

# Interaction Design

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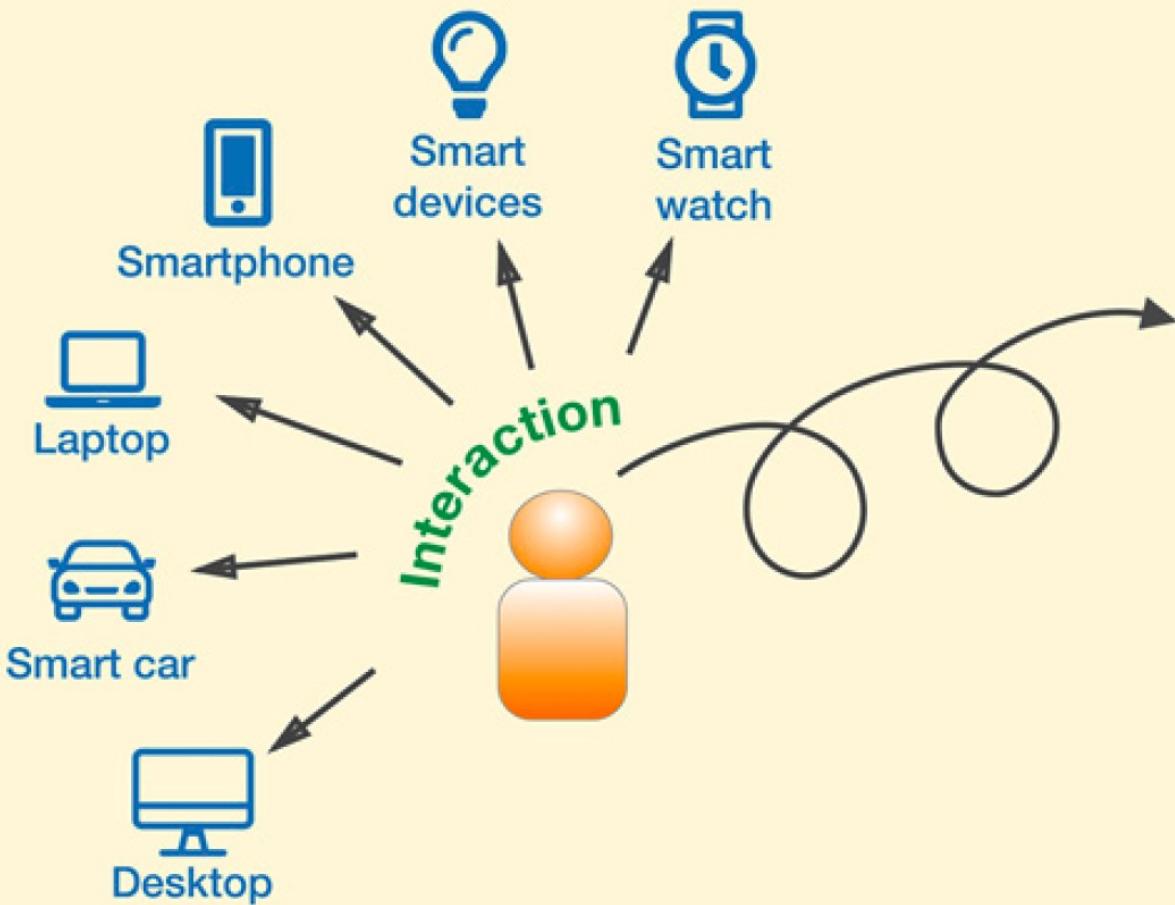
UNIVERSITY OF AUCKLAND

COMPSCI 705 / SOFTENG 702

Dr Danielle Lottridge

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what is interaction?



**The user experience:**  
The totality of effects  
felt by the user as a  
result of interaction

what is ux?

