# IN4MATX 232: Research in HCI

## Class 2:
## Research Contribution Types

Daniel Epstein

# Participation

- Will make the class better
- Would be nice to hear from people who didn't speak up as much last class
- I'll call on some of you today, based on your Perusall comments
  - It's because I thought you had something productive to contribute!
- I have a bunch of points prepared, but I'd rather discuss what you have questions on

# Multiple contribution styles

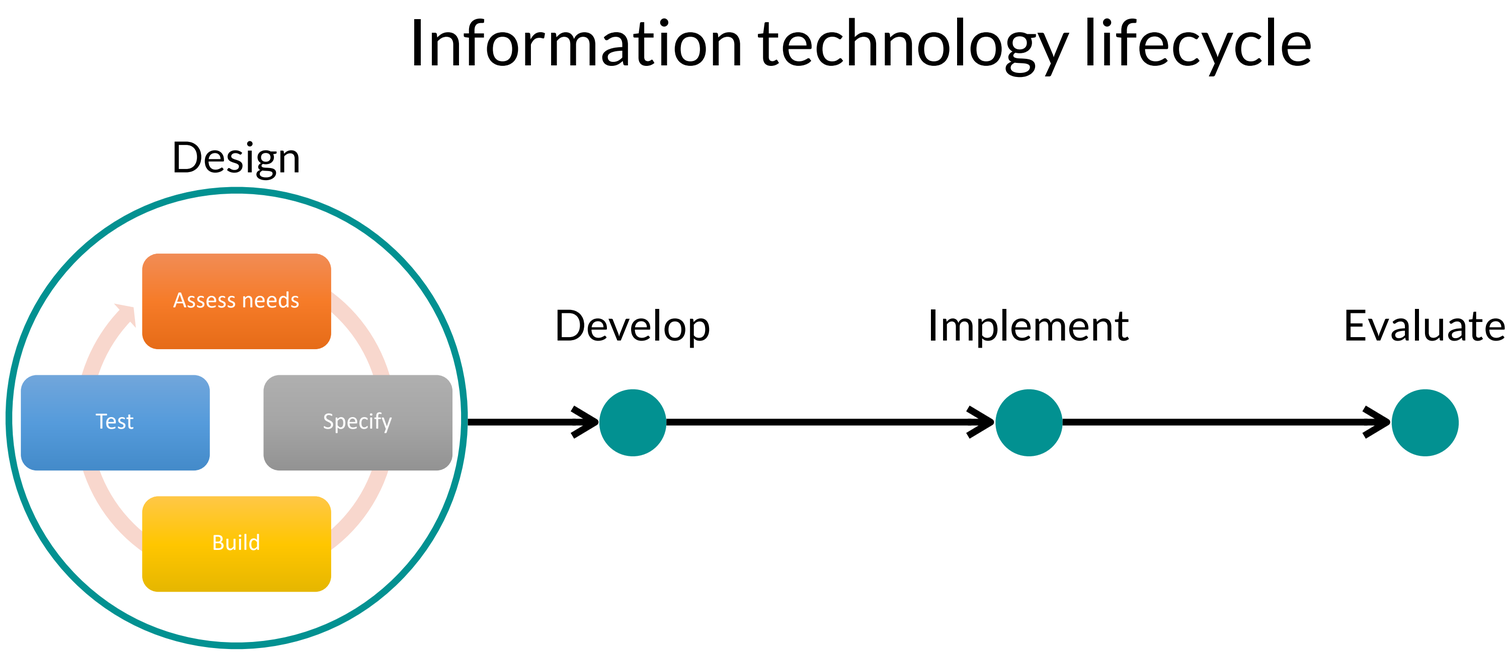
- Relatively common
  - Certainly empirical combines well with other styles
- But maybe less focused?
  - The more points you make, the more it dilutes the core takeaways of your work

