Subjective measures for **Usable Security**

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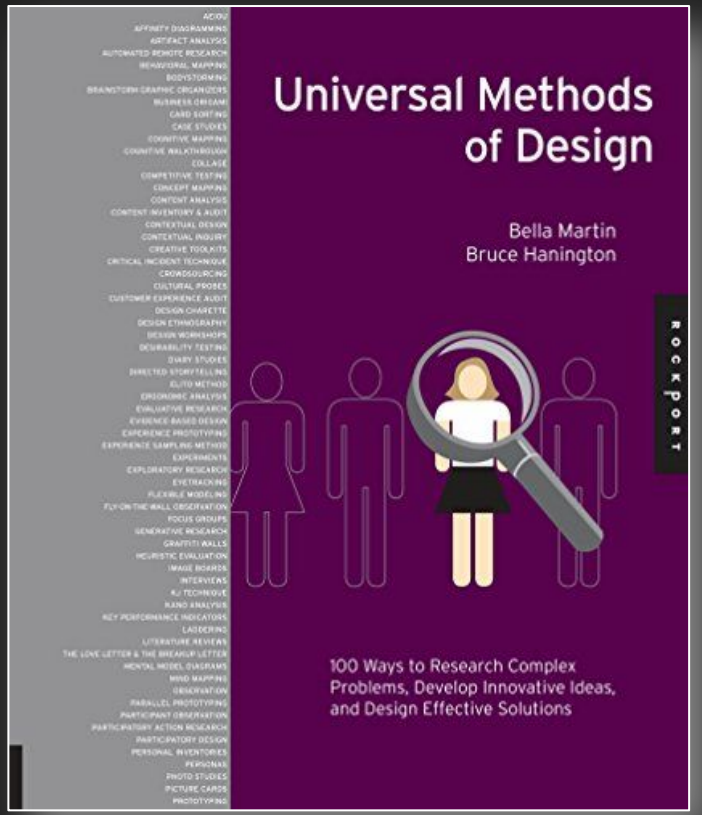
https://bit.ly/MethodsExp

Overview of my talk today

- How to decide on a measure
- **Interviews**
- **Questionnaires**
- Other methods of note (brief)
- Questions and comments



Bella Martin and Bruce Hanington. 2012. ***Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions***. Rockport Publishers.

How to decide on a measure for your study

What you measure	Type of data collected	Originality of measure	Purpose of measure	Category of measure
Attitudinal	Qualitative	Traditional	Evaluative	Self-reporting
Behavioral	Quantitative	Adapted	Generative	Expert review
		Innovative	Exploratory	Observational
				Participatory
				Design process

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Summary evaluations of an object, concept, event, etc. - primarily affect (emotion) + cognition (thinking)

Actions that both influence and are influenced by attitudes

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Numeric data - “counts or measures” (Wikipedia)

Non-numeric data - “meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions” (Wikipedia)

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You based your measure on an accepted or normative measure, but customized it for the study