# User experience

=

**Usability**

Productivity, efficiency,  
ease of use, learnability

**Usefulness**

Ability to use system or  
product to accomplish  
goals of work

**Emotional  
impact**

Affective component of  
user experience and user  
feelings, user satisfaction

**Meaningfulness**

Long-term personal  
relationship with product

# INNOVATION LESSONS FROM STEVE JOBS AND APPLE: STORY OF THE iPod

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1. Start with the customer experience and work backwards to the technology
2. Know the competition and how to beat them - especially when entering new markets
3. Recruit the right team and have a DRI
4. Connect the dots
5. Simplify

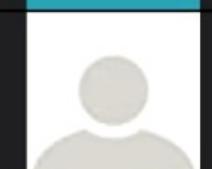


**IGNITION**framework

*“In most people’s vocabularies, design means veneer. It’s interior decorating. It’s the fabric of the curtains and the sofa. But to me, nothing could be further from the meaning of design. Design is the fundamental soul of a man-made creation that ends up expressing itself in successive outer layers of the product or service.*

*- Steve Jobs, 2000*





## How might we build an effective alarm clock?

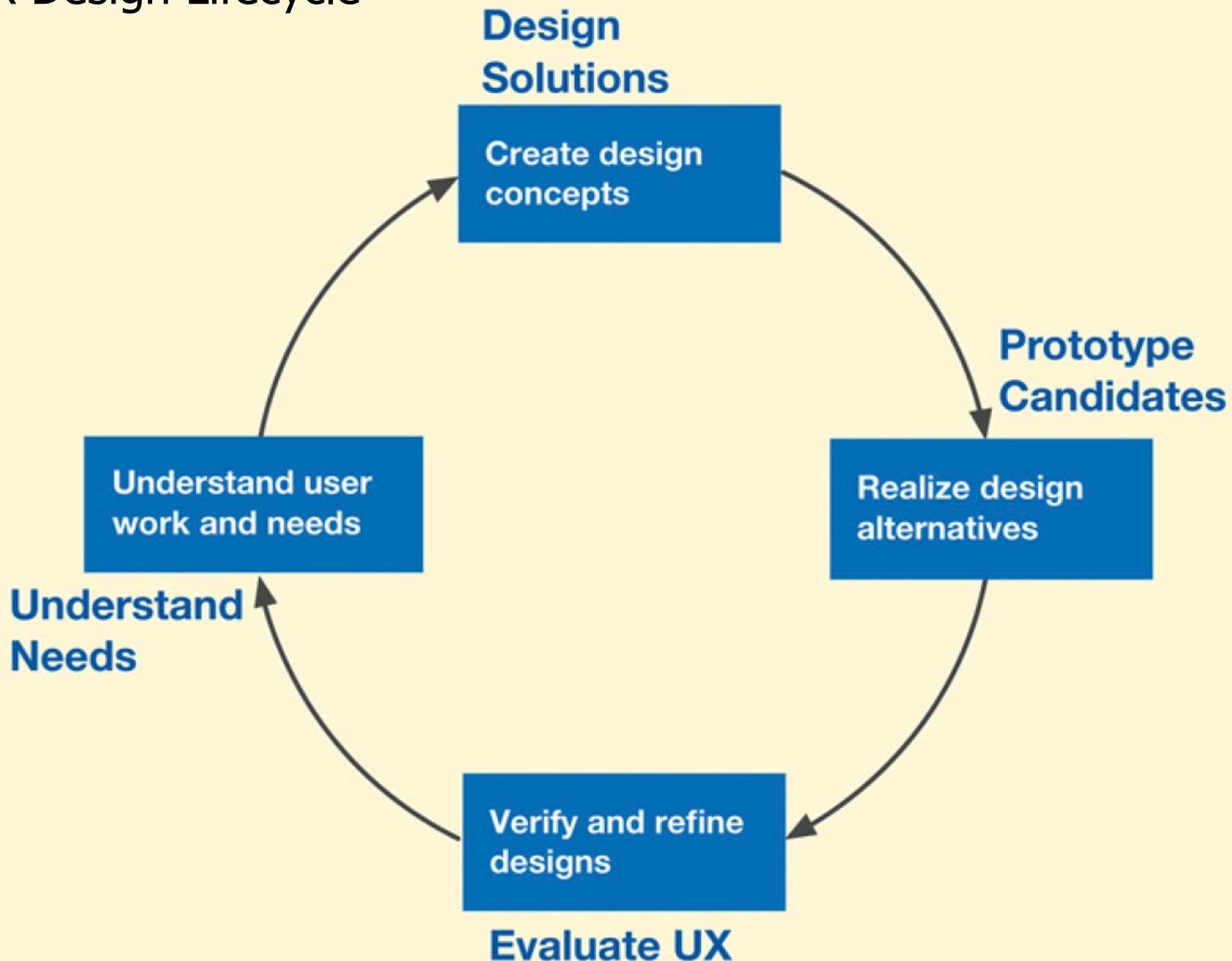


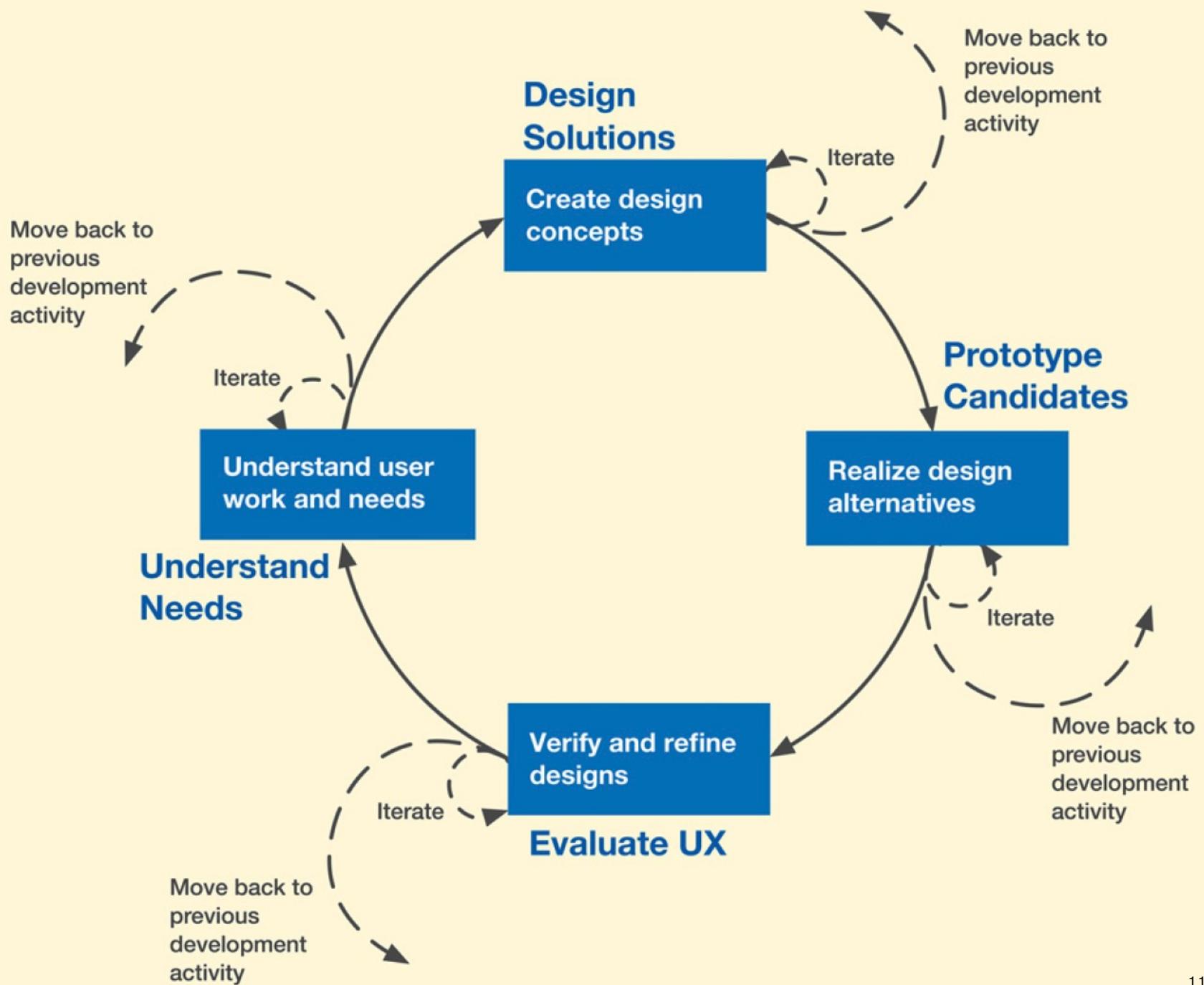
## How might we enable waking up on time?