# Why are empirical and artifact contributions so prominent?

# Applying Human-Centered Design

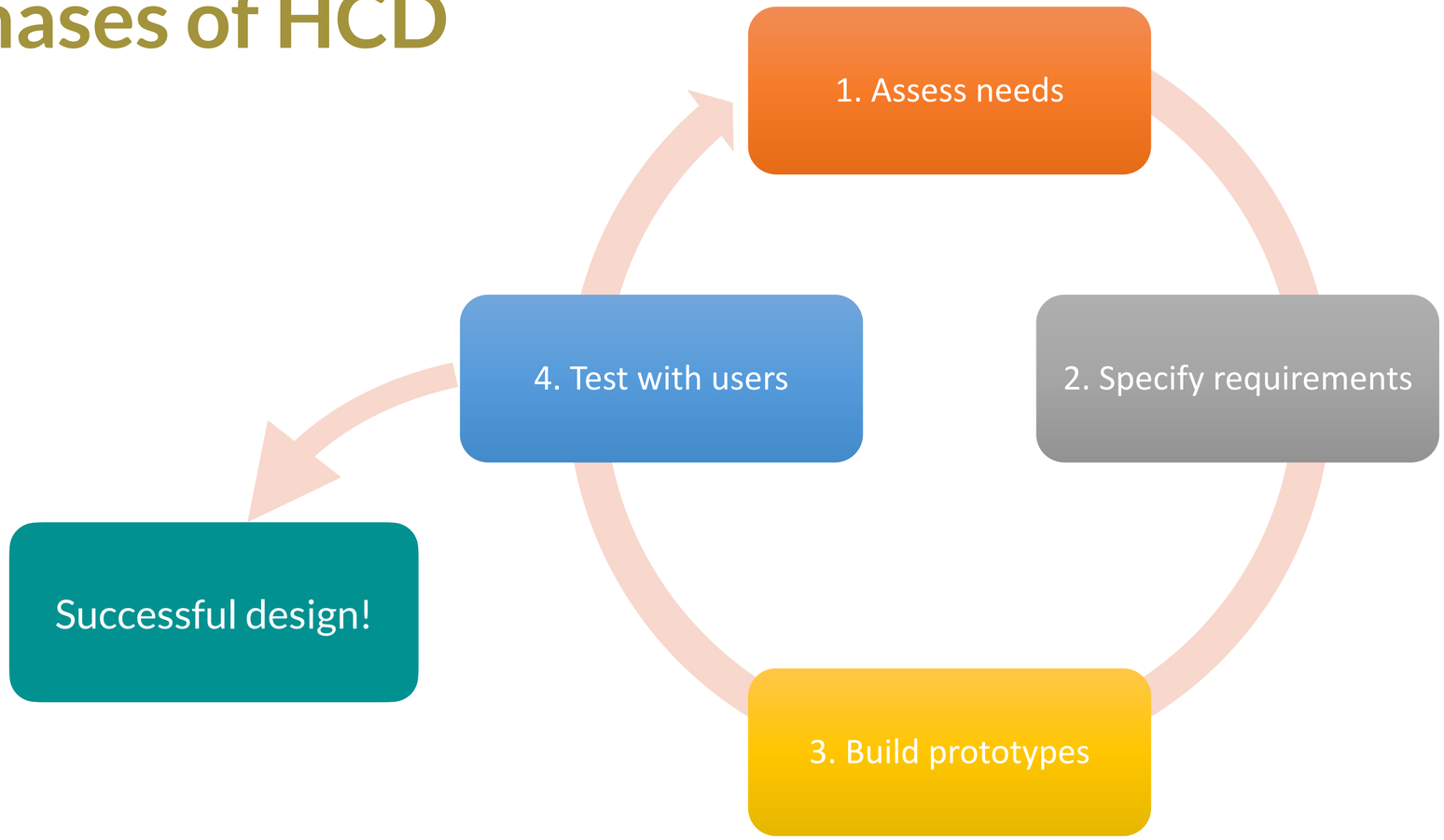
Information technology lifecycle

