Lab Title: Semi-structured Interviews to Inform Robotic Design Thinking

Submission Type: Individual submission

Learning Objectives:
1. Design and evaluate open-ended questions to engage with stakeholder perceptions.
2. Demonstrate active listening skills to support understanding a diversity of stakeholders.

Introduction:

As roboticists, we want to design robots that serve society. It is important to understand what roles a robot should take on and how to design systems that can effectively assist people for different applications. During the design process it is helpful to conduct interviews to gather in-depth knowledge relevant to informing your design. Interviewers and interviewees each come into the interview process with their own frame of reference, a distinctive point-of-view that emerges from an individual's cultural norms, assumptions, and experiences. When the interviewer and interviewee frames of reference diverge, it creates a very real possibility for misunderstandings or missed information. The way you structure a question can affect the understanding of the question as well as the level of detail provided in the response. For example, it would not make sense to directly ask a nurse or patient for design requirements. However, you could learn about how a nurse performs their job, or the needs of patients when they are in the hospital, and use that knowledge to guide defining design requirements. Interviewing is not a means of collecting objective facts, but rather of building empathy. The stories interviewees tell provide access to their core beliefs about themselves and the world. This level of engagement is a spark for creativity and the basis for solid designs.[1]

Our goal as designers for this lab is to learn how robots could assist nurses. There are many jobs that nurses take on, some of which a robot could support. The selected tasks that a robot supports could lead to vastly different design requirements. For example, robots can be designed to transport items within a hospital (e.g., medications, supplies). They could also be designed to have a manipulator arm and change their environment (e.g., flipping light switches, adjusting patient position). Robots could also be designed to converse with patients and have embedded social intelligence. In this set of labs, we will design questions to learn about the job of a nurse, the tasks they take on, and their ideas for tasks where they would value robot assistance. You will be active listeners and engage in asking questions based on the responses provided by the nurses.

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[1] The Bootcamp Bootleg. (2015). Hasso Plattner Institute of Design at Stanford. Stanford University. Retrieved from http://dschool.stanford.edu/use-our-methods/.

Lab Procedure:

Week 1

Part 1: Conducting preliminary research on problems facing nurses

It's a good idea to do some preliminary research to establish a base of knowledge about a problem before interviewing stakeholders. You should have done some research during the librarian's visit in lecture, and you will have some time to do some additional research now.

    a. Begin by discussing the references you found during the lecture period with your group. Individually, formulate at least two search queries that make use of **boolean operators** and either **quotation marks and/or truncation**. Use these search queries in a UM library database. Copy and paste your initial search queries into the submission template for this lab. As you conduct your search, you will likely refine your search queries. Don't copy and paste every single query into the lab submission template, but you're welcome to copy and paste more than two into the submission.

    b. Any time you find an article that might be relevant to your research, list it in the submission for this lab. Record the following information for **at least 4 articles**: the author(s), the title of the article, the title of the publication, the year it was published, and the DOI or stable URL (i.e., a URL that will always take you to the article).

    c. After you've found at least four articles by conducting keyword searches through databases, look for **2 additional sources** through **citation mapping**, looking for sources cited by or that cite sources you've already found. In this case, we want you to find **one article that cites an article** you've already found, and **one article that is cited in an article** you've already found. Record the same information as you did for 1b. as well as how you found it in parentheses at the end, e.g., (cited in

    d. For next week, we'd like you to read one article in full. Share the sources you found with your group, and decide what themes you want to explore. Try to cover a range of topics, rather than all reading articles on the same topic. Pick which article you want to read, either one you found or one that one of your groupmates found, and write a complete, properly formatted reference list entry for it. Follow the course Citation and Reference Guide (found in the Files in Canvas, under Additional Resources).

Part 2: Designing questions for a stakeholder interview (INDIVIDUAL)

When we interview stakeholders, we want to use active listening (Appendix A) to support our understanding of what is said and to encourage detailed explanations.

- Individually brainstorm questions that will help you understand the following information:
  - a. A work shift for a nurse and the tasks they take on
  - b. The types of technologies they use for their job
  - c. Challenges they face
  - d. Parts of the job they enjoy
  - e. Concerns they may have for robots in their workplace
  - f. Opportunities they may see for robots in their workplace

Consider different ways to elicit the nurses' experiences. Think about how you can use ideas from active listening to create insightful questions.

- Review your question phrasing. Are they direct or indirect questions? Are they open-ended or closed? Are they leading or non-leading questions? Take a first pass at editing your questions to support encouraging sharing of specific experiences.

- For the questions that you developed, what follow-on questions might you want to ask? Refer to the active listening guidelines (Appendix A) to support creating useful questions.

- What additional information would you like to learn from the nurses to support your ability to write problem statements and ideate solutions? Brainstorm questions to help you learn that information.

Part 3: Testing your questions with peers and refining an interview script

Now that you have an initial list of questions, it is important to assess if other people interpret the questions the way you intended. Team members will combine their questions into a single interview protocol. During the interview day, you will have the opportunity to interview three nurses, with each interview lasting approximately 20 minutes.