You created this measure from scratch or introduced a method from another field

An accepted or normative framework for measurement

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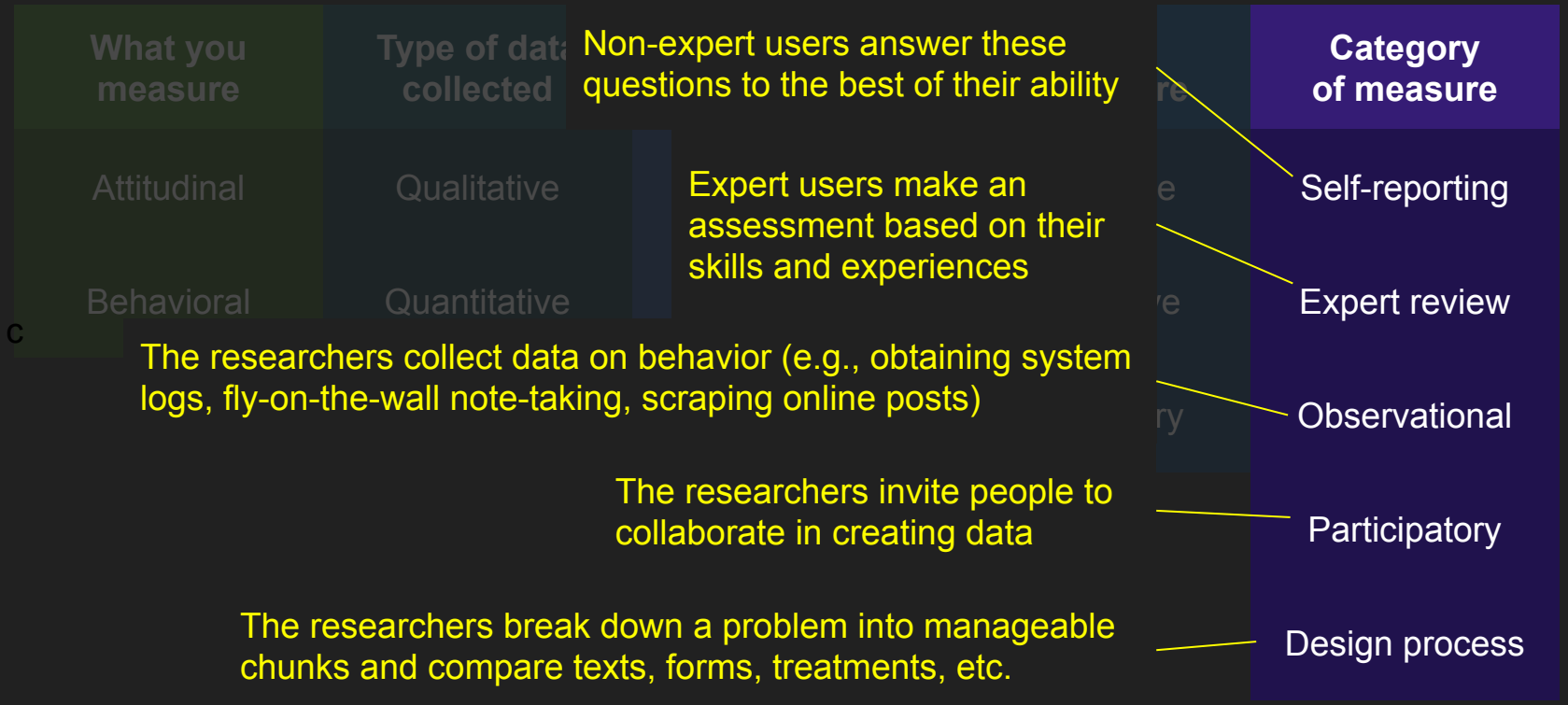
Directed - Aims to create new ideas or insights for a product, design or service

Open ended - Empathize with users and define their needs

Systematic - Assess the qualities of concern in the study and compare with benchmark metrics

How to decide on a measure for your study



Interviews - overview

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Interviews - overview

- “A fundamental research method for **direct contact with participants**, to collect firsthand personal accounts of experience, opinions, attitudes and perceptions” (Martin and Hanington, 2012)
- **Best conducted in person** to observe facial expressions and body language, also the feeling in the air
- Can be conducted over video chat, telephone or social media/email

https://www.plum.io/blog/why-structured-is-better-when-it-comes-to-interviews

Interviews - two main types

Unstructured/Semi-structured

- **Exploratory** or **Generative**
- You have a guiding set of topics (unstructured) or a loose set of questions that flow from general to specific things you want to know about, with detours allowed (semi-structured)
- More comfortable and conversational for participants

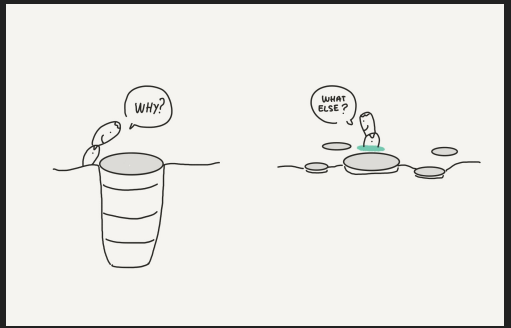
Structured

- **Evaluative** or **Generative**
- You have a script of the exact questions to ask and in a specific order, with little to no deviation or detours
- Easier to control and to analyze
- Helps avoid introducing bias
- More formal and impersonal for participants

Interviews - success strategies

Present yourself as **pleasant** and **professional**. Practice your expressions, body language and tone of voice in mock interviews.

