

## **Utilizing Interviews and Thematic Analysis to Uncover Specifications for a Companion Robot**

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Researchers in the field of human-robot interaction (HRI) strive to do research that produces a direct and meaningful impact on society. To accomplish this goal, they must deeply understand both the needs of their target audience and how a robot could help meet those needs. Qualitative research methods can be a useful tool for bridging the information gap between researchers and the intended users of their technology. Interviews can enable researchers to obtain a richer understanding of their users' needs than could be derived from the literature alone, or from surveys.

In this workshop talk, we plan to discuss the qualitative methods we used to develop technical guidelines for a robot with a specific target audience. In particular, we will share our experiences conducting structured video-conferencing interviews with 11 autism specialists and utilizing thematic analysis [1] to create qualitative requirements and quantitative specifications for a touch-perceiving robot companion tailored for children with autism. The autism specialists we interviewed had deep domain knowledge but little background in technology. Therefore, we could not directly ask them to recommend engineering-style specifications. We will discuss how we designed our interview study to empower the specialists to provide meaningful feedback on the technology and requirements in relation to their knowledge. We will also explain how we wrote about our qualitative approaches and findings in our recently accepted journal article [2].

First, we will discuss our methods in detail and share lessons learned from conducting the interviews. Each interview was divided into multiple stages. Each stage provided the specialist with a new method to provide feedback. The interview stages included general questions on children with autism and their touch interactions, ranking initial system requirements that we had developed from analyzing the literature, detailed follow-up questions regarding the ranking task, comments on a prototype tactile sensor design, and closing recommendations. We will discuss the benefits of and supporting materials for each of these stages.

Next, we will explain thematic analysis, discuss how we used it to analyze our interviews, and give some practical tips. In our study, two co-authors transcribed and coded the specialists' interviews. We will focus on how we highlighted our qualitative findings by developing three comprehensive themes, sharing useful terminology from the specialists, providing direct quotes from participants in our paper, and ending each theme with a summary of how the information related to sensor and robot recommendations.

Finally, we will discuss how we used the themes to refine our initial qualitative requirements, and how we then translated those finalized requirements into quantitative specifications. This process involved studying the existing literature and current best practices of several relevant fields. We will provide some examples of how we developed specific numerical values and ranges to meet the therapists' qualitative recommendations. We will also discuss how we attempted to produce specifications that were as "approach agnostic" as possible, so that researchers developing many different sensing technologies and processing methods could utilize the specifications to create successful robot companions.

**References:**

1. Virginia Braun and Victoria Clarke. Thematic analysis. In *APA Handbook of Research Methods in Psychology, Vol 2: Research Designs: Quantitative, Qualitative, Neuropsychological, and Biological.*, pages 57–71. American Psychological Association, 2012.
2. Rachael Bevill Burns, Hasti Seifi, Hyosang Lee, and Katherine J. Kuchenbecker. Getting in touch with children with autism: specialist guidelines for a touch-perceiving robot. *Paladyn. Journal of Behavioral Robotics*, 2020. Accepted.