Design Discovery

Prof. James A. Landay
Computer Science Department
Stanford University

Winter 2022

January 5, 2022

* some slides based on those of Julie Stanford, Sliced Bread Design

https://youtu.be/rxdyp_dyYZU
by AX Ali

"What we are working on is going to be ridden in, sat upon, looked at, talked into, activated, operated, or in some way used by people individually or en masse. If the point of contact between the product and the people becomes a point of friction, then the industrial designer has failed. If, on the other hand, people are made safer, more comfortable, more eager to purchase, more efficient—or just plain happier—the designer has succeeded."

– Henry Dreyfuss, *Designing For People*, Simon and Shuster, 1955

Hall of Fame or Shame?

http://www.dol.wa.gov

Select Language

Google™ Translate Limitations & Disclaimer

UPDATE

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WASHINGTON STATE DEPARTMENT OF LICENSING

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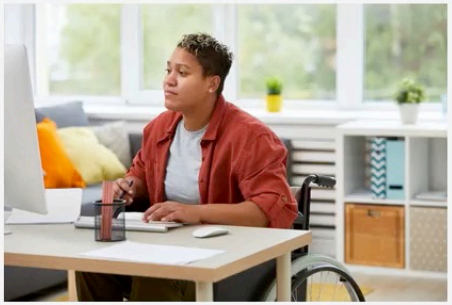
Renew your license online now!



More news REAL ID enforcement delayed until October 1, 2021 ▶

Drivers

- Get a driver license
- Renew your driver license
- Update your driver license/ID card
- Check the status of a license/ID card
- Learn how to reinstate your driver license

... more driver & ID cards

Vehicles & boats

- Renew your tabs
- Transfer ownership of a vehicle into your name
- Get WA license plates
- Buying a vehicle
- Selling a vehicle

... more vehicles & boats

Professions

- Renew your professional license
- Get a professional license
- Look up a professional or business license
- Setup account access
- Uniform Commercial Code (UCC)

... more professions

Find offices & hours

Get a form

Moving to WA?

View list of licenses

License eXpress

Check out License eXpress or our other online services

Hall of Fame or Shame?

http://www.dol.wa.gov/

Hall of Fame!

http://www.dol.wa.gov/

+ UI is (mostly) clean & uncluttered
+ Most common task prominent (renew)
+ 3 other key users/tasks right up front
+ Less important info (tweets, videos) below *fold*
+ Multiple language options are clearly indicated
+ *Similarity* & *connectedness* gives strong aesthetic & indicates navigation
  - examples of Gestalt Principles

- A bit busy overall, but easy to fix
- Update at top seems weird (really an update?)

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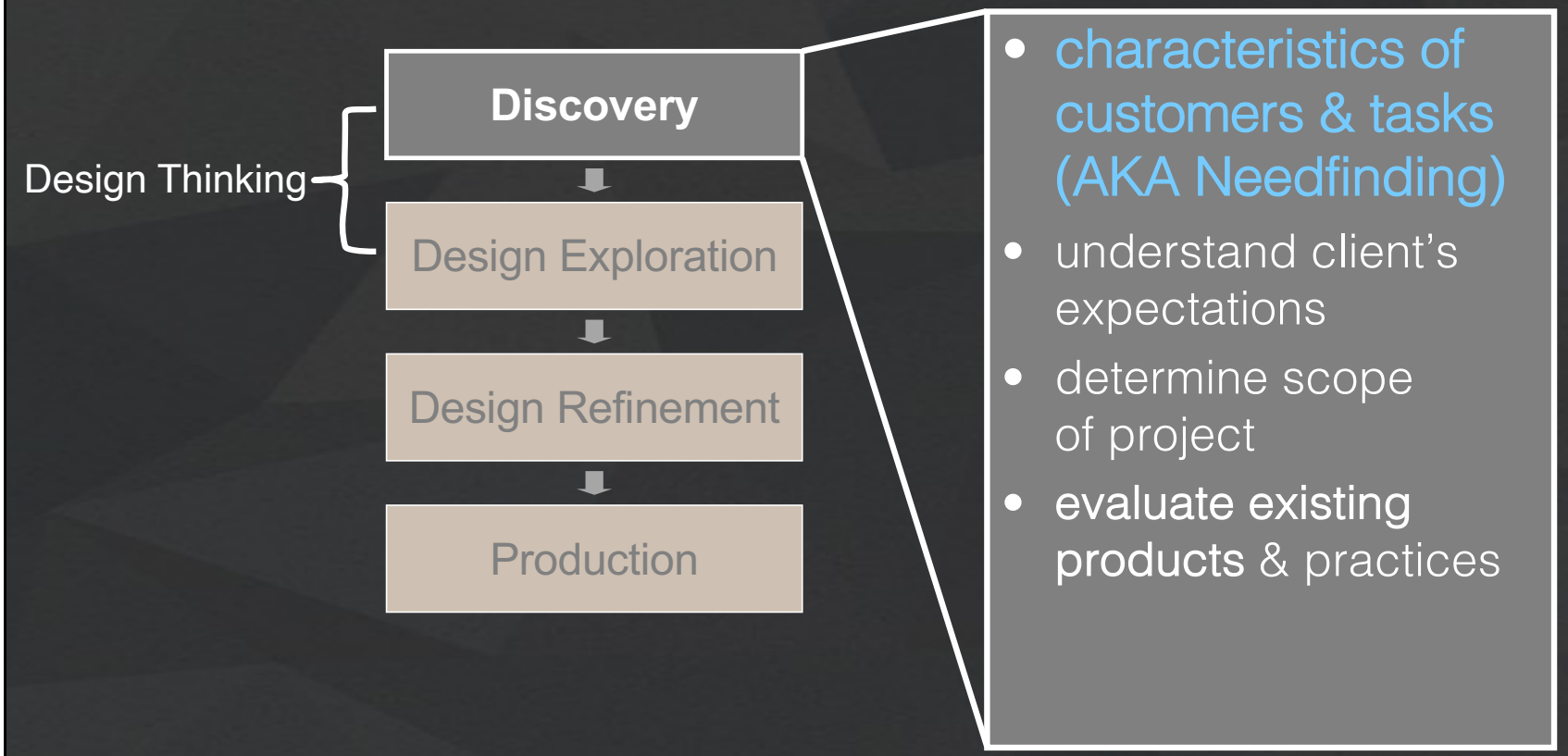
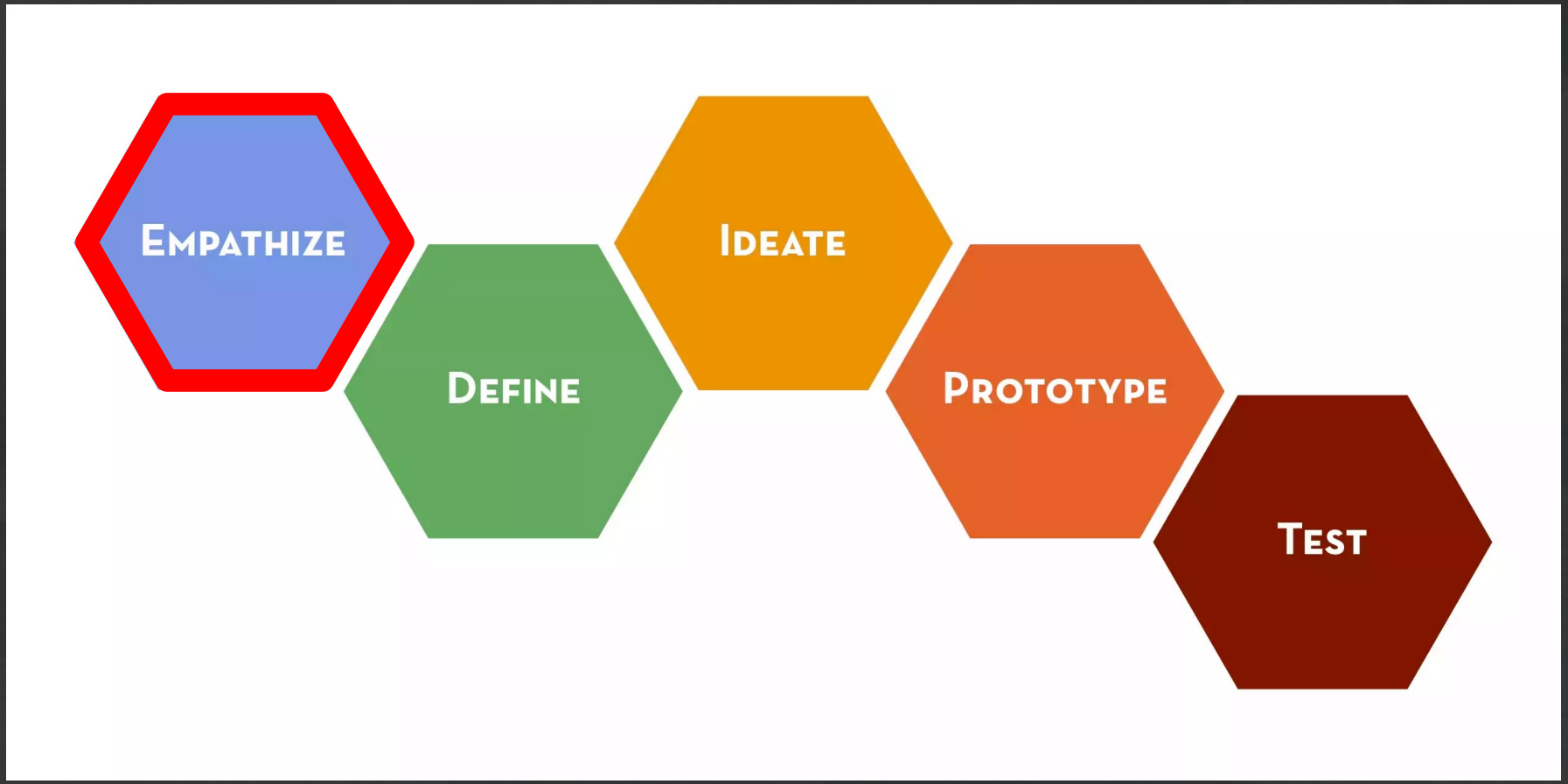
Outline