# Applying Human-Centered Design



# Applying Human-Centered Design

## Phases of HCD



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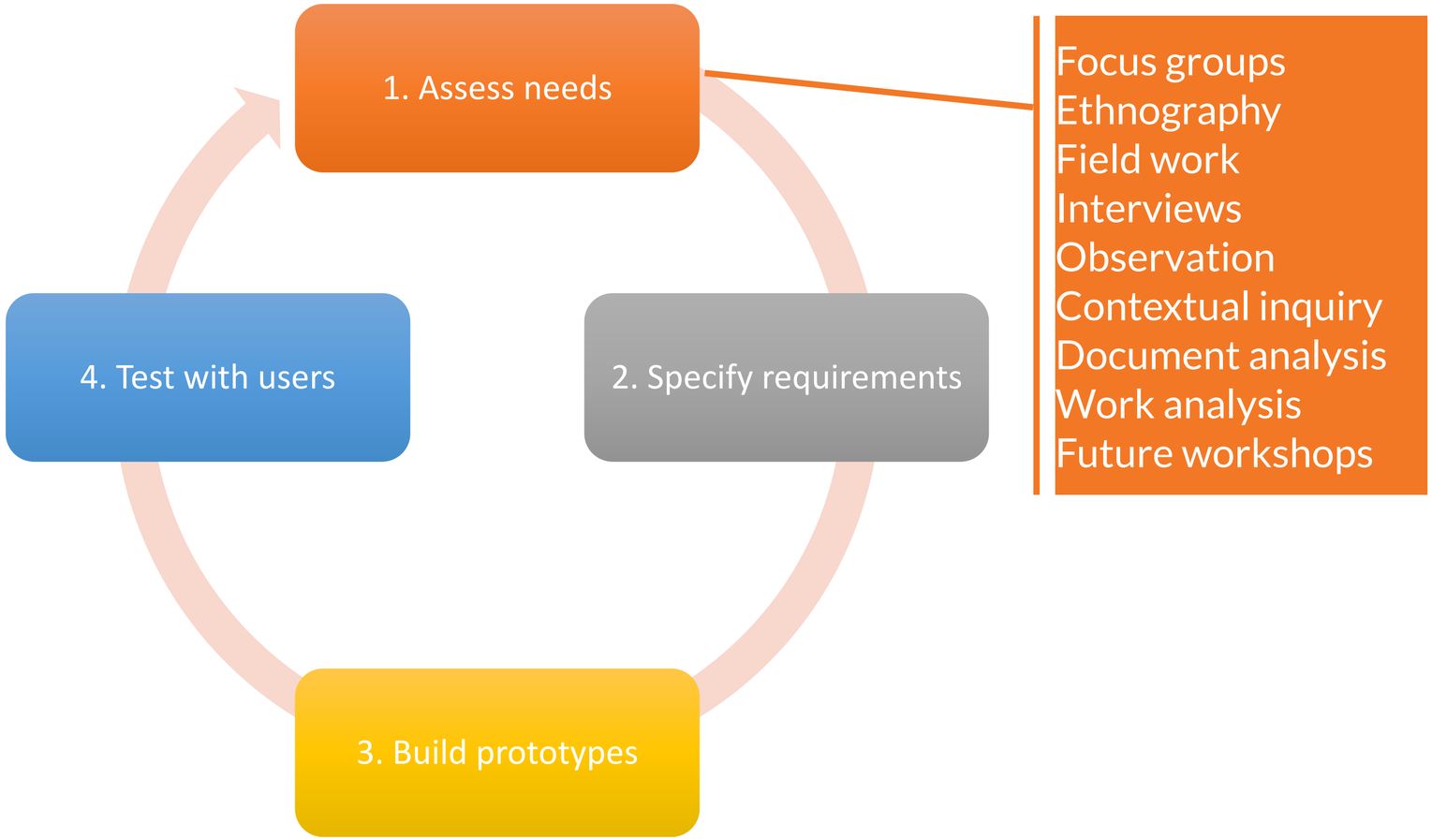

