SWE 632 - Design & Development of User Interfaces

George Mason University

Class will start in:

20:00

Instructor:
Dr. Kevin Moran

Teaching Assistant:
David Gonzalez Samudio

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Fall 2020

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Week 4:
Contextual Inquiry

Administrivia

- ***Project Checkpoint 1:*** Due Today — Feedback/Grades by Friday

- ***Project Checkpoint 2:*** Posted on Course Website, Due next week

- ***Discussion Question 4:*** Posted After Class, due on Friday

Project Checkpoint 2

Project checkpoint 2

Heuristic Evaluation

Possible Points	Due Date
40 Points	September 22nd - Before Class

Description

In this HW assignment, you will conduct a Heuristic Evaluation of 3 web apps (Group Assignments will be emailed to each group individually), identifying at least 5 potential usability issues for each web app (at least 15 in total). The 15 issues should include at least 8 of the 10 usability heuristics.

1. Each project group will be assigned 3 web apps on which to conduct a heuristic evaluation. A URL and list of 5 use cases will be provided for each web app.

2. You should focus your inspection on the areas of app behavior encompassed by the 5 use cases.

3. For each potential usability issue you identify, you should describe (1) the number and name of the violated heuristic, (2) screenshot(s) providing evidence of the specified issue (circles and arrows pointing out the issue can be helpful, if applicable) (3) a short paragraph briefly describing the app behavior and clearly explaining how the heuristic has been violated.

4. Be professional in your language describing the issue - treat it as a public report you are writing.

5. If the provided URL does not work or you are unable to execute one of the use cases, contact the TA.

6. All of your submitted documents should include your name and the name of the other group members (if applicable).

Questions?

Class Overview

Class Overview

- *Part 1 - Principles of Contextual Inquiry:* Apprenticing with the User

- *Short Break*

- *Part 2 - Performing Contextual Inquiry:* Walking through the process

- *Part 3 - Example:* Contextual Inquiry for Travel Site

- *Part 4 - In-Class Activity:* Trying out Contextual Inquiry
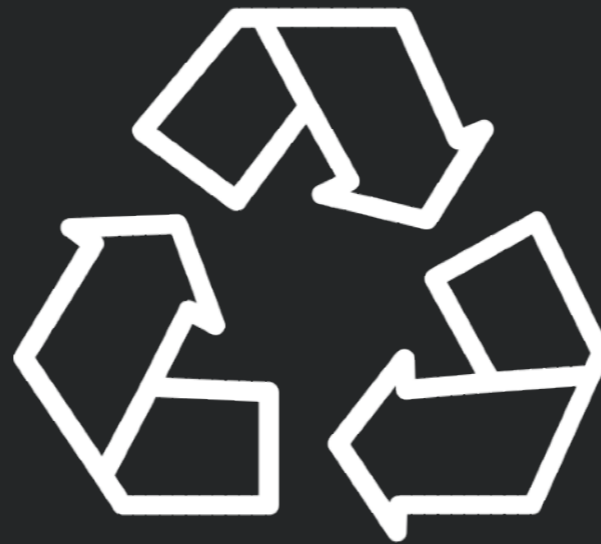
- *Part 5 - Bootstrap Tech Talk:* Keyan & Roger

Iterative Model of User-Centered Design

Observation

(Re)Define the Problem

Understand User Needs

Test

Evaluate what
you have built

Idea Generation

Brainstorm
what to build

Prototype

Build

Needfinding (a.k.a. design research)