1. In your teams, compare the questions you have written. Are the questions clear? Does your peer understand what is being asked? Are the questions mostly direct? Open-ended? Non-leading? Narrative? Specific? What could be improved?

2. In your teams, compile a list of questions that your team will use for interviewing the nurses that will visit. Consider the order you want to ask the questions, with the knowledge that the conversation with the nurse may take you in a different order.

Create an additional script to help you walk through your interview. Recall that in your interviews, your team will want to start by introducing your group and present the goals of the conversation, setting the stage for the types of questions your team will ask and what you want to learn. You will build rapport by listening and letting them introduce themselves and their roles. You will then evoke stories by asking your questions and taking time to understand how they feel about the systems they work with and opportunities for new technologies. Finally you will give time to reflect and summarize, make sure you are interpreting correctly. Your additional script should support the initial and final portions of your semi-structured interviews.

You will submit Parts 1-3 before Week 2.

Week 2

Part 4: Interview the nurses

Now that you have your interview questions prepared, you will have the opportunity to interview three nurses during your upcoming lab section. You will be active listeners and engage in asking questions

based on the responses provided by the nurses. Share asking questions across your teammates. Make sure your team takes notes during the interviews so that you can reflect on the conversations for Part 4 of this lab.

If you were absent for Lab 7, or your group has changed, briefly share with your group the questions you prepared individually, before the interviews begin. As a group, decide whether and how to integrate any of the questions into the prepared script.

Part 5: Reflection on the conversations with the nurses
You will now have the opportunity to reflect on your interviews with the nurses. Guided by the teaching team, groups will share what they have learned from their interviews. You will then individually respond to the following prompts:
1. Provide a summary of what you learned from each nurse you spoke with that includes information about their job, the technology they use, what they find most rewarding, and what they find most challenging. Briefly summarize what you know about the other nurses who spoke with your peers.
2. Where do the nurses think robots might be most useful or interesting? What are their concerns about integrating robots into a hospital setting?
3. What opportunities seemed most interesting to you? Why were those interesting to you? What concerns do you have about integrating robots into a hospital setting?
4. Name 3 themes/topics that you would be interested in developing further for your final project, from most to least interesting.

Deliverables:
The following should be included in your Week 1 submission.
1. From Part 1, provide your list of search queries, your 4 sources found through database searches, your 2 sources found through citation mapping, and your reference list entry.
2. From Part 2, provide your list of questions and follow-on questions (*Individual*).
3. From Part 3, provide your team's combined script for running the interview (*Group*), as well as reflection on the iteration (*Individual*).

The following should be included in your Week 2 submission (due immediately after Lab 8!)
4. From Part 4, there is no submission requirement, but be sure to take notes!
5. From Part 5, provide your individual reflection responses (*Individual*).

Appendix A - Active Listening

Active listening is a way to obtain more understanding out of verbal interactions. It takes a conscious effort to not only hear the words of another person, but to understand what is being communicated. Part of active listening is to reflect on what has been said by paraphrasing in your own words, asking questions to clarify certain points, and working to summarize what the speaker has said to verify understanding. The goal of active listening is to understand the speaker's perspective and communicate that understanding back to the speaker so that they can confirm the accuracy of your understanding.

- **Encourage sharing:** Ask open-ended questions. These are questions that encourage elaboration, rather than "yes" or "no" responses. Open-ended questions tell the speaker you are listening, and you want to learn more and give the speaker an opportunity to provide additional information on a specific topic. Yes/no questions can be a place to start, but be sure to ask open-ended follow-up questions.
    - Examples: "What is it like to …?", "How do you …?"
    - Tip: Questions beginning with *what, how, why,* etc. are more likely to elicit an open-ended response than questions beginning with *is, are, should, do,* etc.
- **Encourage specificity:** It's often a good idea to ask your interviewee to recall a specific experience, rather than asking them to generalize about a range of experiences for you. As with yes/no questions, generalizing questions can be a good place to start, but be sure to ask more specific follow-up questions.
    - Example of a generalizing question: "How do you use technology when helping patients?"
    - Example of a specific question: "Think about a time you used technology while helping a patient. Tell me about what happened."
- **Strive to understand:** You want to understand the speaker's point of view. Avoid forming opinions and making judgements until you fully understand their perspective. It is ok to ask for clarification if you are not sure what someone said. Understanding can come through paraphrasing (repeating what someone has said in your own words) and verifying you understood correctly. Understanding can also come from asking clarifying questions, where you invite the speaker to explain some aspect further. Understanding can also come from reflecting, where you consider how the speaker feels about something.
    - Paraphrasing example: "It sounds like you are saying …, is this what you meant?"
    - Clarifying example: "Can you tell me more about …?"
    - Reflecting example: "It seems you felt [INSERT FEELING] about…,"
- **Summarizing:** You want to leave active listening making sure you understand what the speaker was trying to convey. You want to identify, connect, and integrate key ideas and feelings in what the speaker said. Summarizing will help you and the speaker identify and confirm what was important.
    - Examples: "So on one hand …., but on the other …", "It seems several things are important to you, first…., second …., third …", "Let me summarize what I think occurs/occurred based on what you said…"