Bring **props** or **artifacts** that will stimulate discussion and reflection such as pictures, cards, personal inventories, small prototypes.



Follow up with:

- Why is that?

- What else should I know about this?

- Wow, tell me more.

https://service-design.co/the-what-else-question-2af9c11f411f

Interviews - Example from **Mutlu & Forlizzi 2008**

“Semi-structured interviews ... involved asking hospital personnel open-ended questions about their experiences with the robots … :

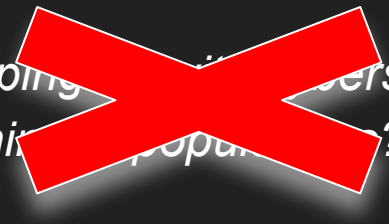
- Organizational roles, work experiences at the hospital and with the robot,
- Encounters with the robot in the hospital,
- Experiences with the robot and experiences of others that they observe or hear about,
- Perceptions of and attributions made to the robot,
- Evaluations of scenarios about the robot’s actions presented to them,
- Suggestions for changes/improvements in the robot. “

Bilge Mutlu and Jodi Forlizzi. 2008. Robots in organizations: the role of workflow, social, and environmental factors in human-robot interaction. In Proceedings of the 3rd ACM/IEEE international conference on Human robot interaction (HRI '08). ACM, New York, NY, USA, 287-294. DOI: https://doi.org/10.1145/1349822.1349860

Interviews - what *not* to do

- **Don’t forget to arrive early** to set up chairs, recorders, etc. for the study.
- Don’t fail to keep good records of who participates and their assigned study ID (P1, P2 …). **Keep these records separate** from actual interview data.
- **Don’t talk too much.** Let the participant do most of the talking … when they are not forthcoming, just let a few beats of silence pass to prompt THEM to step in.
- Don’t use leading questions. These are **questions that suggest the answer you want**.

“So, would you agree that keeping [illegible] cybersecurity practices is a problem for both the aging U.S. and Chi[illegible]?”



Questionnaires - overview

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Questionnaires - overview

- “Designed for collecting self-report information from people about their characteristics, thoughts, feelings, perceptions, behaviors, or attitudes, **typically in written form**” (Martin and Hanington, 2012)
- Easily constructed and administered through the web (Qualtrics, Mturk)
- Completion rate is tied to **question wording** and **response options, sequencing, length**, and **layout**

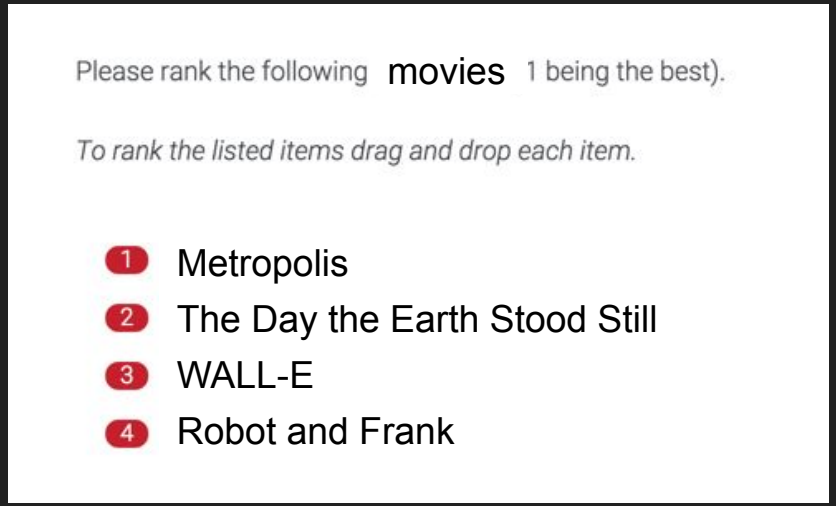
https://usatodayhss.com/2017/how-to-use-recruiting-questionnaires-in-the-recruiting-process