# Applying Human-Centered Design

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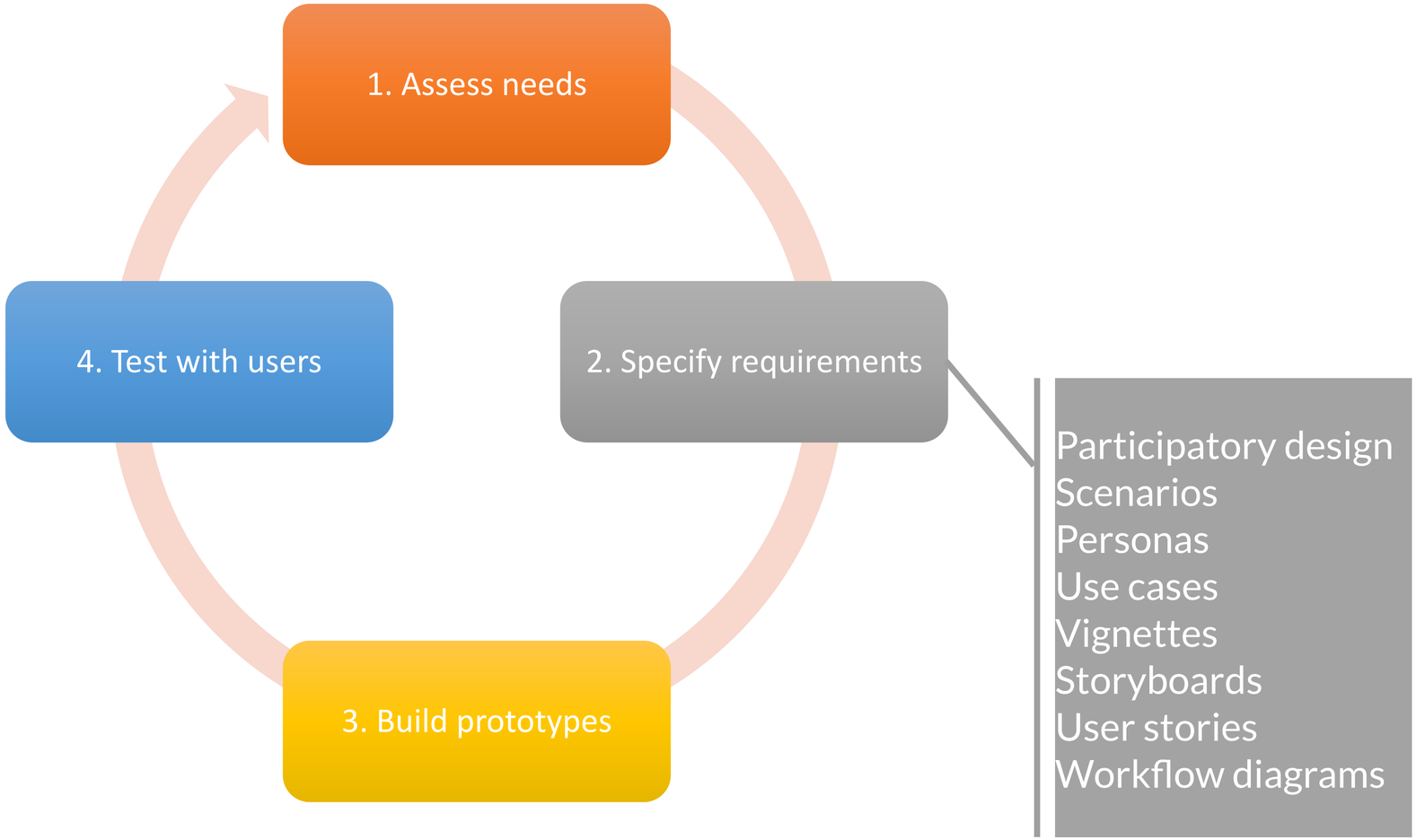