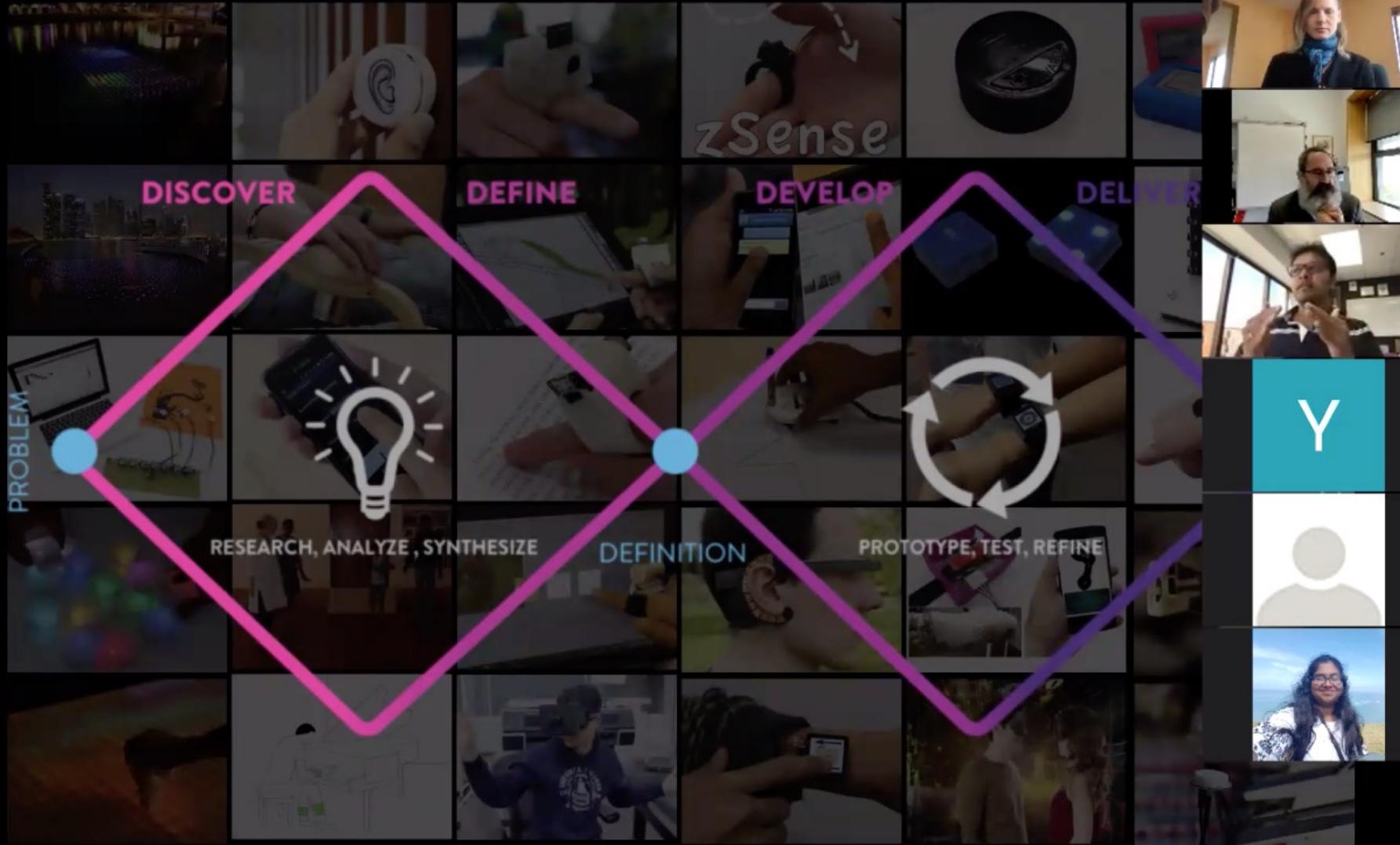


Acknowledgement: Associate Professor Suranga Nanayakkara