- Goal: understand user's needs

- Use of methods to gather qualitative data

  - behaviors, attitudes, aptitudes of potential and existing users

  - technical, business, and environmental contexts - domain

  - vocabulary and social aspects of domain

  - how existing products used

- Empowers team w/ credibility and authority, helping inform decisions

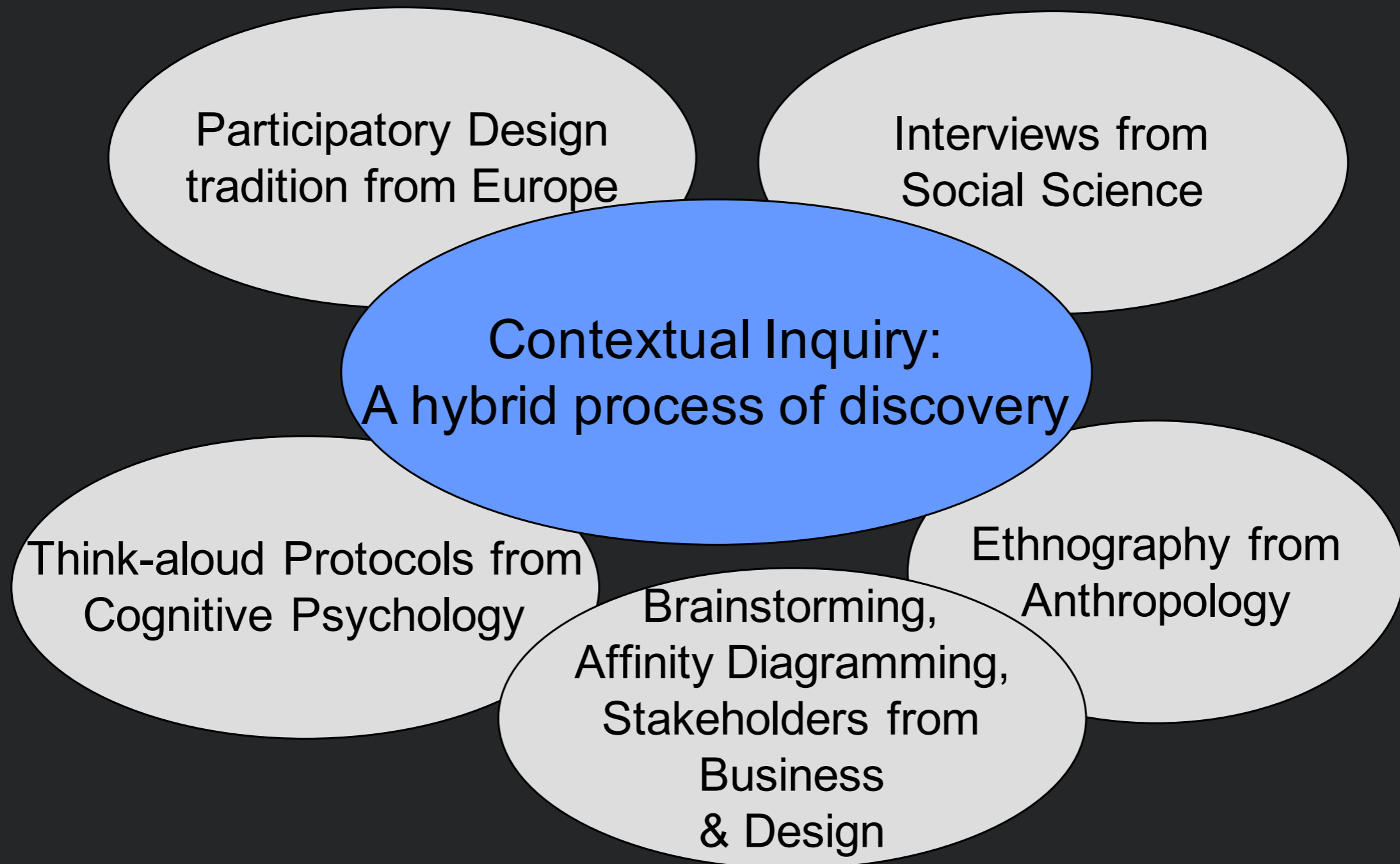# Principles of Contextual Inquiry

Contextual Design

- An approach to answering the question, "What should we build to help people do their work better?"

- Key elements

  - Contextual Inquiry – Gather data from customers while they do their **_work_** to help decide what system should do.

  - Work modeling – Use data to build **_models_** of work that are explicit and sharable.

  - Work redesign – Use data and models to design work model for how customers will work in the future. The core design problem is **_work design_**, rather than technology design.

  - Use work model and iterative prototyping to drive detailed user interface design.