# Applying Human-Centered Design

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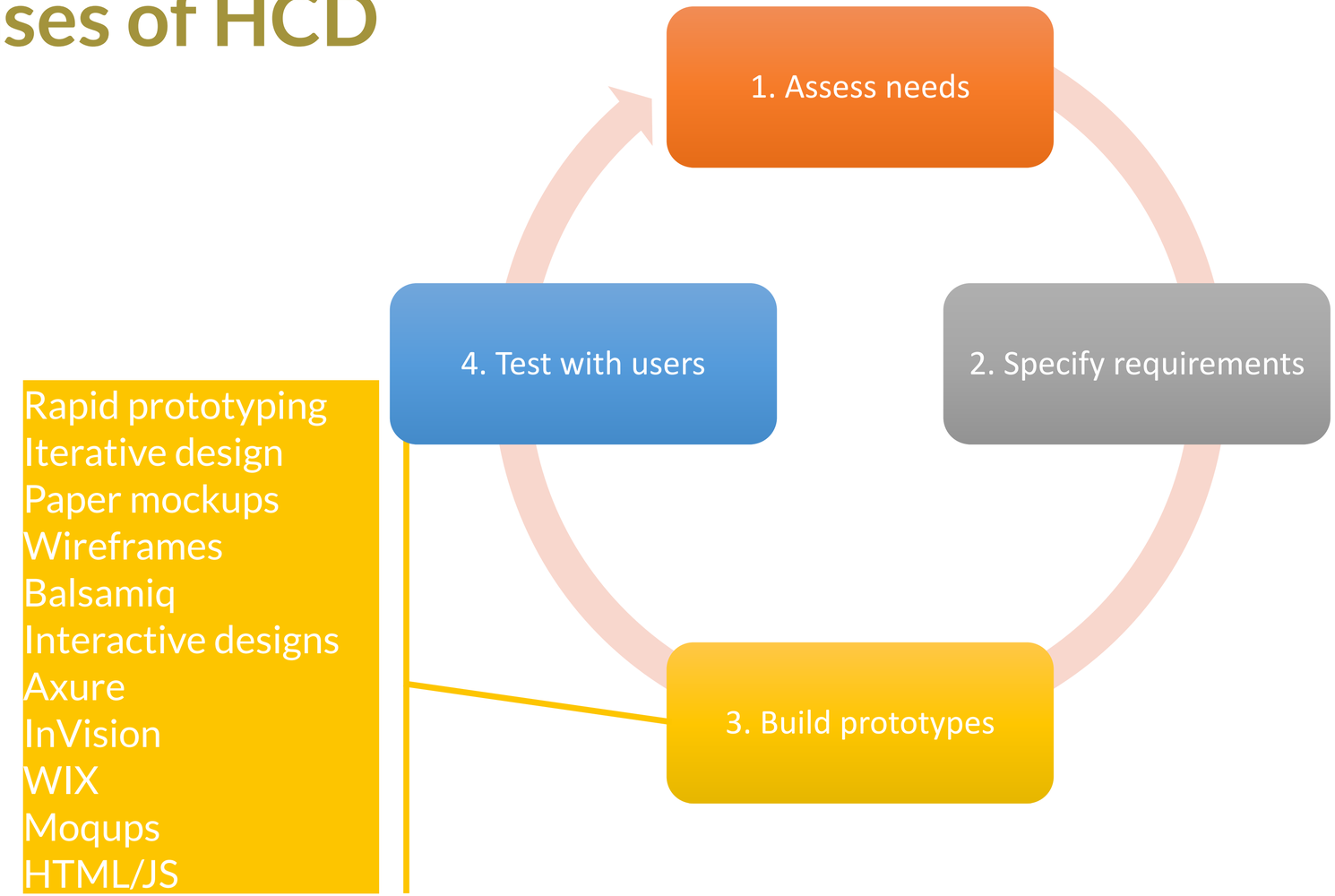

