A comprehensive approach to support the analyst before, during, and after requirements elicitation interviews

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Why interviews?

- Elicitation has considerable impact on software quality
Current trends in elicitation

Requirements and features from social media and online reviews

Large groups of people in the process
When are we eliciting?
Why interviews?

• Elicitation has considerable impact on software quality
• Interviews are considered among the most effective technique for knowledge transfer
• Interviews are widely used in the industry
Common problems in interviews

- Use of jargon
- Tacit knowledge
- Domain knowledge
- Ambiguities
- ...

- Unexperienced analysts
- Lack of specific education to become an analyst
- Lack of "soft" skills
- ...

Support for Requirements Elicitation Interviews
Types of solutions

Technology-based Solutions  Human-centered Solutions

Support for Requirements Elicitation Interviews
The overall approach

“Before” support: analysis of common mistakes and development of trainings to avoid them;

Computational thinking skills to the interviewees

“During” support: use of biofeedback and voice analysis to support the analyst during the conversation;

“After” support: development of techniques to analyze the interviews after they have been performed.

NSF SHF: Small: RUI: Before, during, and after requirements elicitation interviews: a comprehensive support for improving the quality of requirements (Award #1718377)
Before support

“Create” better analysts

1. Identify students and young analysts’ common mistakes
2. Investigate ”remedies” for the mistakes
3. Develop a training to better educate analysts
Examples of common mistakes

Wrong opening
- Tell me about your idea

Wrong closing
- I think I have a good understanding, thank you
Examples of common mistakes

**Interrogatory**

1. .....  
2. .....  
3. .....  
4. .....  

**Poor phrasing**

1. YES  
2. NO  
3. YES  
4. NO  

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Support for Requirements Elicitation Interviews
Guidelines to Mitigate Unexperienced Analysts’ Mistakes

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Problem Statement

Based on a previous study involving student analysts conducting requirements elicitation interviews, several mistakes were identified and catalogued after a thorough analysis was made by the study’s contributors. The analysis revealed that there were 9 major points of contention that prevented the student analysts from resolving all ambiguities from their requirements gathering interview. This research goes into detail as to what these problems mean as defined in the referenced paper, and provide ways to prevent or recover from those mistakes once they are made in an interview.

Solution

Perform a Light Systematic Literature Review with the following criteria to establish guidelines for student analysts to follow in elicitation interviews.

(1) Choose the Topic
- Identify the client to the interview and provide initial information to ease them into the interview process.
- Keep in mind the context of the conversation.
- Attempt to gain domain knowledge on the subject to reduce ambiguity.

(2) Identify Databases & Resources
- Determine the performance, reliability, usability, security, and maintainability of the software.
- Determine the non-functional requirements based on that criteria.

(3) Search and Refine Criteria
- Write big, expansive interview questions which can lead to follow-up questions.
- Attempt “conversational-like” interviews.

(4) Read and Analyze Publications
- Use universal terminology so all parties can understand the questions being asked.
- Ask unbiased questions.
- Ask relevant questions that help the interview “flow.”

(5) Compile Data & Write Review
- Figure out who benefits from the system, who is affected by the system, who are the decision makers on the project, and where the resources come from.
- Determine their role & how big a part they play in the project.

(6) Non-Functional Requirements Not Considered
- Summarize the interview for the client.
- Verify that the client has no more questions, comments, or concerns about the interview.

(7) Implicit Goals
- Determine the performance, reliability, usability, security, and maintainability of the software.
- Determine the non-functional requirements based on that criteria.

(8) Implicit Stakeholders
- Identify shortcomings of the present system.
- Determine, based on the shortcomings, the desired functionality of the new system.
- Establish realistic goals based on the desired functionality.

(9) Limitation in Terms of Resources Not Considered
- Ask about the budget and time allocated to a project.
- Determine effort and priorities for the project based on the time and budget.

Light Systematic Literature Review Results

(1) Wrong Opening
- Introduce the client to the interview and provide initial information to ease them into the interview process.
- Keep in mind the context of the conversation.
- Attempt to gain domain knowledge on the subject to reduce ambiguity.

(2) Ambiguity Not Leveraged
- Introduce the client to the interview and provide initial information to ease them into the interview process.
- Keep in mind the context of the conversation.
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(3) Implicit Goals
- Introduce the client to the interview and provide initial information to ease them into the interview process.
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(4) Implicit Stakeholders
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(6) Non-Functional Requirements Not Considered
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- Attempt to gain domain knowledge on the subject to reduce ambiguity.

(7) Interrogation-like Meetings
- Introduce the client to the interview and provide initial information to ease them into the interview process.
- Keep in mind the context of the conversation.
- Attempt to gain domain knowledge on the subject to reduce ambiguity.

(8) Problems Phrasing Questions
- Introduce the client to the interview and provide initial information to ease them into the interview process.
- Keep in mind the context of the conversation.
- Attempt to gain domain knowledge on the subject to reduce ambiguity.

(9) Wrong Closing
- Introduce the client to the interview and provide initial information to ease them into the interview process.
- Keep in mind the context of the conversation.
- Attempt to gain domain knowledge on the subject to reduce ambiguity.

Acknowledgments

Special thanks to Dr. Paola Spoletini for allowing me to work with her on her research this semester. Special thanks also to Alessio Ferrari and Stefania Gnesi for allowing me to work on their research.

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Education for the Interviewees

**Hypothesis**: Interviewees with a basic education on SE/computational thinking are “better” interviewee

- Mini trainings
- General education courses
Initial experiment

**RQ:** Can we use bio-metric sensors and voice analyzers to determine the perceived relevance of certain topics during requirements elicitation interviews?

- Three roles: User, Observer, Requirements Analyst
- Survey concerning the profile of the subject
- Emotions Calibration
- Interview (**38 Questions** – Facebook related): recording of voice and bio-feedback
- Post-Interview Questionnaire
- Data storage
Interview

Usage Habits: How many hours do you use Facebook per day? Privacy: If someone shared a photo of you in an embarrassing, incriminating, or shameful situation, how would you react?

Procedure: Can you explain me how to add a new friend on Facebook?

Relationships: Have you ever wanted to delete or deleted a family member (even of the extended family) from your set of friends?

Money: Would you agree to pay a subscription to use Facebook? If yes, how much would you consider a reasonable amount to pay?

Information: Is the information on Facebook more or less reliable than other sources?

Ethics: FB censures some photos and posts if their content is signaled as inappropriate. Do you think this is correct?
After support

Support for Requirements Elicitation Interviews
Our idea

Support for Requirements Elicitation Interviews
Research plan

**Hypothesis:** Review of requirements elicitation interviews allows identifying ambiguities that can be leveraged to ask useful follow-up questions in future interviews.

An exploratory study

A controlled experiment with two independent groups of students from University of Technology Sydney and Kennesaw State University

An industrial case-study

Support for Requirements Elicitation Interviews
Real-world Case Study

- The protocol is applied in real world

- The usefulness of the questions generated by the protocol will be measured
  - Perceived usefulness
  - Actual usefulness
Conclusion

Before support

Interrogatory

Poor phrasing


does it have any attachment?

Can you give me another question?

Support for Requirements Elicitation Interviews

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Support for Requirements Elicitation Interviews

During support

After support

Support for Requirements Elicitation Interviews
Collaborators

Support for Requirements Elicitation Interviews
References

- P. Spoletini, C. Brock, R. Shahwar, A. Ferrari. Empowering Requirements Elicitation Interviews with Vocal and Biofeedback Analysis. 24th International Requirements Engineering Conference (RE 2016), RE@next! track.