- Customer data, modeling and work design drive technology design.
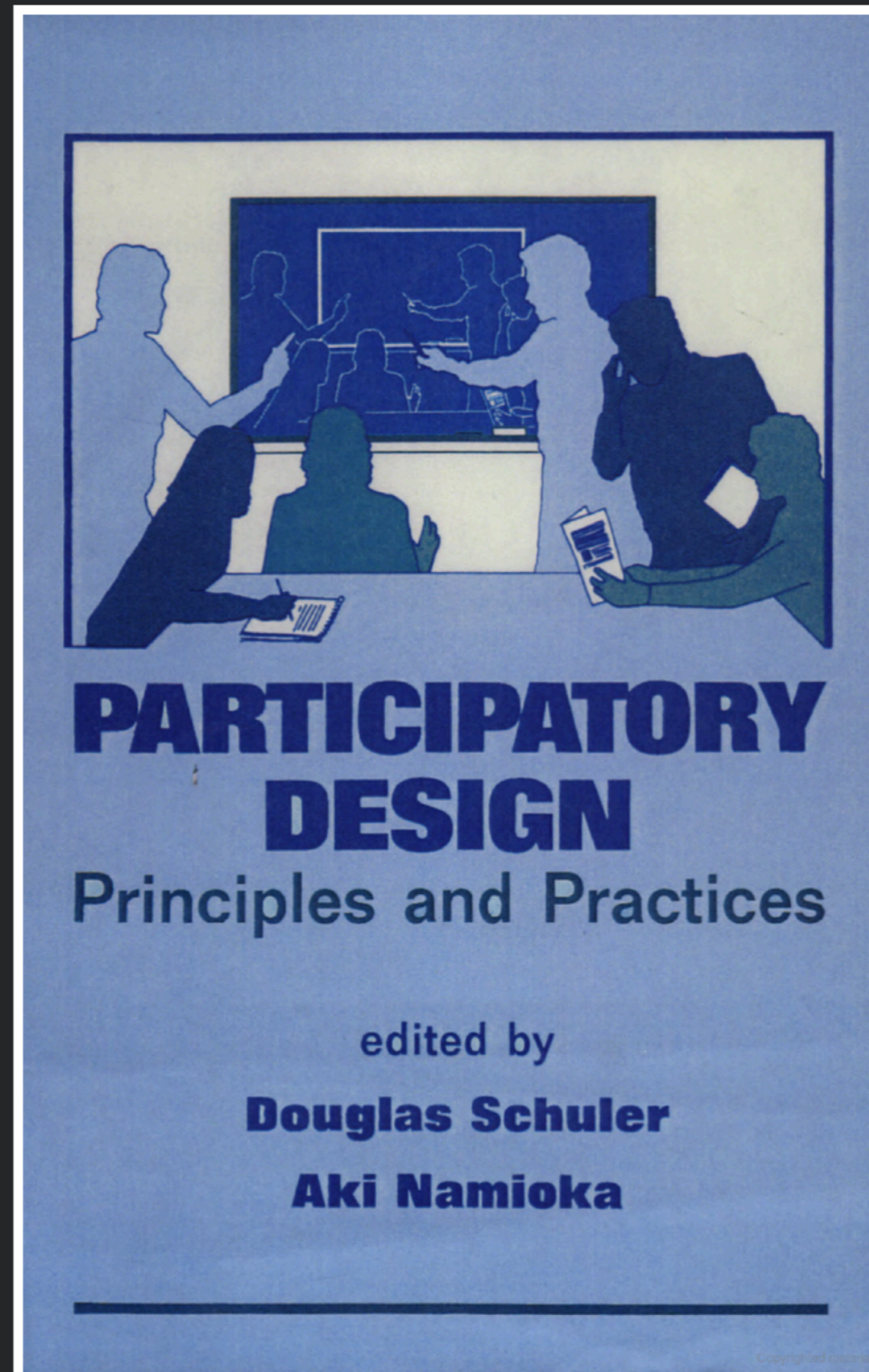
Why Perform Contextual Inquiry?

- Need to understand what will help people do their work better while fitting into their lives and matching their culture.

Historical Influences on Contextual Inquiry

Participatory Design tradition from Europe

Interviews from Social Science

Contextual Inquiry: A hybrid process of discovery

Think-aloud Protocols from Cognitive Psychology

Brainstorming, Affinity Diagramming, Stakeholders from Business & Design

Ethnography from Anthropology

Purposes of Contextual Inquiry (CI)

- To obtain ***data*** from users in their context

  - insights about the users' ***environment***

  - insights about their many ***tasks***

  - insights about the ***people*** they work with

  - insights about ***cultural influences*** on work (expectations, desires, policies, values, etc.)

  - understanding of ***breakdowns*** in current processes

- To help define requirements, plans and designs and to prioritize

- *Actions* speak louder than words

  - People usually cannot say what innovations they would like and even when they can, are sometimes wrong about what would be helpful.

- Have *conversations* with users in the *context* of their work

  - "Direct observation" when possible

  - When not possible

    - Cued recall of past experience, or

    - Re-creation of related experience
      (we'll eventually see that this is similar to Think Aloud usability studies)

Principles of Contextual Inquiry

1. Context:

Understand users' _needs_ in their work environment

2. Partnership:

Work with users as **_co-investigators_**

3. Interpretation:

Assign **_meaning_** to the observations

4. Focus:

Listen & **_probe_** from a clearly defined set of concerns

- Definition:

  - The interrelated conditions within which something occurs or exists

- Understand work in its natural environment

  - Go to the stakeholders (users, agents, etc.)

  - Observe real work

  - Interview while she/he is working

Key Differences in Methods

Interviews, surveys, focus groups

- Remembered experience (or summary data & abstractions)

- Subjective

- Limited by reliability of human memory

- What customers think & say they do

Contextual Inquiry

- Ongoing experience & concrete data where work is happening

- Objective

- Limited by ability to observe directly

- What customers do

Context Do's & Dont's

- Go to the workplace & see the work as it unfolds

  - **Seek concrete data**

    - Direct conversation to ongoing work:
      Customer: "I usually record appointments in my calendar"
      Interviewer: "Could you go ahead & walk me through the process"

    - If direct observation is not possible in area of focus, elicit retrospective accounts
      "Think about the last time you used System-X. Take me through the steps you went through with the system to get the job done."

