

Appendix A - Large Scale Survey

Empathy Guidelines in SE

Purpose: The survey aims to assess the importance of adopting the developed empathy guidelines, ease of their adoption, likelihood of adoption, and gather software practitioners' feedback on potential improvements.

Section 1:

1 - How old are you?

Answers: **(Multiple choice - select one)**

Below 20, 20-30, 31-40, 41-50, 51-60, 61-70, Above 70, Prefer not to answer

2 - How do you identify your gender?

Answers:

- Woman
- Man
- Prefer to self-describe as (Add a textbox to capture input)
- Prefer not to answer

3 - What is your Country of residence?

Answers: **Dropdown** of countries to select from or input field

4 - Country of your residence when you were working on your most recent role where you interacted with other software practitioners?

Answers: **Dropdown** of countries to select from or input field

5 - How many years of experience do you have in working as a software practitioner?

Answers: **(Multiple choice - select one)**

- Less than 1 year
- Between 1-2 years
- Between 3-5 years
- Between 5-10 years
- Between 10-15 years
- Between 15-20 years
- Between 20-30 years
- Between 30-40 years
- Between 40-50 years
- More than 50 years

6 - What is the title/designation of your current role? (**Short answer**)

7 - What are the job responsibilities of your current role?

8 - What types of software development methodologies have you primarily been involved in? (Select all that apply)

Answers: (Checklist of items)

- Traditional (Waterfall)
- Agile - Kanban
- Agile - Scrum
- Agile - XP
- Other (Please specify)

9 - What is the nature of the organisation you are affiliated with in your current role?

Answers: (Multiple choice - select one)

- Self-Employed
- Startup (5-10 employees)
- Small (10 -100 employees)
- Medium (100 - 500 employees)
- Large (More than 500 employees)

10 - How many team members are part of your current team?

Answers: (Multiple choice - select one)

- No members
- Less than or equal to 5
- 5-10
- 10-20
- More than 20

Section 2:

We have developed 17 actionable guidelines aimed at enhancing software development practices and improving practitioners' well-being by fostering empathy and addressing the negative effects of its absence. Each guideline is explained below. Please read the explanations carefully and answer the questions below.

G1 - Fostering strong relationships among stakeholders: Strong relationships foster trust, open communication, and mutual understanding, which are key to cultivating empathy and enhancing collaboration, reducing misunderstandings, and creating a shared sense of purpose. Practitioners can achieve this guideline by being empathetic, friendly, and supportive in daily interactions. At the managerial level, team bonding can be promoted through informal activities such as dinners or outings.

At the organisational level empathy can be integrated into company values to reinforce its importance and host company wide events to strengthen connections across departments fostering teamwork.

G2 - Bridging the technical and non-technical gap: Bridging this gap is crucial for successful collaboration. Practitioners can help non-technical stakeholders better understand developers' technical work, tailor technical explanations to the audience's understanding, and use scenarios to illustrate business use cases clearly. Managers can facilitate direct developer interactions with end-users, and include cross-functional team members who understand both technical and non-technical aspects to bridge the gap. These actions foster empathy, enhance collaboration, and align technical and business needs for better outcomes.

G3 - Reducing friction among different stakeholder groups: Interactions between different SE roles can sometimes lead to friction due to the nature of their responsibilities. For instance, developers and testers frequently work closely, with developers building products and testers identifying issues within those products. This dynamic can naturally create friction, as the roles inherently involve critique and evaluation. Fostering empathy by understanding that these actions are part of professional duties, not personal attacks, can help mitigate this friction. Managers, senior practitioners, and organisations should promote this perspective and lead by example to create a more empathetic work environment.

G4 - Encouraging bi-directional communication: Clear and effective two-way communication is essential for fostering empathy and building strong collaborative relationships. Practitioners can adopt this guideline by actively engaging in open, bi-directional communication, ensuring clarity, being receptive during exchanges, and using non-verbal cues like gestures, body language to enhance understanding. Managers and organisations can promote this guideline by ensuring a proper two-way flow of communication between leadership and practitioners. This builds trust, reduces misunderstandings, and fosters mutual understanding, which are key elements in cultivating empathy.

G5 - Ensuring transparency about business goals: Transparent business goals allow practitioners to better align their work with organisational objectives. A proactive approach at managerial and organisational levels is essential for clearly communicating these goals. Understanding the broader business context fosters empathy towards business needs, reduces misunderstandings, and promotes collaboration, cohesion, and a shared sense of purpose across teams.