- Design Discovery
- Needfinding

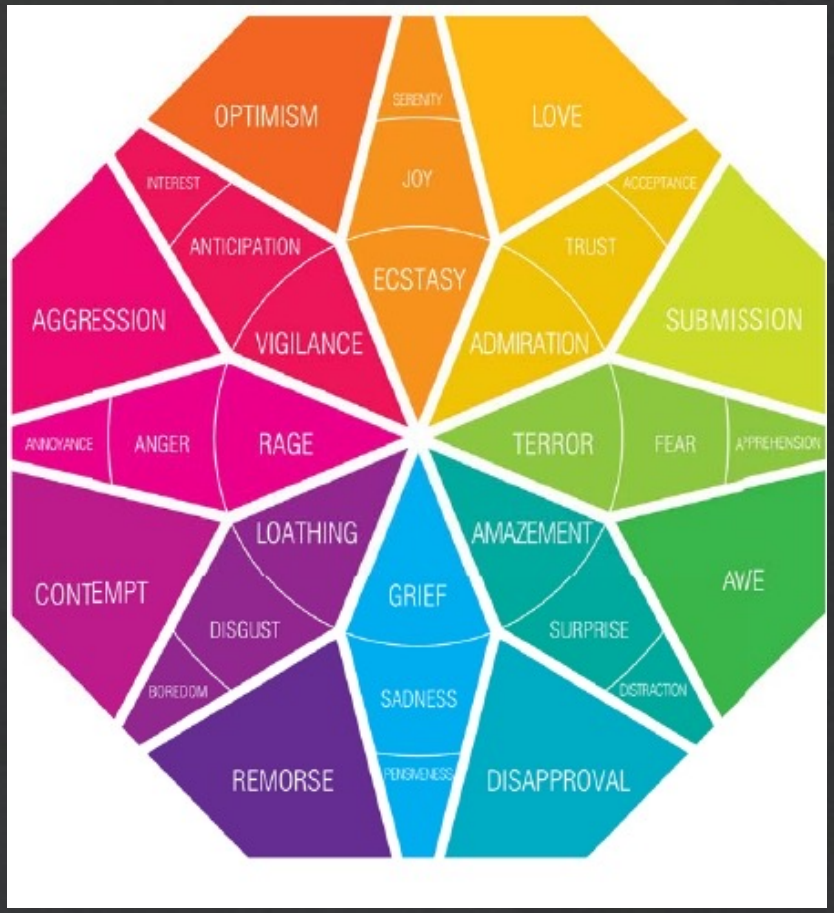
Design Process: Discovery



Design Thinking Process



Empathy: Feel what they feel



Principles

1) Immerse

2) Observe

3) Engage

https://hci.stanford.edu/courses/cs147/2021/wi/readings/FIELDGUIDE-Screen-DTBC-March-2015-V2.pdf

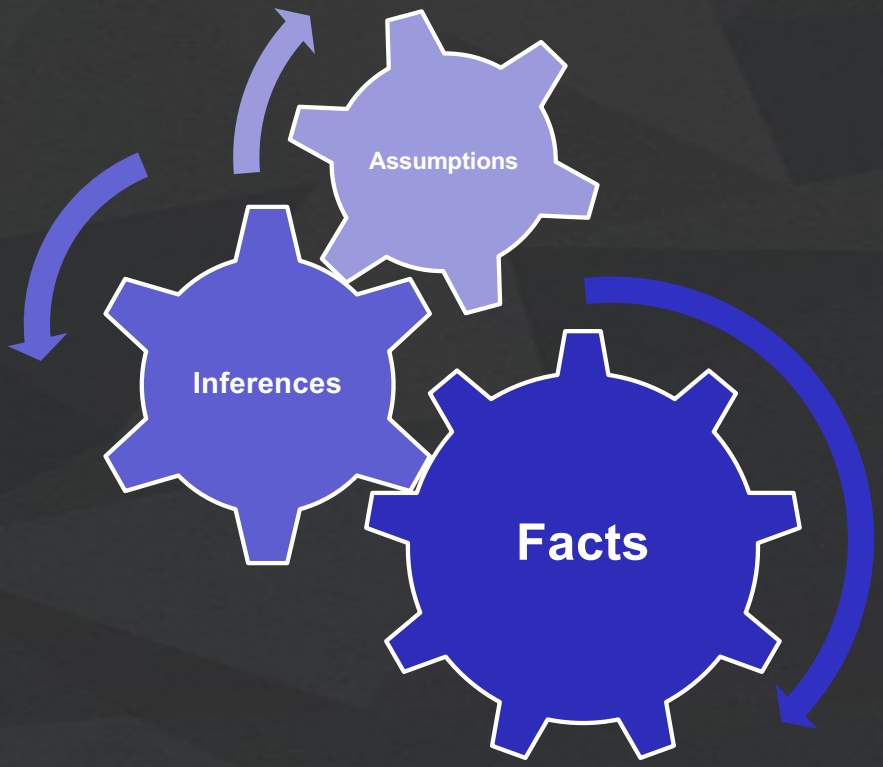
“You Can Observe a Lot Just by Watching”

–Yogi Berra

Bronislaw Malinowski Learning From Trobriand Islanders (1914)

Image Courtesy Wikipedia: https://upload.wikimedia.org/wikipedia/commons/1/1e/Wmalinowski_trobriand_isles_1918.jpg

Technique: Active Observation



Observe & interview
without knowing what
you are looking for

discover what is interesting!

Needs
gaps within
a system

Needfinding
discovering
opportunities
by recognizing
those gaps

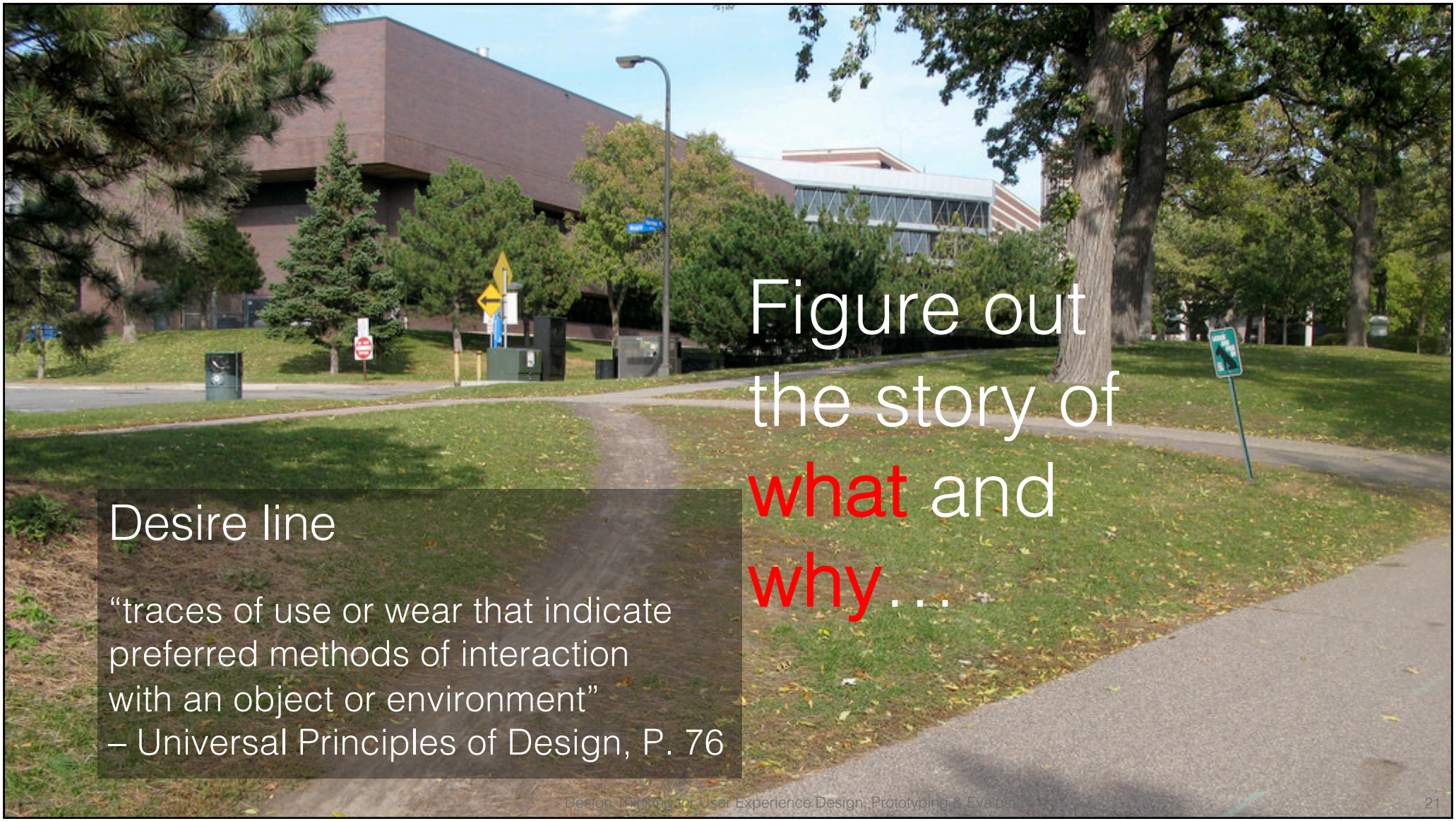


Figure out the story of what and why…
Desire line
“traces of use or wear that indicate preferred methods of interaction with an object or environment”
– Universal Principles of Design, P. 76