  - **Avoid summary information**

    - Don't ask:
      "What do you dislike about the ordering system"

    - Instead ask:
      "Could you show me what you have to do in order to place an order. Let me know about things you like and don't like about the process as we go through it"

Context Do's & Dont's

- **Avoid abstract data**

  - Watch out for words like "usually", "generally" etc.

    - Abstractions are open to interpretation & can compromise the concrete data needed to guide design

  - Instead, direct conversation towards ongoing work or recent past events

    - You want responses that include words like:
      "Let me show you…"
      "Here's how I do it …"
      "Last time, I …"

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Pay Attention!

- User's work space

- User's work

- User's work intentions

- User's words

- Tools used

- How people work together

- Business goals

- Organizational and cultural structure

- ***Be guided by focus*** (and open to changing focus if the changed focus falls within another area of concern)

2. Partnership

- Definition:

  - A relationship characterized by **_close cooperation_**.

  - The goal is to make the customer and you collaborators in understanding the customer's work within your area of focus.
    The participant should understand the focus.

- Build an **_equitable_** relationship with the user

  - Not traditional interviewer-interviewee

  - Not master-apprentice model

    - An approximation for partnership, but has limitations

  - Not expert-novice (unless they are experts)

  - Not host-guest (be nosy)

- AIM FOR EQUALITY

  - CI Interviewer must built a partnership

Partnership => Informed Consent

- Informed consent is a very important principle in doing empirical work

  - Tell people why you are doing the inquiry and ask for their consent

  - It is the "right thing" to do ...and it may be required by law (depending on your employer)

- Keep data confidential!

  - Do not use data for any purposes not disclosed in the consent agreement

Establishing Partnership

- Share control

- Use ***open-ended*** questions that invite users to talk:

  - "What are you doing?"

  - "Is that what you expect?"

  - "Why are you doing X ...?"

- Let the user lead the conversation (provided on focus)

- Listen!

- Pay attention to communication that is non-verbal

Partnership Do's & Don'ts

- **Engage user as a partner in design**

  - Be *nosy* -- clarify, probe, watch

  - *Test* design ideas in work context in which they might be relevant -- "would it be useful if …"

    - Use caution on "would it be" questions

- **Do not assume role of interviewer**

  - Ongoing work ceases in a question & answer mode

  - Instead, questions should be in context of ongoing work

Partnership Do's & Don'ts

- **Do not assume role of expert**

  - Answering user questions about system alters their behavior

  - Instead: "Why don't you go ahead & do what you'd do if I weren't here, I'll answer any questions you may have at the end."

- **Do not assume role of guest**

  - Being overly polite may inhibit the kind of interaction that may lead to a better understanding of work. Instead, be nosy!

Attitude During the CI

- Be open to possibilities

- Be committed to expand and ground the focus (more about focus soon)

- Learn rather than teach

- Be willing to modify your thinking

- Pay attention to the participant's needs

- Pay attention to your needs

Useful Interview Techniques

- Repetition and rephrase

- Get behind the behavior

- Ask for an example

- Step by step

- Question terms and concepts (even if you think you know it)

