

Developer Troubleshooting Study Interview Protocol

Interview goals: Collect qualitative data *to understand the experience of troubleshooting in software development, workflows and strategies, difficulties, and collaboration patterns.*

Introduction: Interviewer describes the context, the motivation and the goal of the study. The participant is also informed that all information collected will be anonymized and it won't be shared outside the team of researchers directly involved in the project. The interviewer asks the participant for his/her consent to record the interview as well.

Hi [NAME], and welcome. I am Arty Starr, a researcher from the computer-human interaction and software engineering lab, chisel, at University of Victoria, working in collaboration with my supervisor, Dr. Margaret-Anne Storey.

We would like to learn about your experiences of troubleshooting in software development – strategies used, difficulties faced, and how you collaborate with others on your team to troubleshoot problems. My PhD research is focused on developing a theory of momentum in software development, and how we can measure the experience of “friction” and “flow”. We are focused on understanding developer troubleshooting, in particular, because it's one of the best opportunities to learn about the cognitive processes of software development, so we can build better tools to support developers.

I also want to inform you that I've personally been a software engineer in industry for about 20 years, so it's okay if you speak in familiar developer terms in answering the questions, I'll be able to understand what you mean.

Only the researchers involved in this study will see your responses, and we will summarize the responses so they are fully anonymized. Your participation in this study is voluntary, and you do not have to answer any question that makes you uncomfortable, and you can stop the interview whenever you want. We'd like to encourage you to refrain from sharing identifying information as much as possible, such as names of 3rd parties, and to refrain from sharing any confidential information during the interview.

The interview should take no longer than 60 min. During the interview we will ask several questions, and we would appreciate it if you respond only based on your personal experiences. If needed, feel free to take your time in answering the questions.

So, before we get started, do you have any questions?

If this is clear, and you have no more questions, do I have your permission to record the interview?

Demographics

1. Could you please introduce yourself?
2. Could you describe the people you work closely with at your organization?

Generalized Experiences of Troubleshooting

We're going to be talking a lot about **troubleshooting**. If you think about experiences, where you were coding something, then you ran an application or a test, and then got some unexpected output that you

didn't understand, then had to troubleshoot the problem – these friction points that we run into during our everyday coding experiences, is what I want to spend some time understanding better with you.

1. From your experience, what makes these troubleshooting experiences easy versus difficult?
2. What sort of tools and strategies do you normally use, if any, to enhance your ability to troubleshoot?
3. Are there different types of troubleshooting situations? How would you categorize the different types of situations you encounter?
4. What resources (websites, tutorials, references, communities) do you usually use/access while troubleshooting? How often do you use them? Can you give me an example scenario?

Recalling a Specific Troubleshooting Experience

1. Can you think of a recent experience, where you were coding something, then you ran an application or a test, and then got some unexpected output that you didn't understand? First, just try to think of a specific experience.
2. Can you walk me through the experience and steps you went through? How did you first encounter the problem? (then what happened after that?)
3. Did you write down or record anything while you were troubleshooting? What sort of tools did you use to help you think through the problem? (follow up) Did you keep any of this information for future use?
4. How did you feel when you were troubleshooting?
5. How did you feel after you solved the problem?
6. About how long did it take you to troubleshoot the problem?
7. On a scale from 1-10, 1 being the easiest, and 10 being the hardest troubleshooting experience you've ever had, how would you rate this particular troubleshooting experience?

[Interviewer: Just a reminder that all the information provided in this interview will be treated confidentially. Names of companies and people will be anonymized and not shared outside the research team]

Generalized Experiences of Team Troubleshooting Collaboration

Next, let's talk about what happens when we get stuck troubleshooting a hard problem, and need some help from our team.

1. From your experience, when do you typically decide to ask a team member for help?
2. How do you typically reach out?
3. How do you usually decide who to ask?
4. What are some of the challenges that come up with trying to collaborate on a problem?
5. What are some of the strategies you've found that make this collaboration easier?

Recalling a Specific Ask for Help Experience

1. What is an experience you remember where you were troubleshooting and asked a team member for help? First, just try to think of a specific experience.
2. First, what was the problem you were troubleshooting, and what made you decide to ask for help?

3. How did you decide who to ask?
4. How did you go about communicating the problem?
5. How did collaborating affect your ability to resolve the problem?

Recalling a Specific Helper Experience

1. What is an experience you remember where someone else on your team was troubleshooting, and you were asked for help? First, just try to think of a specific experience.
2. What were you doing or trying to do when your teammate asked you for help?
3. How did your teammate go about communicating the problem to you?
4. What did you do to help?
5. How did collaborating affect you and your teammate's ability to resolve the problem?

Ideas for Improvement

1. What would you suggest are some potential opportunities to support software developers in being more effective at troubleshooting?
2. What would you suggest are some potential opportunities to make team collaborative troubleshooting easier?

Closing: Interviewer thanks the participant for joining the study and briefly describes the next steps in the study and the possibility to contact him/her again for a focus group session.

That was my last question, is there anything else you want to share about your experiences, or things that you think should be included in the study?

Thank you for participating in the study, this concludes the interview.

For this study, we were interested in learning about your experiences of troubleshooting in software development. We also plan to do a follow up focus group to share what we've learned from the interviews, get feedback, and also demo some ideas for cognitive support tools for software developers, and get your thoughts and feedback on the tooling ideas as well.

Would it be alright if we contacted you about participating in the focus group?

Our next step is to process and transcribe this interview. We will securely process the recording and the transcript. If at any point in time, you decide you want to withdraw from the study, you can email us and we will remove your data. Also feel free to email us if you have any questions.

Do you have any final questions or any further comments?

Alright, I'm going to stop recording.

Thank you very much for your time.