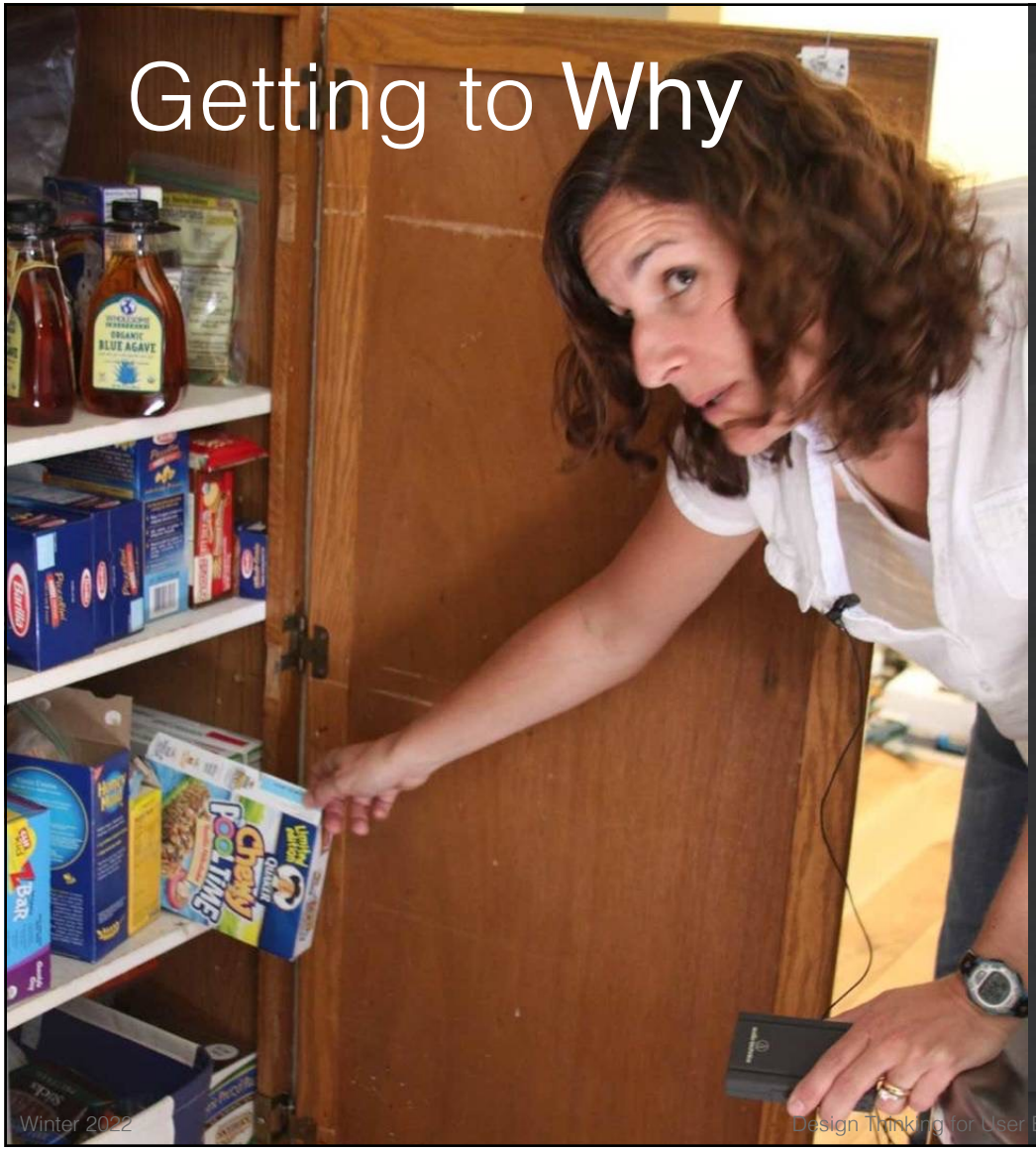
And tell a
new one

Pay attention to *all* the artifacts

Look for workarounds & hacks

“Errors” are a goldmine

Getting to **Why**



Needfinding starts with basic questions of everyday experiences

But moves from

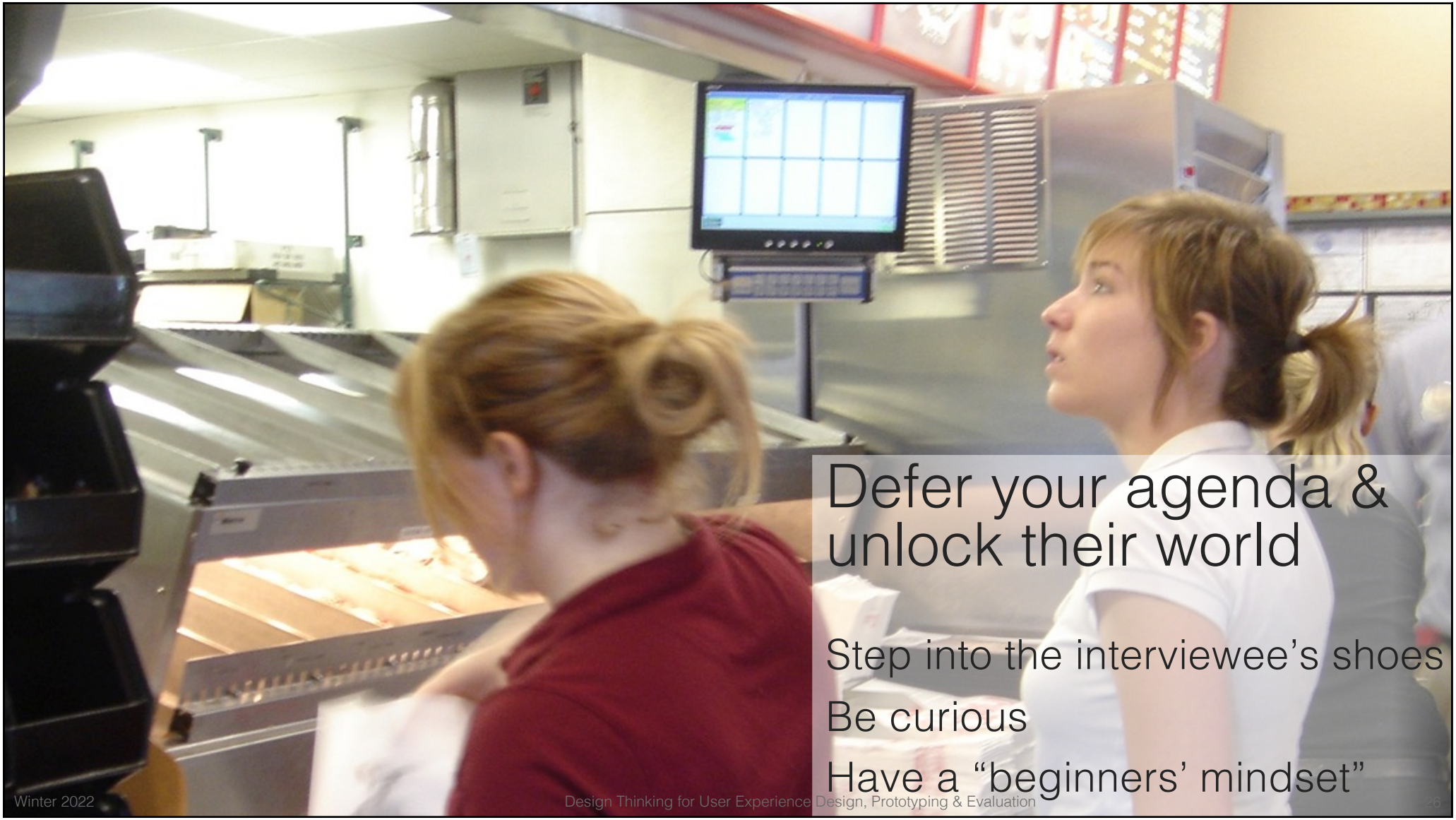
- closed ended questions to *open ended* questions
- "whats" to "whys"
- actions to feelings

Engage people in *their environment*

A needfinding interview is….

