioners mention three facets of empathy: cognitive empathy, compassion, and emotional empathy.

**Practices:** how to practice empathy in software engineering, according to the practitioners' perception.

**Effects:** the expected effects of practicing empathy in software engineering.

### Navigation



### Elements



# Understanding the stakeholders

---

Refers to understanding what stakeholders need, think or feel.

---

## Effects

- +Communication
- +Trust
- +Feedback
- +Happiness
- +Work environment
- +Professional growth
- +Inclusion

- +Software quality
- +Productivity
- +Problem solving
- +Work culture
- +Self-development
- +Human connections
- +Collaboration
- +Employee retention

-Blame

### Caption:

+Positive effect

-Reductive effect

# Considering different perspectives

---

Means being able to take the perspective of the stakeholders.

---

## Effects

- +Communication
- +Trust
- +Software quality
- +Happiness
- +Self-development
- +Problem solving
- +Inclusion

- +Collaboration
- +Work culture
- +Team
- +Productivity
- +Professional growth
- +Work environment

- Stress
- Blame

### Caption:

+Positive effect

-Reductive effect



# Adopting good programming practices

---

Refers to choosing good variable names, simple code and design, maintaining a consistent architecture, adopting single responsibility, fixing what is possible, using abstractions, modularization, documenting and adding comments to the code.

---

## Effects

- |                         |                |
|-------------------------|----------------|
| +Communication          | +Confidence    |
| +Respect                | +Team          |
| +Software quality       | +Collaboration |
| +Developers' onboarding | +Productivity  |
|                         | +Work culture  |

**Caption:**

+Positive effect

# Being compassionate

---

Means being polite, respectful and kind to other stakeholders. Showing compassion towards others. Communicating with kindness in a nonviolent way. Compassionate coding in a meaningful way.

---

## Effects

- +Communication
- +Trust
- +Software quality
- +Collaboration
- +Team success
- +Work environment

- +Human connections
- +Motivation
- +Work culture
- +Team
- +Productivity

- Blame
- Frustration

### Caption:

+Positive effect

-Reductive effect

# Running tests

---

Refers to testing the software.

---

## Effects

- +Communication
- +Compassion
- +Software quality
- +Pride

- +Confidence
- +Team
- +Work culture
- +Professional growth

**Caption:**

+Positive effect

# Actively listening

---

Means actively listening to the needs of the stakeholders and asking meaningful questions.

---

## Effects

- +Communication
- +Trust
- +Self-development
- +Morale

- +Collaboration
- +Feedback
- +Work culture
- +Productivity
- +Work environment

-Blame

### Caption:

+Positive effect

-Reductive effect

# Being mindful

---

Means being mindful of interactions with any of the stakeholders.

---

## Effects

- +Collaboration
- +Leadership
- +Software quality
- +Trust
- +Professional growth
- +Work environment

- +Self-development
- +Psychological safety
- +Motivation
- +Team
- +Employee retention

**Caption:**

+Positive effect

# Accepting and giving feedback

---

Means being open to receiving feedback and providing positive, specific, constructive and actionable feedback to the stakeholders.

---

## Effects

- +Trust
- +Respect
- +Software quality
- +Work culture

- +Work environment
- +Human connections
- +Collaboration
- +Productivity
- +Feedback

**Caption:**

+Positive effect

# Being open

---

Means communicating honestly and sharing knowledge with team members.

---

## Effects

- |                       |                      |
|-----------------------|----------------------|
| +Communication        | +Human connections   |
| +Respect              | +Pride               |
| +Trust                | +Productivity        |
| +Motivation           | +Professional growth |
| +Psychological safety | +Software quality    |

**Caption:**

+Positive effect

# Being patient

---

Means staying calm under pressure, slowing down, offering empathy, and proceeding calmly.

---

## Effects

+Trust  
+Employee retention  
+Communication  
+Professional growth

+Software quality  
+Work environment  
+Feedback  
+Productivity

-Anxiety  
-Stress  
-Blame

### Caption:

+Positive effect

-Reductive effect



# Taking care

---

Means taking care of the stakeholders.

---

## Effects

+Trust  
+Work environment  
+Professional growth

+Leadership  
+Human connections  
+Productivity  
+Work culture

-Stress  
-Burnout

### Caption:

+Positive effect

-Reductive effect

# Admitting failures

---

Refers to admitting being wrong, accepting mistakes, and creating a continuous learning culture where failures are seen as learning opportunities.

---

## Effects

+Trust

+Employee retention

+Software quality

+Productivity

-Anxiety

-Stress

**Caption:**

+Positive effect

-Reductive effect

# Embodying the stakeholders

---

Means getting in their shoes.

---

## Effects

- +Communication
- +Leadership
- +Software quality

**Caption:**

+Positive effect

# Reviewing the code

---

Means reviewing the code before submitting it.

---

## Effects

- +Software quality
- +Respect
- +Productivity

- +Communication
- +Collaboration

**Caption:**

+Positive effect

# Being supportive

---

Means offering support to other colleagues and team members.

---

## Effects

- +Work culture
- +Trust
- +Employee retention

**Caption:**

+Positive effect

# Concepts

---

**Meaning:** software practitioners mention three facets of empathy cognitive empathy, compassion, and emotional empathy.

---

**Practices:** how to practice empathy in software engineering, according to the practitioners' perception.

---

**Effects:** the expected effects of practicing empathy in software engineering.

# Navigation

## Framework of Empathy in Software Engineering

Clicking on a blue bracket will present an empathetic practice and its effects.