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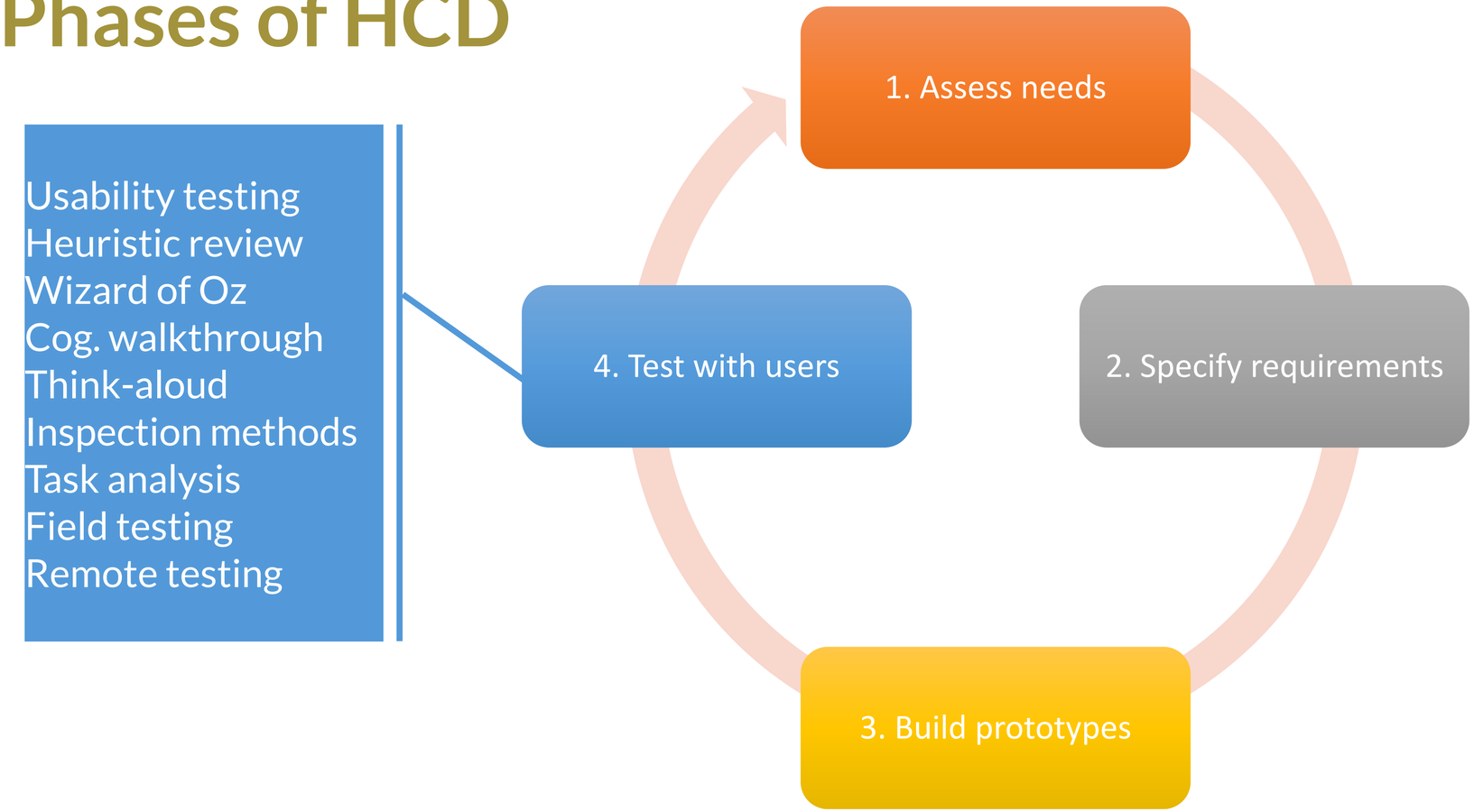