One in which the interviewee speaks 90% of the time.

Be ready to hear something new and be changed by it.



Defer your agenda & unlock their world

Step into the interviewee's shoes

Be curious

Have a "beginners' mindset"

Interview

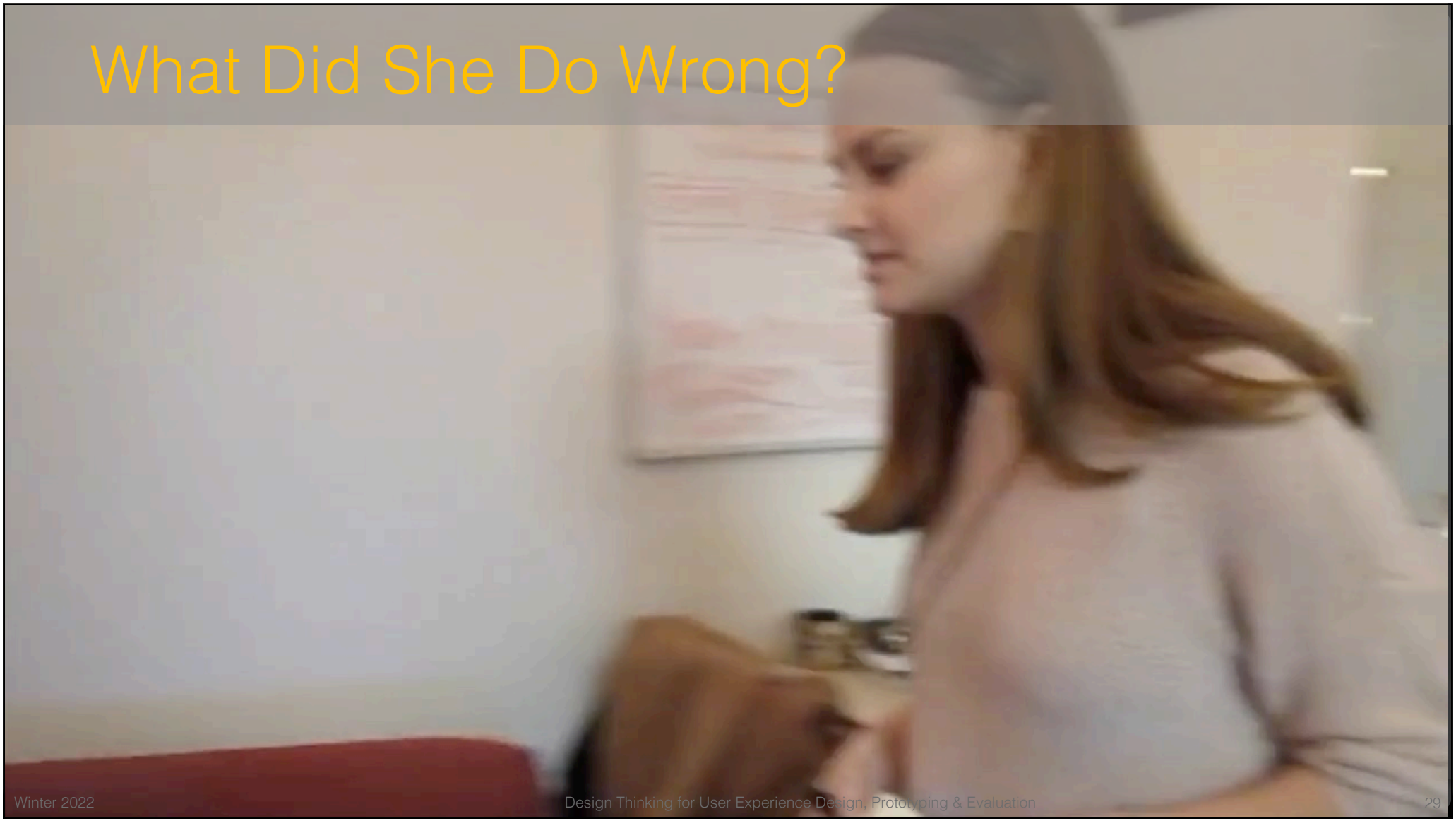
Good interviews require a broad set of questions – but be prepared to *veer*

Adapted from Michael Barry

Interview

Interviews typically share the same basic structure as a story.

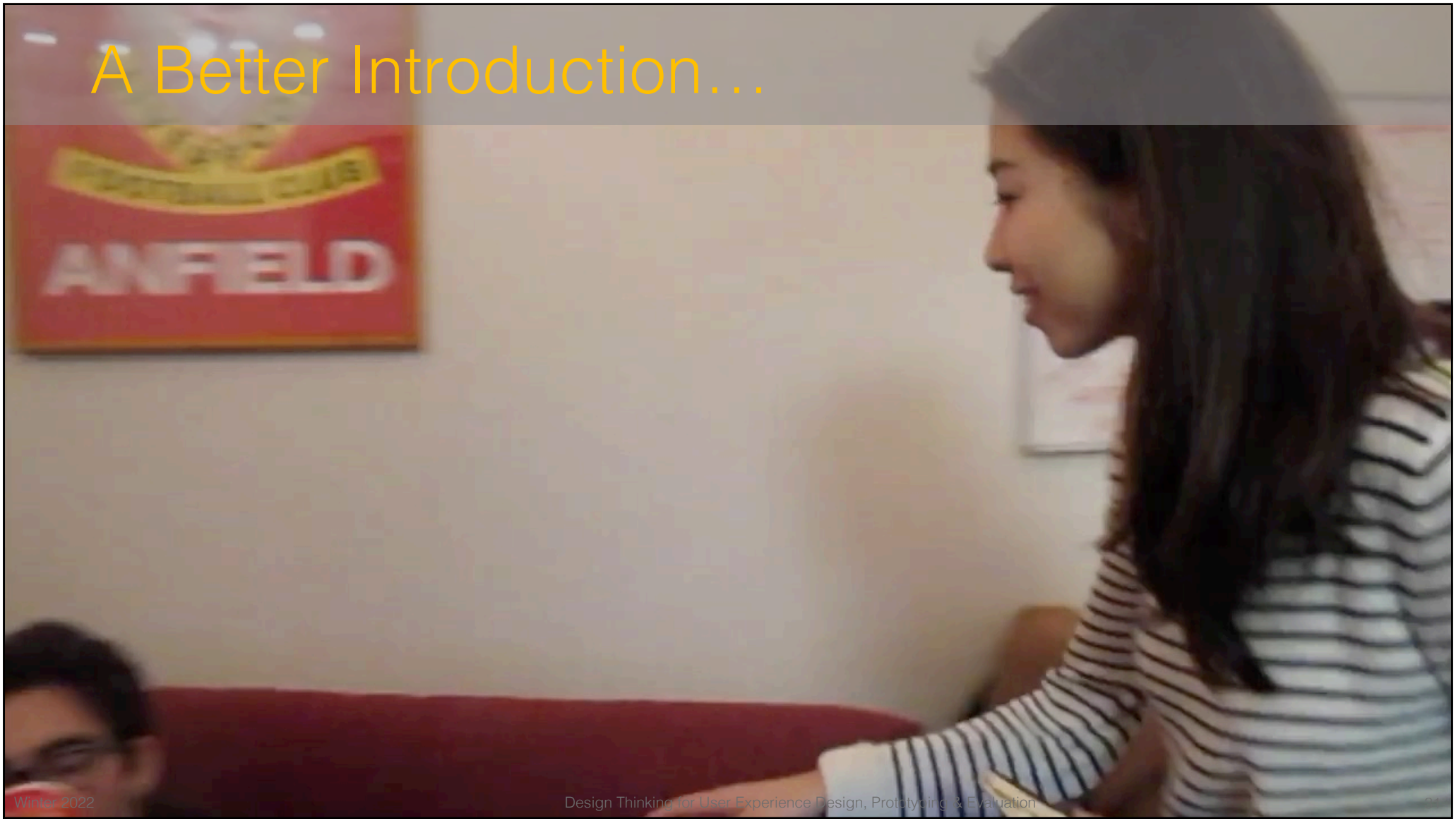
What Did She Do Wrong?



Interview

Adapted from Michael Barry

A Better Introduction…



Interview Questions – Background

- Background — "Tell me about what you do here."
- Sequence — "Walk me through your day yesterday…then what do you do next?"
- Physical tour — "Take me on a tour of how you build the panels…"
- Virtual tour — "Walk me through your sales process from the beginning..."
- Participation — "Can you show me exactly how you prepare a customer bid?"
- Exhaustive List — "What are all the different municipalities where you sell?"