- Summarize and draw out a conclusion or concept

- Question pronoun reference

- Check for deviant cases

- Go for generalization

- Clarify expectations

- Clarify activity

- Clarify metaphors

- Ask for a story

Fact
↓
Hypothesis
↓
Implication for design
↓
Design idea
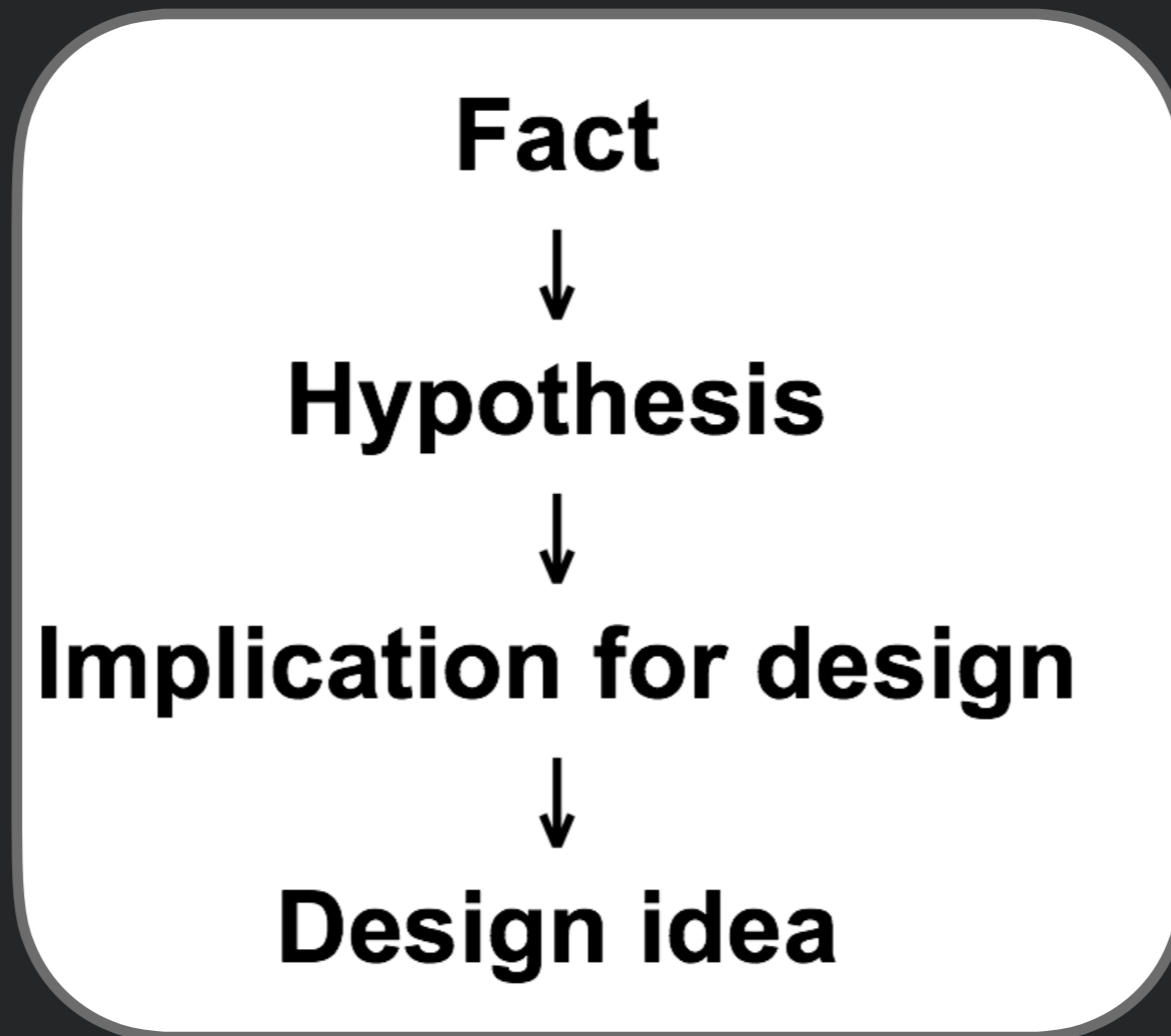
- You can't escape this, so make it explicit!

- Two kinds of interpretation: During data collection and after data collection

- Rephrasing, getting behind the behavior, asking for examples, step-by-step, questioning terms and concepts, etc. really makes things go slowly.

- How do I know what to focus on?

4. Focus

- Focus is a perspective

- We always have an entering focus

- Better to make it explicit

- Characteristics of focus:

    - Helps keep conversation on useful topics

    - Set of pre-conceived assumptions & beliefs

    - Reveals & conceals

see things that are in the focus

User work

might not see things out here
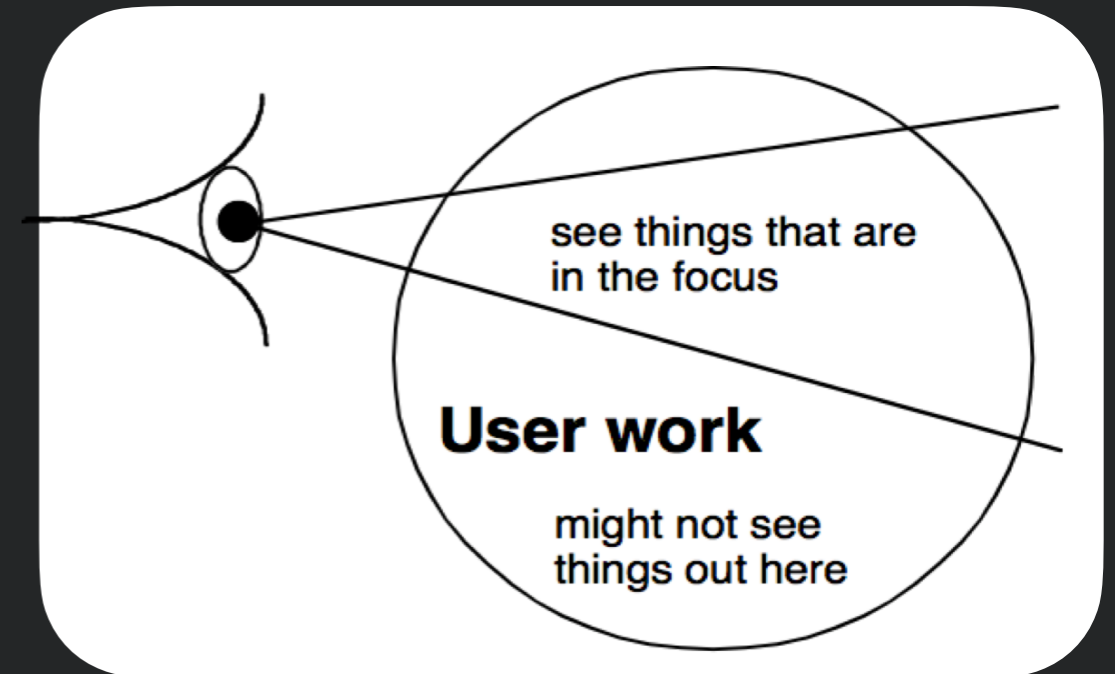
Role of Focus