G6 - Use an empathetic approach to improve requirements engineering (RE) processes: Developers often cited unclear requirements as a result of stakeholders' lack of empathy. They emphasised the need for clear requirements and actively clarifying uncertainties about business and user perspectives. Practitioners can empathise with the challenges their peers face due to unclear requirements and ensure clear communication during requirements gathering and clarification. When developers apply empathy in the RE process, they can better align with user needs, leading to higher-quality products.

G7 - Collaborative problem solving: Involving both technical and non-technical stakeholders in resolving technical issues to enhance solution quality by considering the perspectives of all parties. This can be implemented at both practitioner and managerial levels during problem-solving discussions.

G8 - Empathy during agile ceremonies: Demonstrating empathy during sprint planning, daily stand-ups, sprint reviews, and retrospectives can enhance the development processes. Participants noted that empathy in sprint planning led to more realistic work allocation, while empathy in daily stand-ups helped address challenges and offer support. Empathy during sprint retrospectives and reviews was crucial for fostering a positive team culture and collaborative problem-solving. This can be applied at both practitioner and managerial levels by incorporating these empathetic practices.

G9 - Empathetic feedback process: Empathy during the feedback process to ensure providing respectful and constructive feedback, helps practitioners feel appreciated and valued in their work. It also helps developers better understand and accept user feedback, preventing resistance to necessary changes, enhancing the overall development process. It can be adopted at both practitioner and managerial levels during formal or informal feedback sessions.

G10 - Creating a safe space: Fostering a safe environment where team members can share concerns without fear of judgement promotes well-being and positive team dynamics, enhancing mutual understanding and support. Empathy plays a key role in creating and maintaining this safe space, encouraging openness and trust. Practitioners can contribute by engaging in empathetic interactions, while managers and organisations can institutionalise it by embedding empathy into the company culture and values.

G11 - Backup plans to manage unexpected outcomes: Participants highlighted that personal or family emergencies can sometimes take priority over work, affecting individual and team performance. They recommended implementing backup plans to reduce the impact on projects, including being empathetic towards such situations and using strategies such as incorporating slack time, training backup team members, and liaising with clients to adjust timelines. These strategies can be adopted at both managerial and organisational levels to support team members during unforeseen personal events.

G12 - Flexibility in handling human issues: Lack of empathy from stakeholders during crisis situations lead to negative outcomes, including resignations. In contrast, empathetic support allows team members to handle emergencies and return with renewed loyalty. Demonstrating empathy and flexibility in these situations fosters team loyalty and contributes to project success. Practitioners can apply this guideline by showing empathy towards colleagues facing personal emergencies. Managers can offer flexible work arrangements, and organisations can formalise this through new leave schemes or flexible work policies.

G13 - Emphasising the real-world impact of developers' work: Developers' disconnection from end-users makes it harder for them to recognise the impact of their work. Helping developers see the tangible effects of their work fosters empathy towards user needs, resulting in better product quality. Using storytelling frameworks such as the hero's journey or three-act structure can make the real-world

impact more relatable. At practitioner level, those with direct access to end-users can communicate this impact, helping others see its value. At managerial and organisational levels, this can be highlighted during evaluations, one-on-one meetings, and sprint retrospectives. Organisations can also share success stories on internal platforms, reinforcing the importance of developers' work across the company.

G14 - Building an empathetic team and company culture: Company and team culture influences the ability of practitioners to express empathy. Empathy is influenced by leadership, with team members more likely to express empathy when leadership models it. Given the substantial time individuals spend at work, fostering an empathetic culture is crucial for maintaining mental health and well-being. This can be adopted at all levels: practitioners can contribute by fostering an empathetic team environment in daily interactions, while managers and organisations can promote it through team-building activities and empathetic leadership. To be effective, empathy needs to be consistently demonstrated from the top down, with everyone in the chain embodying it, not just when it is convenient or beneficial.

G15 - Empathy education and training: Integrating empathy and interactive skills into SE curricula to prepare students for the industry as empathetic professionals. Empathy training in professional environments helps practitioners to incorporate empathy into their daily practices. Practitioners can participate in relevant training programs, while managers and organisations can organise and promote such initiatives. Educators are key to incorporating empathy and interactive skills training into SE curricula, to foster empathetic skills early on.