Clicking on a purple bracket will show a facet of empathy.

### MEANING

#### Cognitive empathy

Refers to understanding, perspective taking, and embodiment.  
• **Understanding** is the capacity to understand another person's thoughts, needs, feelings, problems, and experiences.  
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#### Compassionate empathy

Means caring for the team and the needs of clients, customers, users, and future maintainers.

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When one can feel another person's emotions or share the emotional state of others.

### PRATICES AND EFFECTS

#### Understanding the stakeholders

Refers to understanding what stakeholders need, think or feel.

**Effects**  
• Communication  
• Trust  
• Feedback  
• Happiness  
• Work environment  
• Professional growth  
• Productivity

Stress

Empathy

Proactive effect

Reactive effect

#### Considering different perspectives

Means being able to take the perspective of the stakeholders.

**Effects**  
• Communication  
• Trust  
• Feedback  
• Happiness  
• Self-development  
• Problem solving  
• Innovation

Stress

Empathy

Proactive effect

Reactive effect

#### Adopting good programming practices

Refers to choosing good readable names, simple code and design, maintaining a consistent architecture, sharing single responsibility, being what is possible, using abstractions, modularity, discovering and solving constraints in the code.

**Effects**  
• Communication  
• Happiness  
• Team success  
• Software quality  
• Collaboration  
• Productivity  
• Work culture

Empathy

Proactive effect

Reactive effect

#### Being compassionate

Means being gentle, respectful and kind to other stakeholders. Showing compassion towards others. Communicating with kindness in a consistent way. Compassionate coding in a meaningful way.

**Effects**  
• Communication  
• Trust  
• Feedback  
• Happiness  
• Work environment  
• Professional growth  
• Productivity

Stress

Empathy

Proactive effect

Reactive effect

#### Running tests

Refers to testing the code.

**Effects**  
• Communication  
• Trust  
• Feedback  
• Happiness  
• Work environment  
• Professional growth  
• Productivity

Stress

Empathy

Proactive effect

Reactive effect

#### Actively listening

Means actively listening to the needs of the stakeholders and asking meaningful questions.

**Effects**  
• Communication  
• Trust  
• Self-development  
• Happiness  
• Work environment  
• Professional growth  
• Productivity

Stress

Empathy

Proactive effect

Reactive effect

#### Being mindful

Means being mindful of interactions with any of the stakeholders.

**Effects**  
• Communication  
• Leadership  
• Feedback  
• Happiness  
• Self-development  
• Psychological safety  
• Innovation

Stress

Empathy

Proactive effect

Reactive effect

#### Accepting and giving feedback

Means being open to receiving feedback and providing positive, specific, constructive and actionable feedback to the stakeholders.

**Effects**  
• Trust  
• Happiness  
• Feedback  
• Team success  
• Software quality  
• Collaboration  
• Productivity  
• Work culture

Empathy

Proactive effect

Reactive effect

#### Being open

Means communicating honestly and sharing knowledge with team members.

**Effects**  
• Communication  
• Trust  
• Feedback  
• Happiness  
• Work environment  
• Professional growth  
• Productivity

Stress

Empathy

Proactive effect

Reactive effect

#### Being patient

Means staying calm under pressure, slowing down, offering empathy, and providing safety.

**Effects**  
• Trust  
• Happiness  
• Feedback  
• Team success  
• Software quality  
• Collaboration  
• Productivity  
• Work culture

Stress

Empathy

Proactive effect

Reactive effect

#### Taking care

Means taking care of the stakeholders.

**Effects**  
• Trust  
• Happiness  
• Feedback  
• Team success  
• Software quality  
• Collaboration  
• Productivity  
• Work culture

Stress

Empathy

Proactive effect

Reactive effect

#### Admitting failures

Refers to admitting being wrong, accepting mistakes, and creating a continuous learning culture where failures are seen as learning opportunities.

**Effects**  
• Trust  
• Happiness  
• Feedback  
• Team success  
• Software quality  
• Collaboration  
• Productivity  
• Work culture

Stress

Empathy

Proactive effect

Reactive effect

#### Embodying the stakeholders

Means getting in their shoes.

**Effects**  
• Communication  
• Trust  
• Feedback  
• Happiness  
• Work environment  
• Professional growth  
• Productivity

Empathy

Proactive effect

Reactive effect

#### Reviewing the code

Means reviewing the code before submitting it.

**Effects**  
• Software quality  
• Happiness  
• Feedback  
• Team success  
• Communication  
• Collaboration

Stress

Empathy

Proactive effect

Reactive effect

#### Being supportive

Means offering support to other colleagues and team members.

**Effects**  
• Work culture  
• Trust  
• Happiness  
• Feedback  
• Team success  
• Software quality  
• Collaboration  
• Productivity

Stress

Empathy

Proactive effect

Reactive effect

### FRAMEWORK GUIDE



Framework guide

# Elements

## Facet of empathy

*Facet*  
**Compassionate empathy**

*Description*  
Means caring for the team and the needs of clients, customers, users, and future maintainers.

## Empathetic practice and its effects

*Practice*  
**Being patient**

Means staying calm under pressure, slowing down, offering empathy, and proceeding calmly.

### Effects

+Trust	+Software quality	-Anxiety
+Employee retention	+Work environment	-Stress
+Communication	+Feedback	-Blame
+Professional growth	+Incident solving	

*Effects*

*Description*

*Caption*

**Caption:**  
+Positive effect  
-Reductive effect