- Directs the selection of participants

- Directs questioning

- Creates understanding

- Provides rich data

Focus Do's & Don'ts

- DO allow focus to **_steer_** conversation

- DO allow focus to **_expand_**

  - Probe surprises & contradictions

  - Probe what you don't know or understand

  - Be wary of nodding in agreement (Do you REALLY understand?)

- DO **_challenge_** focus assumptions

  - DON'T try to validate them

- DO avoid "expert blind spot"
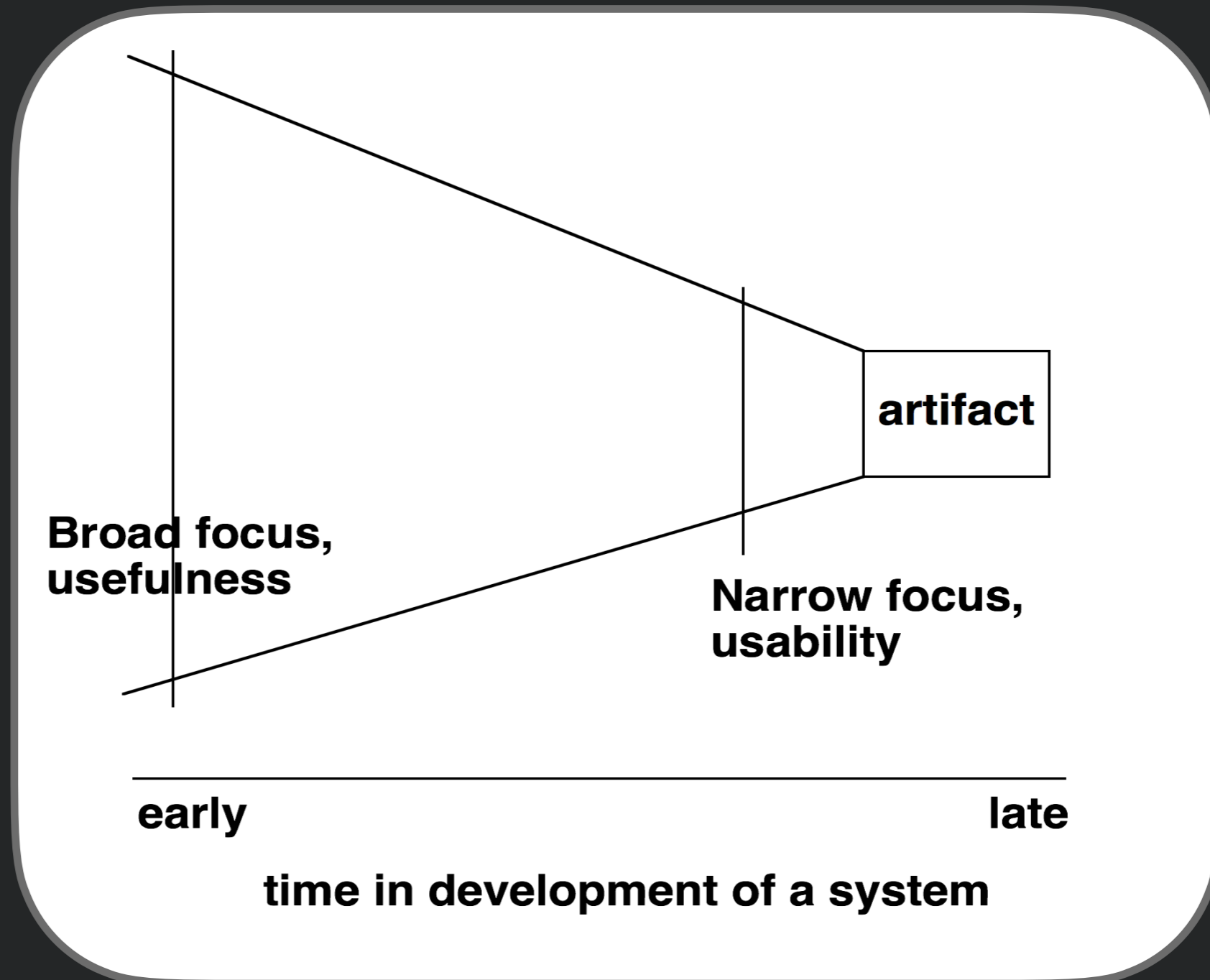
Setting Focus