Adapted from Michael Barry

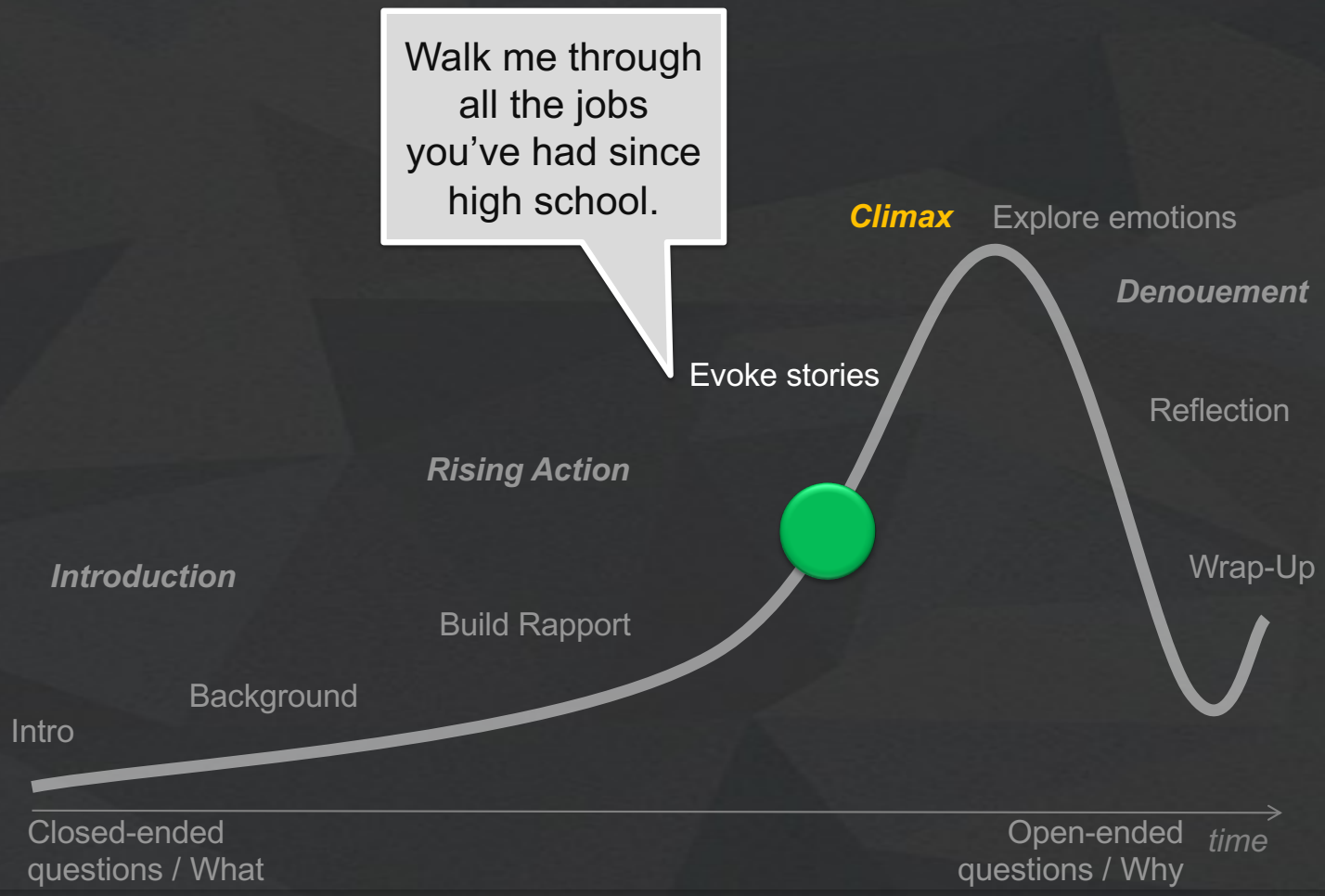
Interview

Interview Questions – Build Rapport

- Naïve Outsider Perspective — "I'm not from LA, how does the housing market work here?"
- Changes Over Time — "How are things different than they were last year?"
- Reflecting Back — "So, what I hear you saying is….. is that right?"
- Quantity — "How many of your competitors fall into that category?"
- Tasks and organizational structures — "Can you draw me a diagram of your org. chart?"
- Native Language — "Why do you call your office 'the command post' ?"

Interview

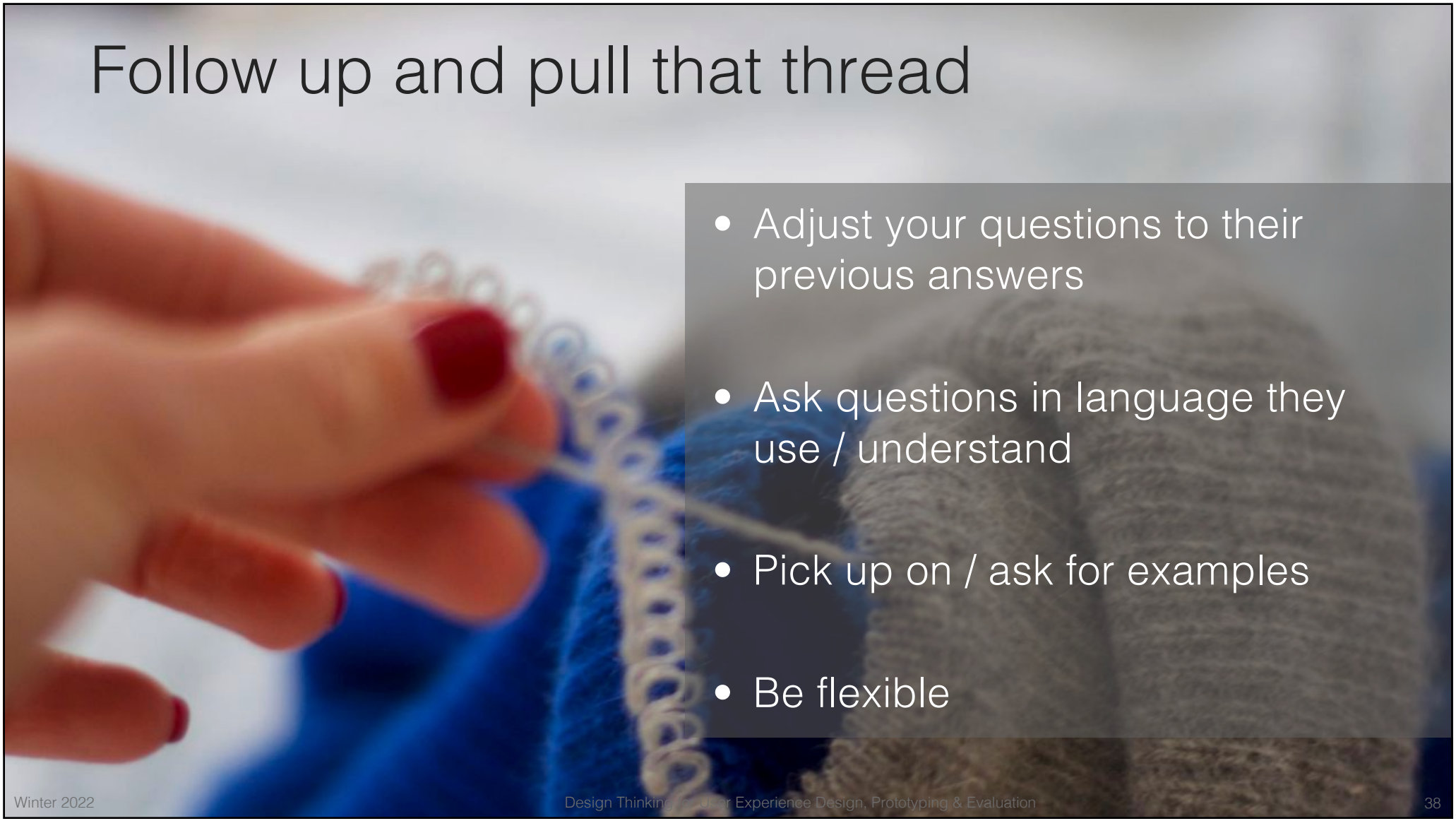
Adapted from Michael Barry



Interview Questions – Stories & Emotions

- Clarification – "…and when you say 'I'm a closer,' what do you mean exactly?"
- Success and Failure – "Describe your most successful sales call. Now tell me about a sales call that was an absolute disaster."
- Peer Comparison – "Do your colleagues share your sales techniques?"
- Other Viewpoint Comparison –"What would other solar owners think about that?"
- Characterization and Comparison –"Could you characterize your sales style and compare it to Mike's?"