Questionnaires - types of questions and responses

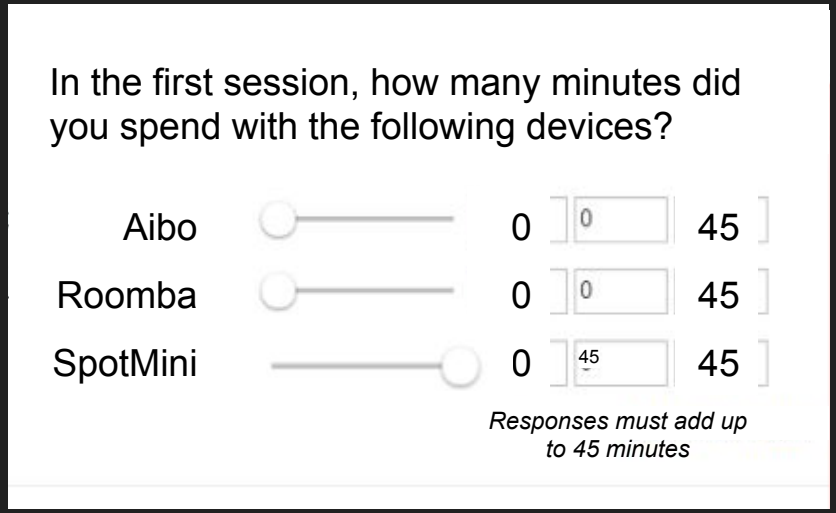
Open ended - Nets you depth of response, similar to interviews

Closed ended - Easier to numerically analyze and communicate

Questionnaires - types of questions and responses



Rank order - Forces clear preferences among a set of options



Divide a constant sum - Forces clear allocation of time or money

Questionnaires - types of questions and responses

Which statement best describes your attitude toward facial recognition (a system that matches a human face in an image or video frame against a database of faces)?

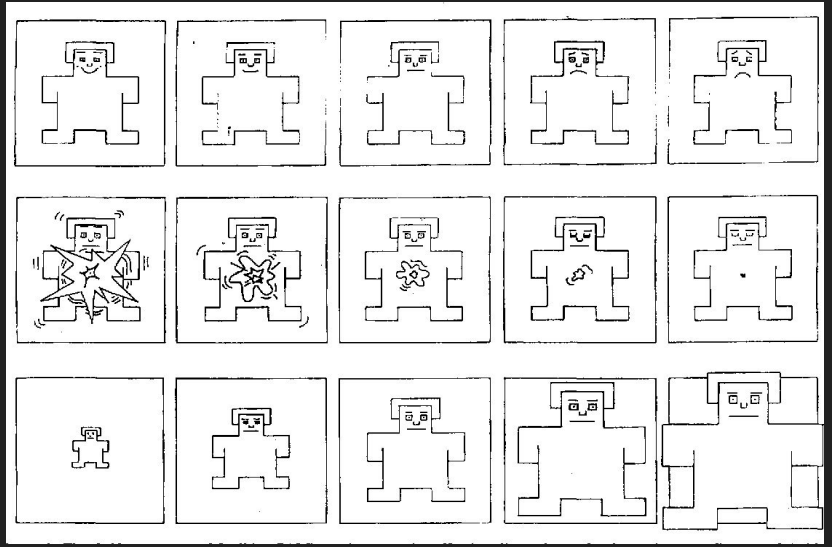
- ☐ It is a **threat**.
- ☐ It is a **benefit**.
- ☐ It is **neither** a threat nor a benefit.
- ☐ It is **both** a threat and a benefit.

Discrete options - Helps sort people's responses into categories.

Likert-type scale - Helps quantify variances in response extremity.

Questionnaires - previously developed scales

- **Security Attitude Inventory (SA-13/SA-6)** - users' general attitudes toward cybersecurity
- **Security Behavior Intention Scale (SeBIS)** - users' intention to engage in expert-recommended practices
- **System Usability Scale (SUS)** - subjective assessment of usability
- **Questionnaire for User Interaction Satisfaction (QUIS)** - multi-part, adapt it to task list

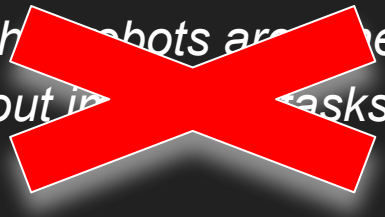


Bradley, M.M., & Lang, P.J. (1994). Measuring emotion: the Self-Assessment Manikin and the Semantic Differential. Journal of behavior therapy and experimental psychiatry, 25 1, 49-59 .