1. Form a team of stakeholders

2. Brainstorm: questions, assumptions, design ideas

3. Record the ideas generated

4. Prune questions

5. Group questions w/ sticky notes (affinity diagram)

6. Develop generalized focus statement

7. Review focus w/ the team

7 Minute Break

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We hope you are doing well!

Conducting a Contextual Inquiry

Work-based Interview

- Use when:

  - Product or process already exists

  - User is able to complete a task while you observe

  - Work can be interrupted

Steps in a Work-based Interview

1. Introduction

2. Transition

3. Observation and Interpretation

4. Wrap-up

1. Introduction

1.***Introduce*** yourself & any other team members present & their roles

2.Get consent/permission to record (if applicable)

3.Articulate your ***focus***

    Vital for creating partnership

4.Get an ***overview*** of their work

    Helps you interpret what you will be seeing

5.Solicit opinions about tools (if relevant)

Transition to OBSERVING THEM DO THE ACTUAL THE WORK

"OK, we've been talking about your work, but now I'd like to watch you do your actual work <in focus area>. Just do what you would normally do. I'd like you to talk aloud about what you're doing as you work. And if there are things I don't understand or would like to know more about, I will ask you about them. If it's not a good time to interrupt, just let me know. I want you to basically do your work. Ready to get started?"

- Key points

  - Customer will do *work* while you watch

  - Encourage *thinking aloud*

  - Interviewer will *interrupt*; OK for participant to say "Not a good time for an interruption."

3. Observation and Interpretation

- Encourage users to "think aloud" as they work

- Take ***notes***

- Follow your ***focus*** and draw the user out

- Interpret & get ***validation***

- OPTIONAL: Co-design with the user (CAUTION: be careful not to use up the precious time you have to observe the work with speculations about what "would" be useful, especially if the design idea is complex; there are often better ways, such as prototyping, to co-design)

4. Wrap-up

- Summarize ***understandings***

- Ask any "pet" questions

- Give tips on system use

- ***Thank the user***

- Leave door ***open*** for future explorations

  - Important for contextual design, should you discover things you should have asked but didn't

  - Important for designing prototypes

What People *Do* Know

- What they do

- How they do things

- Their opinions about their current activities

- Their complaints about their current activities

- How much they like one thing that they know compared with another thing that they know

What People *Do Not* Often Know

- What they would do/like/want

- How often they do things

- How much they like things on an absolute scale

- If you ask, they will "guestimate"

Problems with Asking about New Features

- People understand their world within a structure ("functional fixedness")

- What we usually get: adding new features, fixing problems, transferring features we've seen elsewhere. Seldom a total redesign.

- People have difficulty imagining hypothetical situations

- People are happy to make something up

Use Interviews to Find Out

- Current behavior patterns

- Opinions of currently used products/services

- Complaints about poor or missing functionality

- Comparisons of two or more known options

If You Want *Unreliable* Data, ask:

- If people would like a new feature or product

- What features they would like

- How much people would like or want one option

- How to design a user interface

- Any design issues

- Anything that makes people imagine hypothetical situations!

- ***But who wants UNRELIABLE data??***

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Q. Can you think of some uses that, if you had a microphone on the front and a little panel that would let you record stuff, do you think that would be useful or not useful?

A: *I'm not sure what I'd use it for. . .*

Q: Anything?

A: *I'd like something that I could just talk to and have it do things for me (laughs)*

Q: Yeah, especially 'cause you're. . .

A: *Get rid of this keypad!*

Q: Yeah, right.

This user couldn't imagine any reasons to have audio until the interviewer led him along.

Information You Want to Know

- Understand people's underlying goals

  - What are people trying to **_accomplish_**?

- Understand their current behavior

  - How do they spend their **_time_**?

  - What are their **_priorities_**?

  - What problems do they currently have? What **_inefficiencies_** or costs are they putting up with?

  - How do they feel about different **_experiences_** they have?

Pay Attention!

- What, exactly, should you pay attention to?