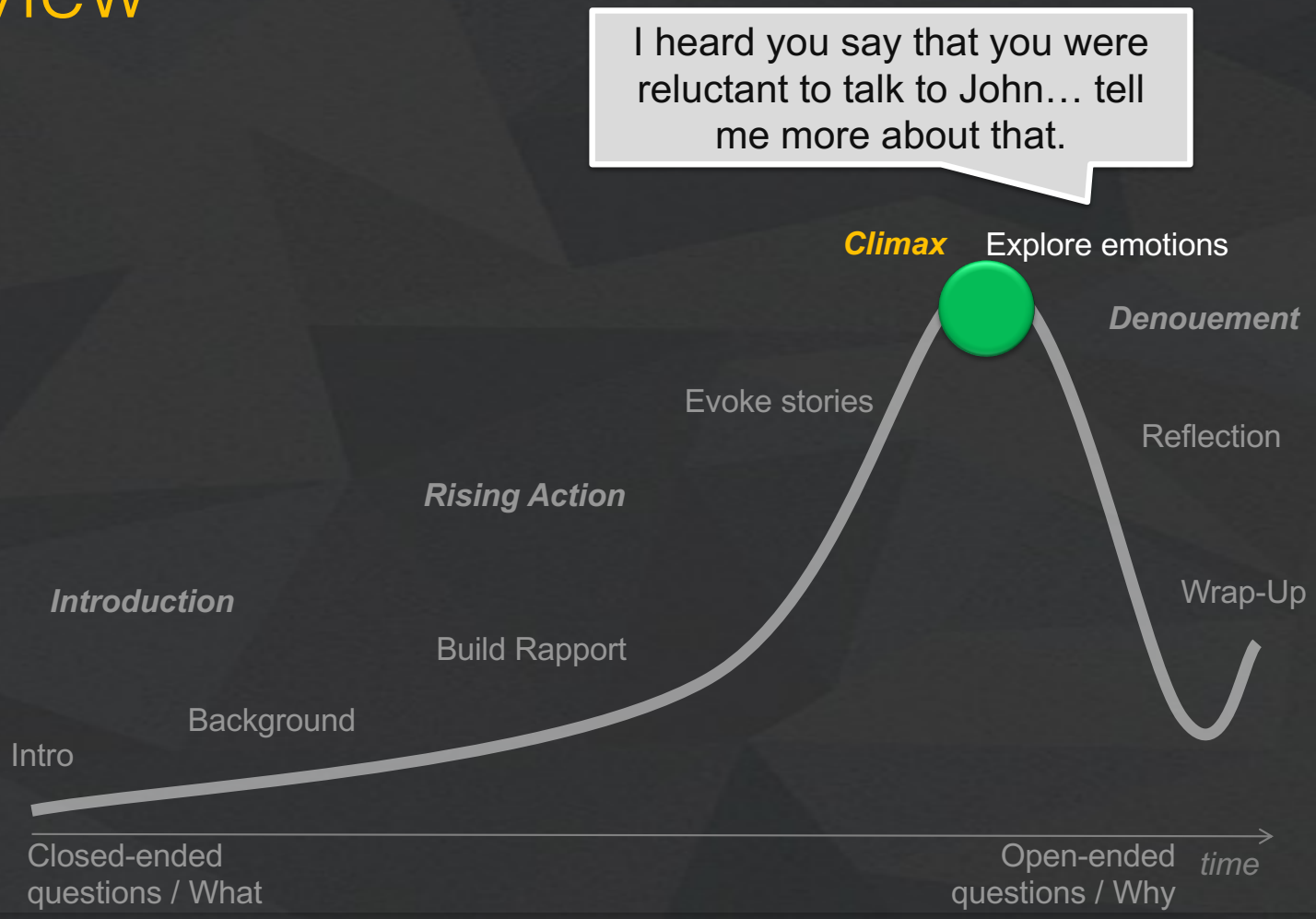
Follow up and pull that thread



- Adjust your questions to their previous answers
- Ask questions in language they use / understand
- Pick up on / ask for examples
- Be flexible

Interview

Adapted from Michael Barry



Interview

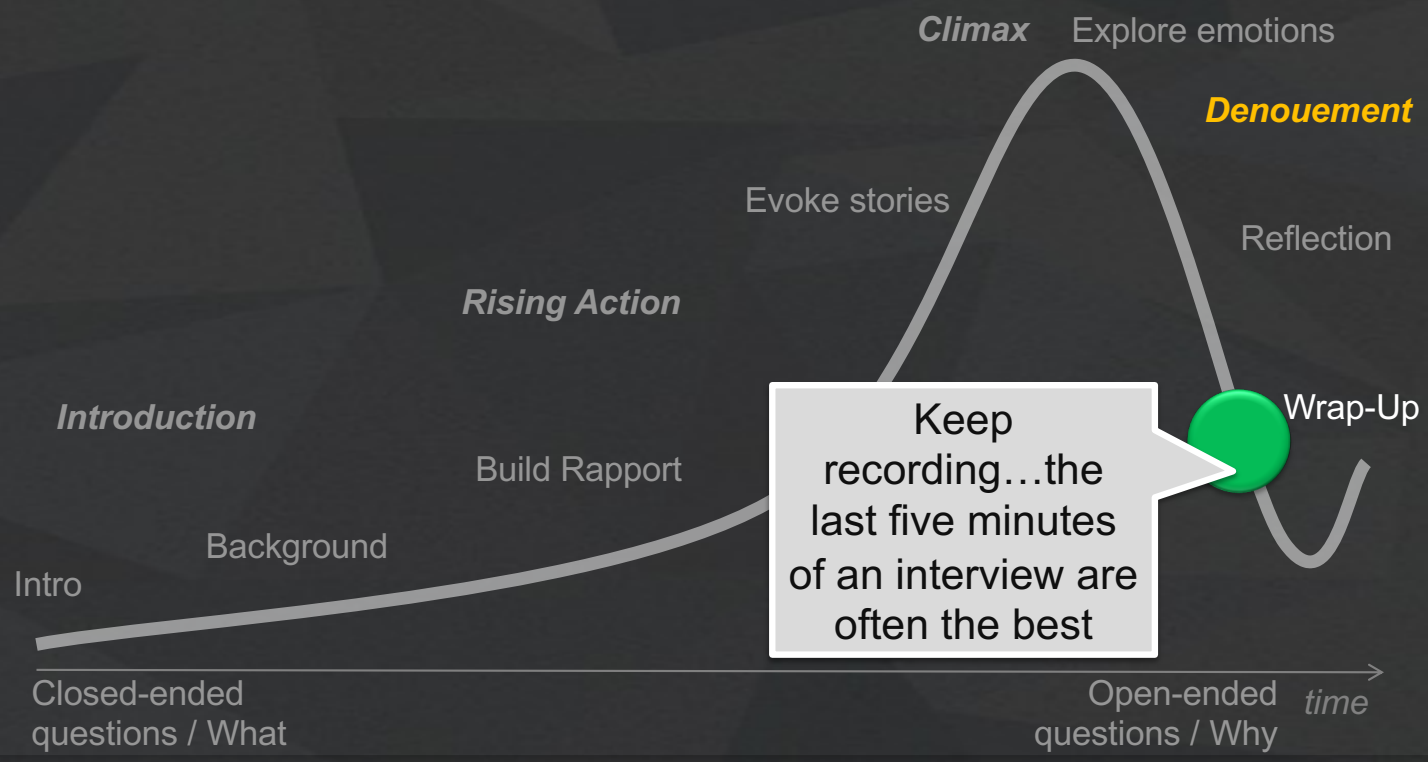
Adapted from Michael Barry

Interview Questions – Reflection

- Point to Their Reaction – "Why do you roll your eyes when you say that?"
- Suggestive Opinion – "Some people have very negative feelings about emotional sales pitches. What are your feelings about it?"
- Contradictions – "You tell me you can sell ice cubes to Eskimos, but you also tell me you have a deep concern for your customers. How do these two work together?"

Interview

Adapted from Michael Barry



A few last tips

- Remember that people make sense (to themselves)
- Your job is to be able to *explain how they make sense*
  - get to the bottom of things & understand the what & *why*
- Create a discussion guide with lots of questions (themes), but be *ready to veer to pull threads*

Administrivia

1) Fill out studio form by today at 5 PM (https://bit.ly/cs147-22wi-studio)
2) Studio assignments coming out late Wed PM (or early Thur AM)
   - attend assigned studio unless pre-cleared by staff
   - inform your TA if you will not be there this week (e.g., have some excused absence)
3) Studio absence policy
   - 1st absence is *free* for a legit reason (*must* inform TA in advance)
   - 2nd absence for a legit reason requires make-up assignment (*must* inform TA in advance)
   - after that you start to lose participation points
4) Teams will be arranged by Friday night/Saturday afternoon at latest
5) Use the slack channels to keep up with Q&A & announcements
6) Make sure to regularly check course web site: cs147.stanford.edu
7) James' office hours: Wed 3:30-4 PM & Fri 4-4:30 PM, scheduled through https://calendly.com/landay/landay-office-hours

hci.stanford.edu/courses/cs147/2022/wi/

Home Calendar Projects Logistics Resources

Monday

Introduction (PPT) (Recording)

Margaret Gould Stewart, "From tecnho-optimism to techno-realism: What it means to innovate responsibly"

Wednesday

Design Discovery (PPT)

Susan Adams, "4 Steps to Successful Brainstorming"

Holtzblatt & Beyer, Contextual Design (Ch 3)

d.school's Empathy Fieldguide

Watch: ABC News Nightline IDEO Deep Dive, July 1999 (22 minutes)

Watch: ABC News, 60 Minutes, IDEO Design Thinking, January 2013 (13 minutes)

Optional: Holtzblatt & Beyer, Contextual Design. In: The Encyclopedia of Human-Computer Interaction, 2nd Ed.

