

The interview guide used during interviews for the Component Comprehension in Context research project.

Accompanies the ICPC 2023 article "Understanding initial API comprehension".

Phases of the interview

Phase 0 - Instructions and consent

Explain the purpose and format of the interview:

- The interviews are part of the *Component Comprehension in Context* research project that aims to analyse programmers' API comprehension processes in professional software engineering settings
- The interview has two stages. During the first stage, the participant will be asked some questions about their programming experience and education, as well as their current job. In the second stage, we will focus on some event where the participant had to learn to use a new API.
- Ask if participant has any questions

Explain data management policy, and provide the *Privacy notice* document (if interview is over zoom, privacy notice and consent form have been sent beforehand to the participant).

- Interviews will be recorded and transcribed. The interview tapes, transcripts, diagrams drawn during the interviews and any notes taken during the interview will be store in a secure folder accessible only by the research team
- Data will be stored with identifiable information for 3 years, and the pseudonymized transcripts will be stored for another 5 years.
- The participant can, at any time, request to see the data stored about them and request the data to be removed. They can also at any time drop out of the study, and there will be no consequences for doing so. Contact information for the research team and the data management team are provided in the privacy notice document.

Ask if the participant has any questions.

Ask if participant can sign the *consent to participate* form, and ask if they want to have their own copy of the form. If participant consents, continue with the interview.

Phase 1 - Background

The actual interview will start with some general questions about the participant's programming experience, their education, and their current job.

Ask the following questions:

- **Where the participant first learned to code?**
 - The aim here is to understand the participants level of experience and the time they have been programming.
 - **What is your educational background?**
 - (if applicable) **What was your major during your studies?**
 - **What is your current job role?**
 - **What kinds of responsibilities does this role involve?**
 - **What kinds of programming languages, technologies, and APIs do you currently use in your job?** If there are many, what are the most important ones?
 - **How much experience did you have with these programming languages, technologies, and APIs before you started to use them for this job?**
-

Phase 2 - incident selection

During this phase, the aim is to identify a suitable event that the participant can discuss in the next phase of the interview.

Prompt the participant to recall an event when they had to learn to use a new API.

If the participant does not come up with one, use some guiding questions to help them recall a suitable event:

- **Have they recently had to learn to use a new API?**
- **Do they remember a case when learning a new API was especially difficult?**
- **When was the last time they had to learn to use a new API?**

After the participant has recalled a suitable event, move on to the incident walkthrough.

Phase 3 - Incident walkthrough

During this phase, ask the participant to explain how they learned to use the API.

As the participant is explaining the event, draw a diagram on what happens: What the main events are, what the participant does and what the order of events is.

As you start to draw, explain that you are drawing a diagram to detail the participant's story, and that they can say at any point of you draw something inaccurately or something does not make sense in the diagram.

Make sure the diagram is visible to the participant at all times.

In practice, we have noticed that it is often helpful to guide the participant in the beginning, and ask questions such as:

- **Why did you have to learn to use this API?**

- What was the task you had to do?
- What was the first thing you did when you started to learn the API?

Let the participant explain their story freely. However, if the participant struggles to describe the event, use guiding questions to prompt them such as:

- So what did you do next?
- What happened next?
- So you just did x, what did you do then?
- So after you did x, were you able to finish the task or did you need to do something else first?

As the participant is telling the story, ask directed questions when they discuss something you would like more information about. Below is a list of items of interest, which can be used to find elements of the story to focus on. The list also provides some sample directed questions related to each element. The list is not definitive and questions should not be limited to those mentioned, and can be modified to fit the participant and the event they are describing.

Phase 4 - Wrapping up the interview

After the participant has come to some kind of conclusion in their story or otherwise indicates that they have come to the end of the story, it is time to wrap up the interview. If there is still a lot of time remaining, you may ask them to recall another event.

Sometimes the time available for the interview ends before the participant gets to the end of the story. In these cases you can prompt the participant a few minutes before the time ends, that you will have to wrap up soon.

Before stopping the recording, ask if there is anything else the participant wants to say. Then thank the participant and ask if they have any questions.

Items of interest

Mental Models

Mental models refer to the participant's understanding of the API at any given point of the comprehension process.

Directed questions related to mental models can be:

- What did you think the API does at this point?

- How did you think the API worked?
- Can you describe what you thought the API is?

Knowledge

Knowledge refers to the participants' knowledge that they use during API comprehension.

In practice, we have often noticed participants to say things like "I knew that...." or "Because x is..." or even "It is known that..." or "Everyone knows that...". Statements like this indicate that participant has used their knowledge.

In practice, we have also noticed that in some situations participants state they had some information about the API but do not explain how they got it, such as knowing that a specific kind of API should not be used in a specific environment. In these cases the participant has also often used their knowledge.

Directed questions related to knowledge can be:

- **Have you done similar tasks before?**
- **Have you used similar APIs before?**
- **Were you familiar with x before?**
- **How did you know x?**
- **Did you know about x already?**
- **What did you know about x before doing y?**

Information needs

Information needs refer to the information the participant says they needed or were looking at some point of the API comprehension process.

Directed questions related to information needs can be:

- **What information were you looking for?**
- **What were you trying to find?**
- **Were you looking for something specific about x?**
- **What did you need to know?**

Actions

Actions refer to the different actions the participant performed to comprehend the API.

Directed questions related to actions can be:

- **What did you do then?**
- **What did you do to find x?**
- **What did you do to figure that out?**
- **Did you have to do something to get that information?**

Reasoning

Reasoning refers to how the participant decides to do something -- why and how they decided to do the actions they did when they did.

Directed questions related to reasoning can be:

- **Why did you decide to do that?**
 - **Why did you decide to use x to do that?**
 - **How did you decide to do that?**
 - **How did you decide that x was the best way to do that?**
-