Questionnaires - what *not* to do

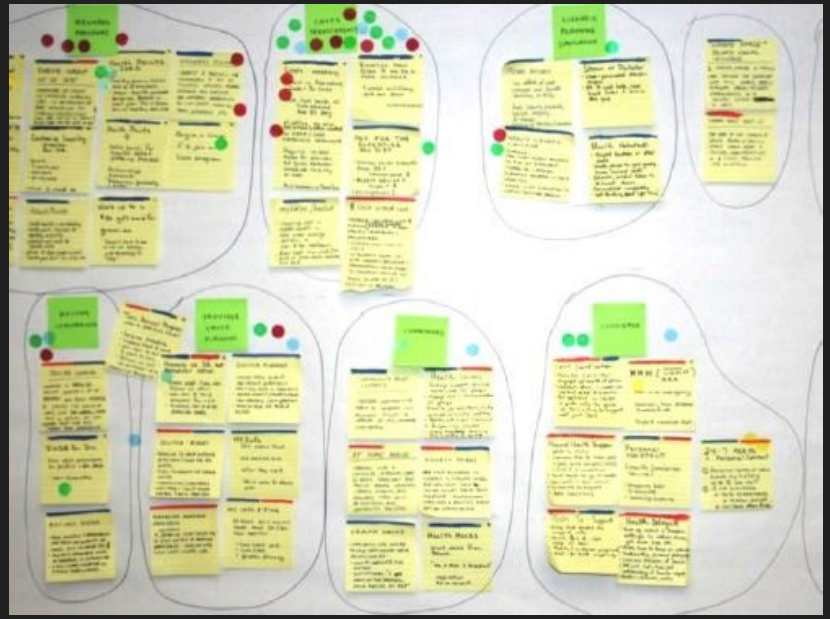
- **Don’t make them too long** - 7-12 minutes is a sweet spot for length.
- Don’t forget to **spell-check** the text and to **pilot** the questionnaire with someone who can show you where the questions or responses are unclear.
- **Don’t use too many** open-ended and/or dense questions**.** These slow down participants and can cause them to abandon your questionnaire.
- Don’t forget to use **attention checks** online, e.g. “Do you ride a dinosaur?”
- Don’t measure **two things in one** questionnaire item.

“To what extent do you agree th[illegible]bots ar[illegible]et benefit to humanity and are needed to help humans carry out i[illegible]asks?”



Other qualitative/subjective methods of note

- Participant observation
- **Affinity diagramming -** “Organizes a large quantity of information by natural relationships” (Weprin, 2016)
- Bodystorming
- Cognitive walkthrough
- Contextual inquiry
- Heuristic evaluation
- Thematic analysis
- Think-aloud protocol
- Wizard of Oz



https://uxdict.io/design-thinking-methods-affinity-diagrams-357bd8671ad4

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- **Thematic analysis -** "Coding the qualitative data makes the messy scripts quantifiable" (Yi, 2018)
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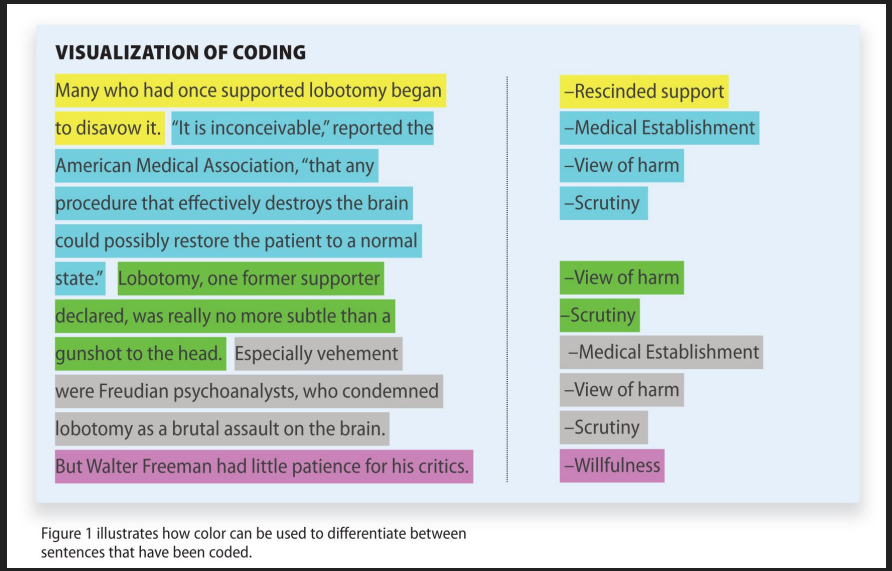