Design

The dt+UX course focuses on bringing design thinking

Prototype

Prototyping is the key tool to move ideas out of a designer's head and

Evaluate

Evaluation is how we choose whether a design or feature

BREAK

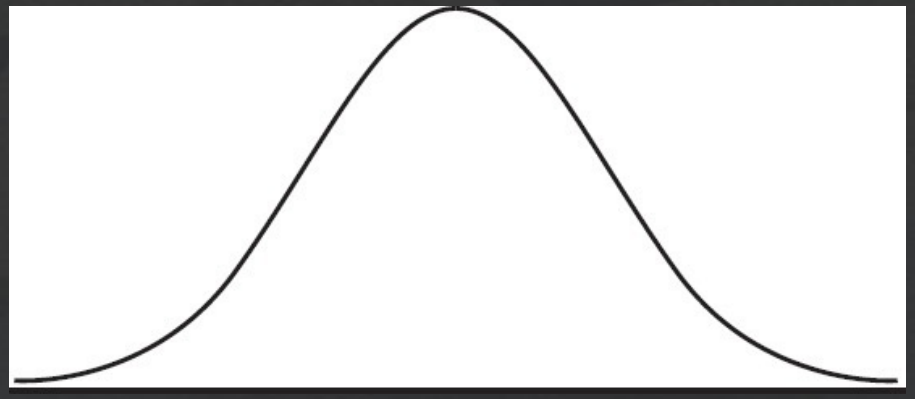
Choosing Participants

- Representative of target users (current or future users)
  - usually not Stanford students
- Interview people on both sides of an interaction (e.g., Lyft)
- Experts good for background but aren't substitute for users
- Consider interviewing *extreme* users
  - e.g., airport design: flies every week vs. never flown vs. a wheelchair user
- Typically interview 6-12 people individually for 30-90 min

- **Note**: interviewing children may require permission

Choosing Participants: Extreme Users

- Users are often distributed in a bell curve with mainstream users in the center & ‘extreme users’ on either end



- The spectrum can relate to any aspect of their identities
  - ability
  - socioeconomic status
  - interest in a topic
  - situation
  - behavior
  - …

Whose Perspectives are Missing?

- Fast-paced iteration can limit who we talk to
  - when including certain people, we implicitly decide who to exclude
- How can we *include* & *learn from* people with different identities?
  - e.g., people with disabilities, racially marginalized communities
- Be mindful of who tech has historically underserved
  - e.g., Joy Buolamwini from MIT has shown that Facial recognition AI is less accurate for women of color, since training databases are predominantly white & male

Where to Recruit

- Depends on target audience…
- Nextdoor.com
- Facebook / wechat groups
- Craig's List
- Local email lists (e.g., parents, etc.)
- *Snowball sampling* – when you recruit someone ask them to pass it on to others they think would be good…
- What's worked for you????

Types of Questions to Avoid

- What they would do / like / want in hypothetical scenarios
- How often they do things
- How much they like things on an absolute scale
- Avoid *binary* questions
- “Tell me a story about yourself”

Common Pitfalls – Suggesting Answers

"*How was that decision reached? Was there a big meeting? Did your boss decide without you?…*"

- Let the informant paint his or her own categories of meaning
- Avoid suggesting answers
- Trust the question – ask it & ***stop*** talking

Let there be silence

Good Questions

(a little bit of)

Silence is Golden

Common Pitfalls – Hypothetical Situations

"What if I designed something that wasn't as round and soft and annoying as your current thing and instead bounced up and down. Would that work for you?"

"What about your friends? What would they do?"

- Ask about events & things that **actually happened/exist**
- Get their point of view, **not what they think someone else might do**

There is More Than One Way to Ask “Why?”

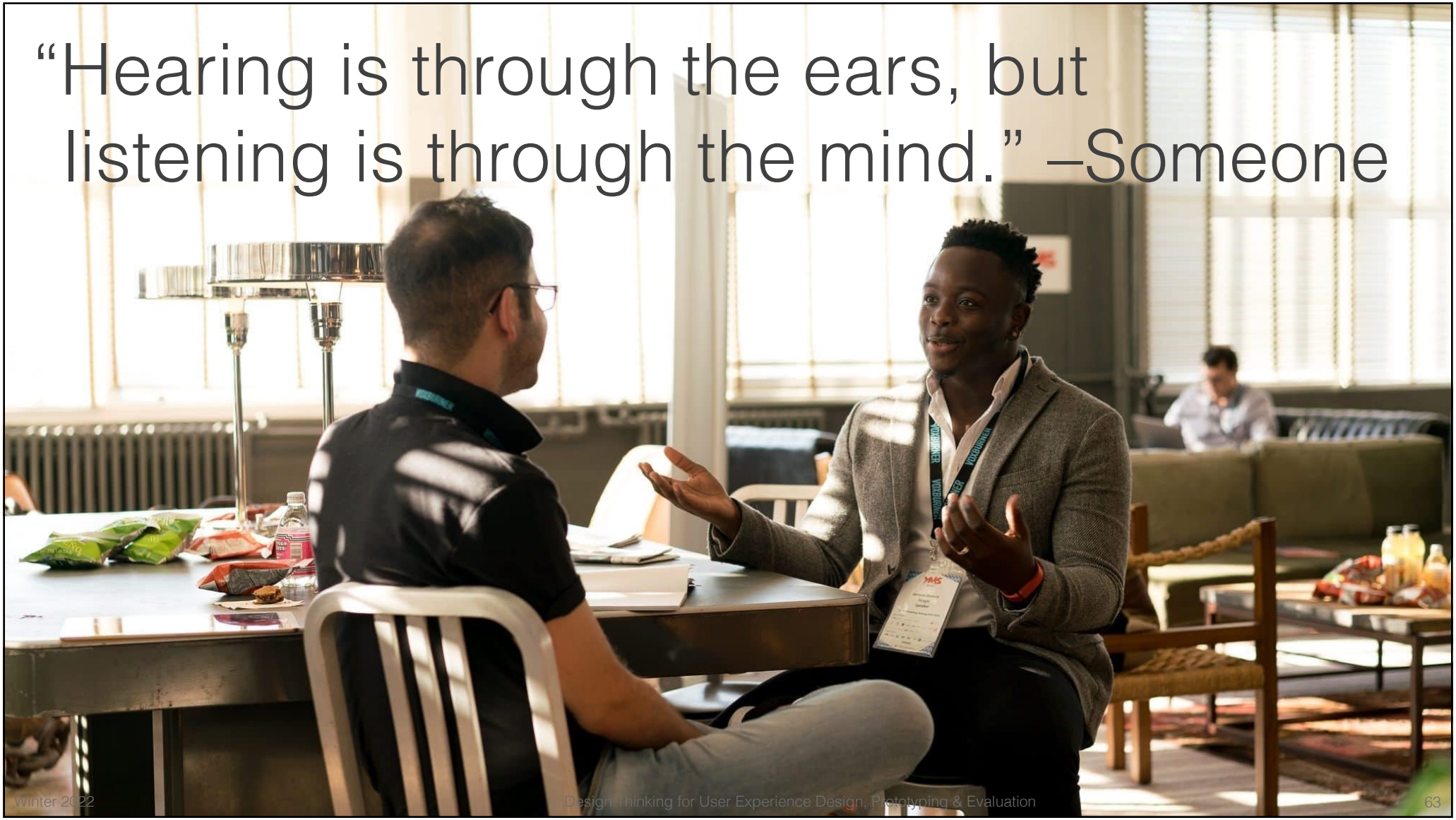
- Tell me more about that
- Tell me what you mean when you say XXX
- [last phrase the person said]?

What mistakes do you spot?

https://www.youtube.com/watch?v=U4UKwd0KExc&feature=youtu.be

What works well?

https://www.youtube.com/watch?v=eNMTJTnrTQQ&t=213s


“Hearing is through the ears, but listening is through the mind.” –Someone

What Are the Gems?

- You've uncovered a surprise/found what is missing
- You can explain why people do unusual things
- You want to tell others about what you learned

Share With Your Team

- Stories
- Photos
- Sketches
- Quotes

In Breakout Rooms of 3 students

You have been hired by Stanford University to reimagine the student COVID testing experience for students returning from travel after winter break.

In each BR:
There will be an interviewer, a participant, and a note-taker.
After 5 minutes, switch roles so that everyone gets the chance to try two roles

After BR:
One person from the BR choose(s) one to share in the Slack:

- An interesting insight
- Something that went well
- Something that didn't work

Users: Unique or One of Many?

"Take the attitude that nothing any person does is done for no reason; if you think it's for no reason, you don't yet understand the point of view from which it makes sense.

Take the attitude that nothing any person does is unique to them, it always represents an important class of customers whose needs will not be met if you don't figure out what's going on."

(p. 63, *Contextual Design*)

Ethical Considerations in Needfinding

- Power
- Language
- Standpoint
- Inclusion

Ethical Considerations in Needfinding: Power

Testing/fieldwork can be **coercive** if there is a power imbalance (e.g., in under resourced communities)

http://centread.ucsc.edu/CenTREAD%20photos/BrianDowd2.JPG

People may feel no option but to speak to you or give you their time even though they may not get anything of value in return.