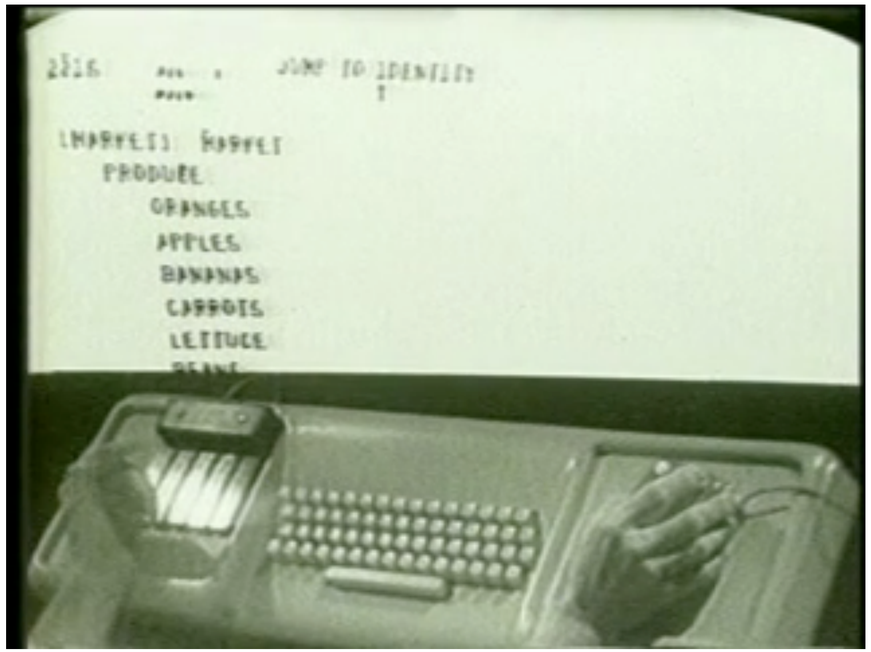
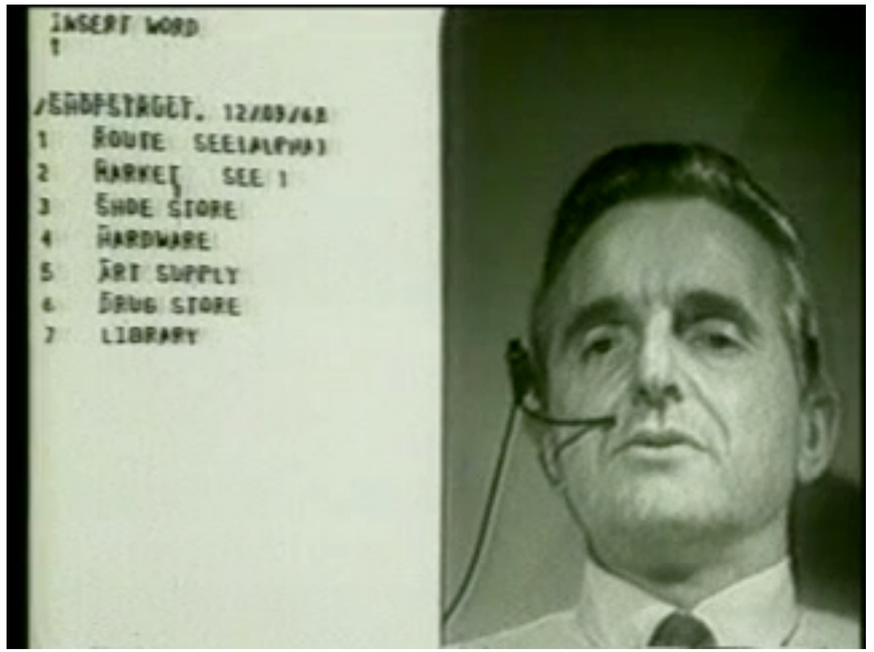