Figure 1 illustrates how color can be used to differentiate between sentences that have been coded.

https://vickysteeves.gitlab.io/2018-ndsr-art/analyzing-interview-data.html

https://medium.com/@projectux/themes-dont-just-emerge-coding-the-qualitative-data-95aff874fdce

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Software	OS	Cost	Analyses	Tools
NVIVO	Windows, Mac, Browser	$1,399	Text, video, audio, pictures, survey, webpages, social networks	Coding, Aggregation, Query, Visualisation
ATLAS.ti	Windows, Mac	$1,290	Text, video, audio, pictures, survey, webpages, social networks	Coding, Aggregation, Query, Visualisation
MAXQDA	Windows, Mac	$635	Text, pictures, audio, video, webpages, social networks	Coding, Aggregation, Query, Visualisation, Statistical Tools
Dedoose	Browser-based	$15/mo	Text, audio, video, survey	Coding, Query, Visualisation, Statistical Tools

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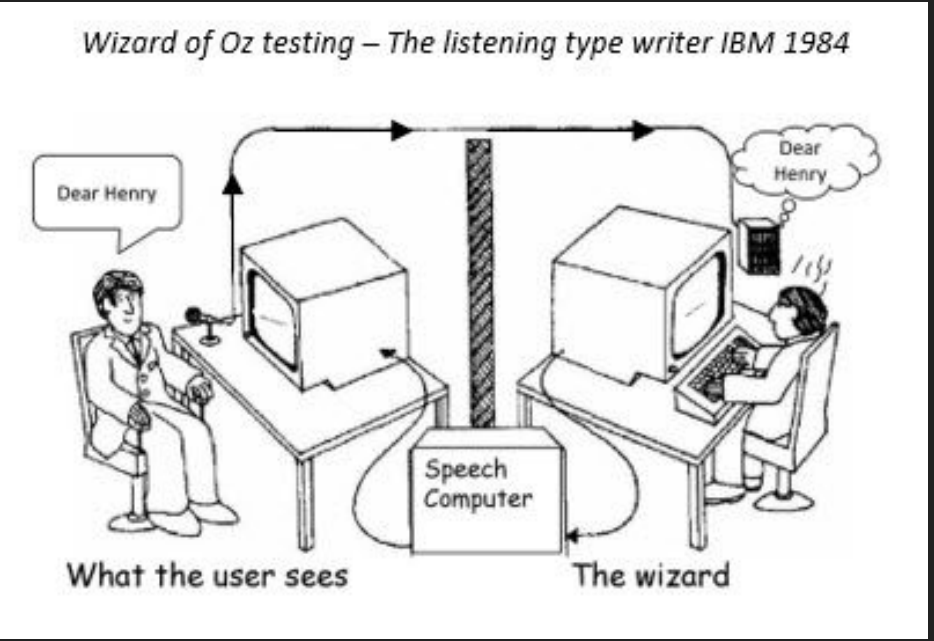
- **Wizard of Oz** - “A method of testing a system that does not exist yet” (Crook, n.d.)



https://www.simpleusability.com/inspiration/2018/08/wizard-of-oz-testing-a-method-of-testing-a-system-that-does-not-yet-exist/

In-Class Activity

Make a copy of doc: https://bit.ly/CISPAinterviewSkills
And this doc: https://bit.ly/CISPA_SA13

Part 1 - Write an introduction script (5-7 minutes)

Part 2 - Take turns rehearsing the introduction script and the interview questions

- Person 1: 5-7 minutes
- Person 2: 5-7 minutes

Part 4 - Write down feedback for the interviewer and exchange it (8-10 minutes)