Ethical Considerations in Needfinding: Power

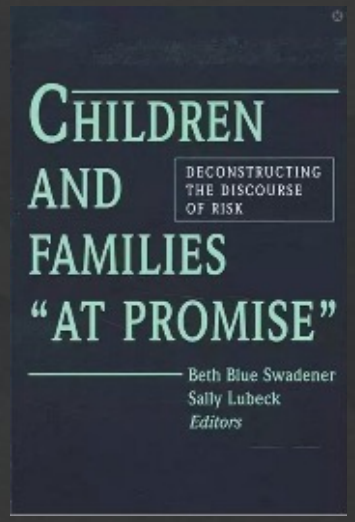
Power imbalances between the researchers and interviewees may create bias in results

http://research.microsoft.com/pubs/163718/CHI2012-Dell-ResponseBias-proc.pdf

"When the interviewer is a foreign researcher requiring a translator, the bias towards the interviewer's artifact increases to 5x."

Ethical Considerations in Needfinding: Language

The language used to describe underserved communities may contain historical prejudice and may affect the way we understand and address their needs and interests.



http://www.sunypress.edu/

"the 'at-risk' label is highly problematic and often implicitly racist and classist… [it] locates problems in individuals, families, and communities, rather than in institutional structures that create and maintain inequality."

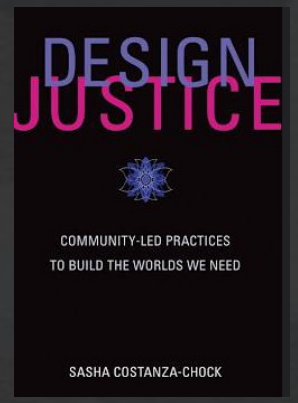
Ethical Considerations in Needfinding: Standpoint

- Our ability to empathize with people who are different from us may be affected by a variety of situational factors
- Empathetic design requires *acknowledging* that members of underserved communities & underrepresented minorities have *perspectives that are not immediately accessible* to the more privileged & empowered
- Listening & *incorporating their standpoints* is crucial as a point of departure for research

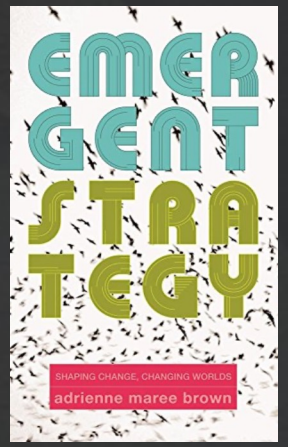
Ethical Considerations in Needfinding: Standpoint

Users not only have greater knowledge of their wants/needs but also of their assets

Emergent Strategies: "whenever people face challenges, they are always already working to face those challenges" (Sasha-Constanza Chock, *Design Justice)*



https://design-justice.pubpub.org



https://www.akpress.org/emergentstrategy.html

Ethical Considerations in Needfinding: Inclusion

- Accommodation
  - meet your interviewees where they are
  - making people comfortable & safe leads to the best interviews & insights
  - accommodations vary depending on who your interviewee is (signers for hearing-impaired, interpreters for non-native English speakers, etc.)
  - be mindful of power dynamics

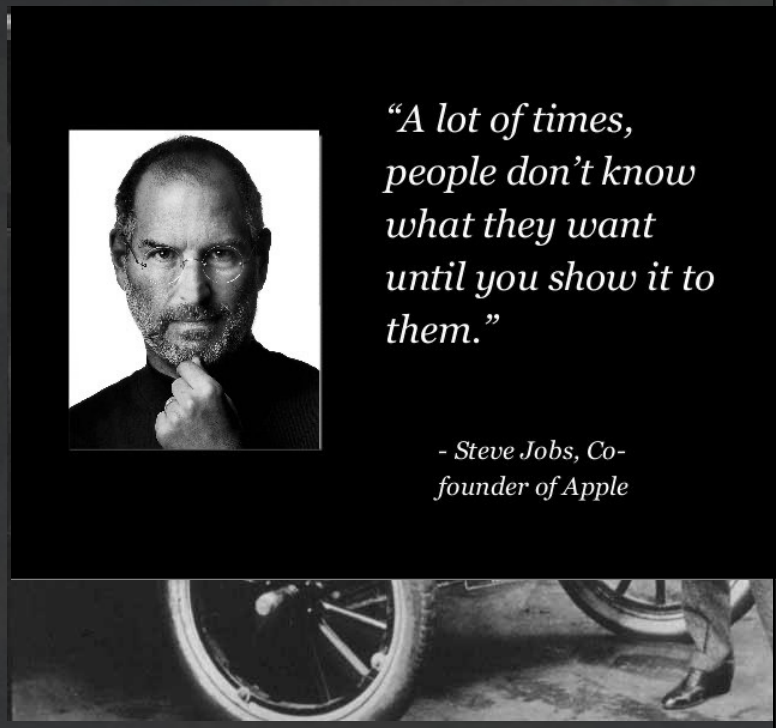
- Accountability
  - involve interviewees in later stages of the design process
  - does your design address their wants & needs?

Caveats of User-Centered Design

- Politics
  - "agents of change" can cause controversy
  - important to get buy-in from all those involved

- Customers are not always right
  - cannot anticipate new technology accurately
  - your job is to design & build system customers will want, not system customers *say* they want
  - "Henry Ford-Steve Jobs Fallacy"
    - If Ford asked/observed what problem people had, he'd have found: "we want to get places faster, cheaper, more comfortably"

- Design/observe forever without prototyping
  - rapid prototyping, evaluation & iteration is key



Discussion Guide Resources

- Creating an Effective Discussion Guide for User Research, Medium
- 5 Steps to Create Good User Interview Questions, Medium
- Asking the right questions during user research, interviews, and testing, uxdesign.cc, Medium
- Sample UX Research Plan (discussion guide + context), Smashing Magazine
- Just Enough Research, by Erika Hall of Mule Design, Talk at UX Salon 2016 (30 min.)

- HCI Guidelines for Gender Equity and Inclusivity, by Morgan Klaus Scheuerman, Katta Spiel, Oliver L. Haimson, Foad Hamidi, Stacy M. Branham
  [note: lots of good material on this page, but linking directly to the survey section, as relevant for everyone]

Further Reading

- Books
  - *User and Task Analysis for Interface Design* by Joann T. Hackos, Janice C. Redish
  - *The Inmates are Running the Asylum* by Alan Cooper
  - *The Design of Everyday Things* by Don Norman
  - *Observing the User Experience*, Goodman, Kuniavsky & Moed
  - *Design Justice*, Sasha-Constanza Chock
- Institute of Design at Stanford
  - lots of online materials at http://dschool.stanford.edu

Further Reading on Ethical Issues With Community-based Research

- Children and Families "At Promise, Beth B. Swadener, Sally Lubeck, editors, SUNY Press, 1995, http://www.sunypress.edu/p-2029-children-and-families-at-promis.aspx
- "Yours is better!" Participant Response Bias in HCI, Proceedings of CHI 2012, by Nicola Dell, et al., http://research.microsoft.com/pubs/163718/CHI2012-Dell-ResponseBias-proc.pdf
- "Strangers at the Gate: Gaining Access, Building Rapport, and Co-Constructing Community-Based Research", Proceedings of CSCW 2015, by Christopher A. Le Dantec & Srah Fox, http://dl.acm.org/citation.cfm?id=2675133.2675147&coll=DL&dl=ACM
- "Imperialist Tendencies" blog post by Jan Chipchase, http://janchipchase.com/content/essays/imperialist-tendencies/
- "To Hell with Good Intentions" by Ivan Illich, speech to the Conference on InterAmerican Student Projects (CIASP), April 20, 1968, http://www.swaraj.org/illich_hell.htm
- "Embracing Four Tensions in Human-Computer Interaction Research with Marginalized People", by Calvin Liang, et al., https://calvliang.github.io/projects/TOCHI2021
- *Ruined by Design: A Design Ethics and Activism Book* by Mike Monteiro, 2019

Further Reading on Ethical Issues

- Ihudiya Finda Ogbonnaya-Ogburu (et. al.) 2020. Critical Race Theory for HCI. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems.* Association for Computing Machinery, New York, NY, USA, 1–16.

- Rosanna Bellini (et. al.) 2018. Feminist HCI: Taking Stock, Moving Forward, and Engaging Community. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems (CHI EA '18).* Association for Computing Machinery, New York, NY, USA, Paper SIG02, 1–4.

- Katta Spiel (et. al.) 2019. Queer(ing) HCI: Moving Forward in Theory and Practice. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems (CHI EA '19).* Association for Computing Machinery, New York, NY, USA, Paper SIG11, 1–4.

Needfinding Summary

- Build *empathy* with customers
- *Listen* to them to *discover* interesting insights
- Exit Ticket #1: https://bit.ly/cs147-2022wi-exit1-398
  due in 24 hours (by Thursday, Jan 6th, 3:30 PM PT)

Next Time

- Studio
  - Design Project 0 – and team preferences
- Lecture

  Monday – Define: *Unpacking* needfinding results to define problem/domain of interest
- Readings
  - *Tips for Working Successfully in a Group* by Randy Pausch
  - *The Discipline of Teams*, by Katzenbach and Smith, Harvard Business Review
  - *How to Survive a Critique: A Guide to Giving and Receiving Feedback* by Karen Cheng
- Listen: Invisible Women, 99% Invisible, Episode 363 (39 minutes)