# Why is evaluation not required (and sometimes dissuaded) for artifact contributions?

# Doug Engelbart's NLS (1968)



# Empirical evaluation can take different forms

- Conducting an analysis on an existing dataset
- Giving a few examples of the solution in practice
  - “Here’s what my new artifact enabled us to make, which wouldn’t have been possible before”
- Demonstrating value on principles there’s a high degree of consensus on
  - Coding, like lines needed to do a task or execution time

# Methods vs. theory

# Methods vs. theory

- Methods contributions aim to suggest how we should do our research and practice
  - How should we as researchers run our studies, develop our systems, share our opinions, etc.
  - How should UX practitioners run their studies…
- Theory mostly aims to produce knowledge (about people, systems, etc.)
  - Our methods may be informed by theories (e.g., Activity Theory as an analytic lens, designing a system which uses principles from Social Cognitive Theory)

# Theory

- “Should be testable and falsifiable”
  - Is this statement too quant-centric?
  - I’d actually argue no, you should be able to articulate whether/how qualitatively-derived theories apply in your new context/circumstances
  - The evaluation might not be as binary as this statement suggests, but it does occur

# Datasets vs. empirical

# Datasets vs. empirical

- Empirical studies will tell us something about how people perceive/use technology, etc.
  - Data (qualitative, quantitative, both) will be collected
  - But the data may or may not be shared with the research community (protecting anonymity, lack of utility)
- For datasets, the released data *is* the primary contribution
  - A large data repository that multiple researchers would find useful, for example
  - The dataset might not provide a study which uses it, and instead expects future researchers to instead

# Datasets

## Rico: A Mobile App Dataset for Building Data-Driven Design Applications

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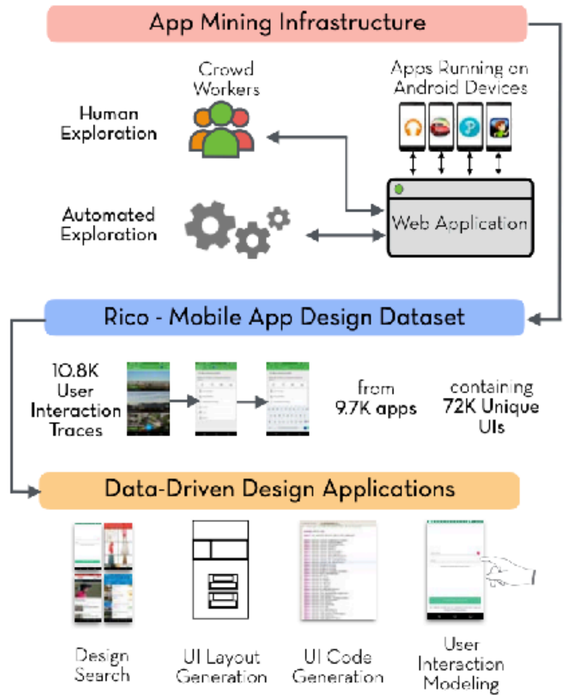
**ABSTRACT**
Data-driven models help mobile app designers understand best practices and trends, and can be used to make predictions about design performance and support the creation of adaptive UIs. This paper presents Rico, the largest repository of mobile app designs to date, created to support five classes of data-driven applications: design search, UI layout generation, UI code generation, user interaction modeling, and user perception prediction. To create Rico, we built a system that combines crowdsourcing and automation to scalably mine design and interaction data from Android apps at runtime. The Rico dataset contains design data from more than 9.7k Android apps spanning 27 categories. It exposes visual, textual, structural, and interactive design properties of more than 72k unique UI screens. To demonstrate the kinds of applications that Rico enables, we present results from training an autoencoder for UI layout similarity, which supports query-by-example search over UIs.

**ACM Classification Keywords**
D.2.2 Software Engineering: Design Tools and Techniques

**Author Keywords**
Mobile app design; design mining; design search; app datasets




https://dl.acm.org/doi/abs/10.1145/3126594.3126651

# Meta-analyses, Systematic analyses, and Survey contributions

# Meta, Systematic, Survey

- Meta-analysis: considers a *question* that people have repeatedly studied
  - Settings may have changed—different populations, for example
  - Often quantitative in nature. Is there an effect? If so, how much?
- Systematic review: considers a *topic* that people have repeatedly studied
  - Tries to build up what the field has learned across disjointed settings
  - Tries to identify underexplored research areas or questions

# Meta, Systematic, Survey

- We don’t do meta-analyses in HCI all that often
  - Why?

# What’s “interesting”?

# What’s “interesting”?

- In the eye of the beholder
  - Translational work can be interesting, even if it’s known in some other field
- Negative results (rejected hypotheses for quant work) can definitely be interesting

# What's "interesting"?

- In my opinion, HCI equates "novel" and "interesting" in ways which undermine building up depth of knowledge
  - There's value in documenting things which some experts might know, but haven't articulated
  - We're not rewarded for more deeply understanding complex phenomena
  - Meta-analyses are extremely rare, though systematic reviews are frequent

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