G16 - Diversity, Equity, and Inclusion (DEI) policies: Organisations can foster a culture of empathy by implementing DEI policies that value diverse perspectives and create an environment where employees feel safe, respected, and included. These policies encourage open communication, build trust, and enhance understanding within teams, laying the foundation for stronger empathy. Although this strategy does not directly address the causes of a lack of empathy, it plays a pivotal role in cultivating empathy across the organisation.

G17 - Managing empathy fatigue: Excessive empathy can lead to empathy fatigue, making it crucial to address this challenge through clear boundaries and a focus on self-care. Practitioners should prioritise their well-being, recognising when to step back and recharge. Managers can support this by fostering a culture where it is acceptable to decline additional responsibilities when overwhelmed and encouraging open dialogue about workload and emotional strain. Organisations can provide resources, such as counselling or mental health support, to help practitioners manage empathy fatigue effectively.

11 - Based on your experience as a software practitioner, **how important do you think** our proposed guidelines are for implementation in real-world industry settings?

Guideline	Critical to Have	Very Important to Have	Somewhat Important to Have	Nice to Have	Not Necessary to Have
G1 - Fostering strong relationships among stakeholders					
G2 - Bridging the technical and non-technical gap					
G3 - Reducing friction among different stakeholder groups					
G4 - Encouraging bi-directional communication					
G5 - Ensuring transparency about business goals					
G6 - Use an empathetic approach to improve RE processes					
G7 - Collaborative problem solving					
G8 - Empathy during agile ceremonies					
G9 - Empathetic feedback process					
G10 - Creating a safe space					
G11 - Backup plans to manage unexpected outcomes					
G12 - Flexibility in handling human issues					
G13 - Emphasising the real-world impact of developers' work					
G14 - Building an empathetic team and company culture					
G15 - Empathy education and training					
G16 - DEI policies					
G17 - Managing empathy fatigue					

11.1 - Please explain the reason for your rating above.

12 - Based on your experience as a software practitioner, **how practical and easy** are our proposed guidelines to implement in real industry settings?

Guideline	Very Easy	Easy	Neither difficult nor easy	Difficult	Very Difficult	N/A
G1 - Fostering strong relationships among stakeholders						
G2 - Bridging the technical and non-technical gap						
G3 - Reducing friction among different stakeholder groups						
G4 - Encouraging bi-directional communication						
G5 - Ensuring transparency about business goals						
G6 - Use an empathetic approach to improve RE process						
G7 - Collaborative problem solving						
G8 - Empathy during agile ceremonies						
G9 - Empathetic feedback process						
G10 - Creating a safe space						
G11 - Backup plans to manage unexpected outcomes						
G12 - Flexibility in handling human issues						
G13 - Emphasising the real-world impact of developers' work						
G14 - Building an empathetic team and company culture						
G15 - Empathy education and training						
G16 - DEI policies						
G17 - Managing empathy fatigue						

12.1 - Please explain the reason for your rating above.

13 - Would you **consider using our proposed guidelines** to enhance empathy in your software engineering practice?

Guideline	I am currently using it	I will definitely use it	I am likely to regularly use it	I might occasionally use it	I am unlikely to use it	I will never use it
G1 - Fostering strong relationships among stakeholders						
G2 - Bridging the technical and non-technical gap						
G3 - Reducing friction among different stakeholder groups						
G4 - Encouraging bi-directional communication						
G5 - Ensuring transparency about business goals						
G6 - Use an empathetic approach to improve RE process						
G7 - Collaborative problem solving						
G8 - Empathy during agile ceremonies						
G9 - Empathetic feedback process						
G10 - Creating a safe space						
G11 - Backup plans to manage unexpected outcomes						
G12 - Flexibility in handling human issues						
G13 - Emphasising the real-world impact of developers' work						
G14 - Building an empathetic team and company culture						
G15 - Empathy education and training						
G16 - DEI policies						
G17 - Managing empathy fatigue						

13.1 - Please explain the reason for your selection above.

14 - Select the top 5 guidelines from above 17 guidelines listed above that you would apply in your work. Explain how you plan to incorporate these guidelines into your daily work and practices, and outline any specific steps or approaches you plan to take.

15 - Do you see any limitations in the proposed guidelines for fostering empathy, or any challenges in adopting them within software engineering? What improvements would you suggest to address these limitations?

16 - Is there anything else you would like to share with us?