  - Flow of work

  - Sequence of work

  - Culture of the work

  - Artifacts used in the work

Questions You Want Answered	Contextual Inquiry Activity
What role(s) is the participant playing?	▪ What is your job title? ▪ What are your responsibilities?
How is work divided among people? What people/groups are involved in getting the work done?	▪ Who do you work with? ▪ What are their responsibilities?
What communication actions between people occur, through what channels and artifacts (conversations, documents, emails, phone calls, etc.) in order to coordinate the work?	▪<Observe> ▪Who sent you that? ▪Who are you sending that to?
Are there any places people go to coordinate (e.g., meeting rooms)?	▪<Observe> ▪<Ask>
Where are the problems in coordination?	▪<Ask about problems>

Sequence of the Work

Questions You Want Answered	Contextual Inquiry Activity
What are the steps in the task?	• Show me • Walk me through step-by-step
What is the intent?	• \<Infer from data> or • Can you tell me (more) about what the purpose of this? Why did you do that?
What event(s) initiates the task?	• \<Derive from observation> or • When do you start this?
Is there an order to the steps?	• \<Derive from observations> or • Are these steps always in this order or are different orders possible?
Are there conditions that change what steps are taken?	• \<Derive from observations> or • Are these steps always the same or are there sometimes different ones?
What are the problems?	• \<Watch for hesitations, errors> • \<Ask about problems>

Questions You Want Answered	Contextual Inquiry Activity
What are the expectations, desires, policies, values that influence the approach to the work?	▪Are there policies? ▪Who sets policy? ▪Who has the right to decide? ▪Who are the influencers? ▪Watch for "We do it this way" or "We don't do this way" types of statements ▪\<Watch for emotions\> ▪\<Probe for what's important\>

Questions You Want Answered	Contextual Inquiry Activity
What is the content?	▪<Get close-ups> ▪<Ask for explanations>
What is the structure (parts)?	▪<Get close-ups> ▪<Ask for explanations>
How does the artifact support the users' goals (intent)?	▪<Probe on artifact> ▪<Ask for explanations>
How does the artifact support the users' values (culture)?	▪<Probe on artifact> ▪<Look for personalizations> ▪<Ask for explanations>

What *Novice* Interviewers Do

- They give their ***opinions***

  - People want to please and interviewer opinions shape what people tell them.

- They do all the ***talking***

  - They forget the interview is not about them.

  - The interviewer should aim for 20-25% of total interview word count.

- They fail to ***follow up*** interviewee remarks

  - When inspiration fails, "Can you tell me more about that?"

Tips for Conducting the Interview

The interview is about them not you.

A: My only frustration is when the server goes down, everything will just freeze

Q-: I know, I would like some kind of indication when everything freezes up, so you know that your work isn't gone.

Q+: What do you do then?

A: Yeah, is that stuff I've been working on really going to be there when it comes back up?

Q-: That makes me feel real nervous when that happens to me

Q+: What's your reaction when that happens?

Ask unbiased questions

-Q: Which of the desktop applications do you use regularly? It looks like file manager, calendar manager...

Avoid presenting options

A: I use calendar manager and mail tool constantly

Q-: And do you use that to uh set up the uh the appointments with the people that you work with or do you keep track on your own?

Q+: What do you use calendar manager for?

Ask the question and let them answer

Q: Mr. Moore let me ask you, what about the difference, the growing gap between those schools that have computers and those that don't?

A: That is a real prob -

Q-: It's very costly to do this isn't it?

Let him finish the first question, then ask "How costly is it to set up computers in schools?"

Example

- You want to book a safe trip to the movies for you and your two roommates during COVID-19. You know that you want to be safe due to the virus, but need to understand the precautions movies are taking with aspects such as seating arrangements and concessions.

Scenario: Interviewer

- You work for ACM, one of the nation's largest movie theater chains. You have made several updates to the site to help with COVID-19 logistics, but you want to understand customers' needs.

- Focus: understand the factors that users consider when identifying whether a movie-going experience would be safe or not

- Note: you should **_not_** tell users to use a specific website, as you're interested in how they search for a movie showing more broadly.

- Take notes on user actions & think aloud

In Class Demo

Group Activity

- In groups of 2

    - Two roles (1) interviewer and (2) user

    - Based on provided scenario, conduct a contextual inquiry

    - 15 mins (will get 5 min warning to wrapup)

- You want to grab dinner with a friend tomorrow night and need to find a restaurant. You know your friend likes fun and unique spots, but you don't want something really expensive and you're a little a worried that trendy spots might not have any outdoor tables (COVID). Find a dinner suggestion for your friend.

- You work for Yelp. Given the many options and features, your team has become concerned that users are getting overwhelmed and are looking to streamline the process for choosing a restaurant.

- Focus: what is the process by which users identify restaurant choices and what factors influence these decisions (particularly during COVID)

- Note: You should **_not_** instruct users to use Yelp, as you're interested in understanding how they use such recommendation sites in general, not only yours.

- Take notes on user actions & think aloud

Acknowledgements

- Slides adapted from Dr. Thomas Latoza's SWE 632 course