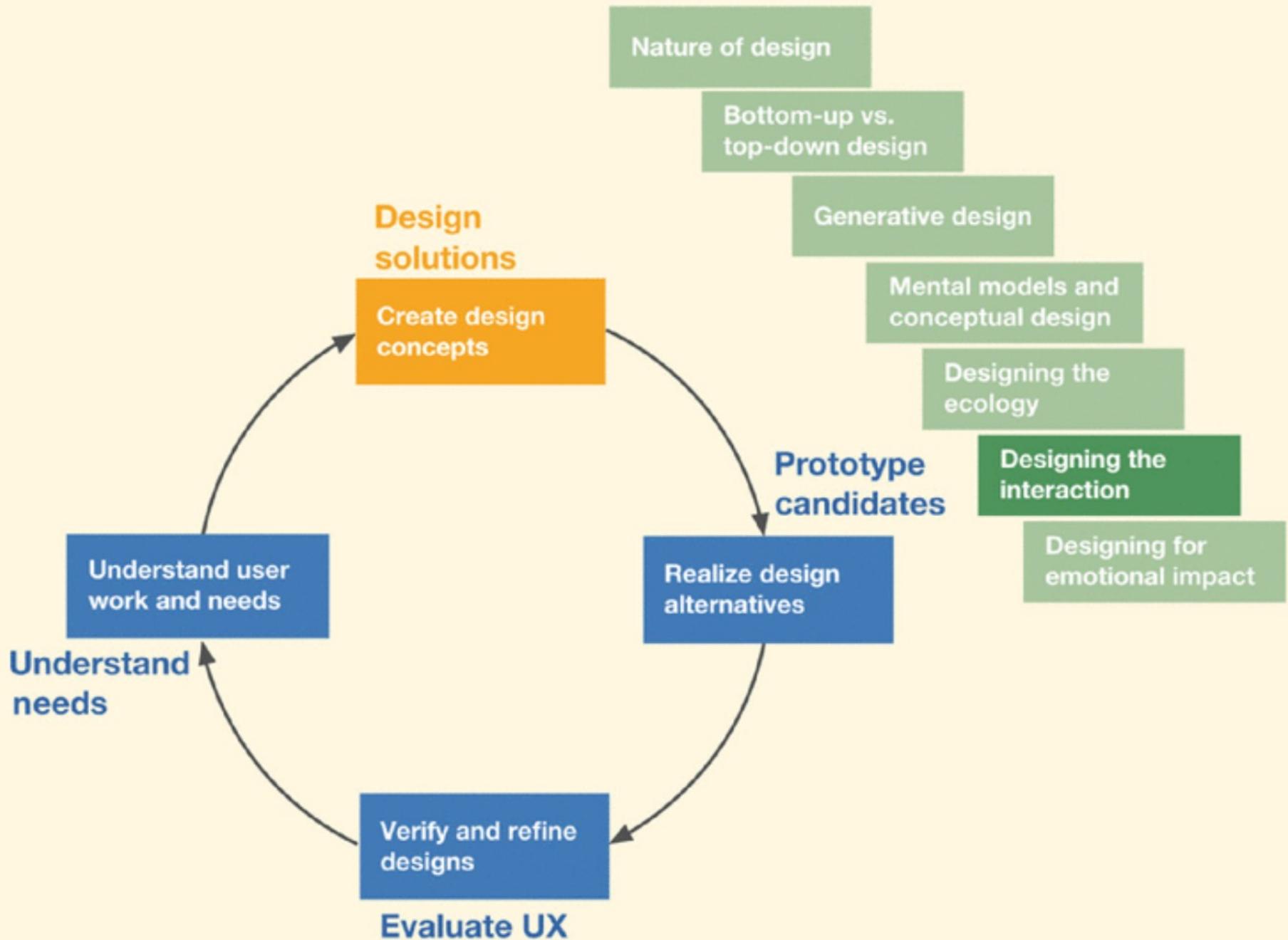
# UX Design Lifecycle





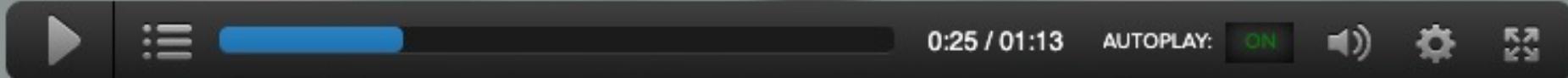
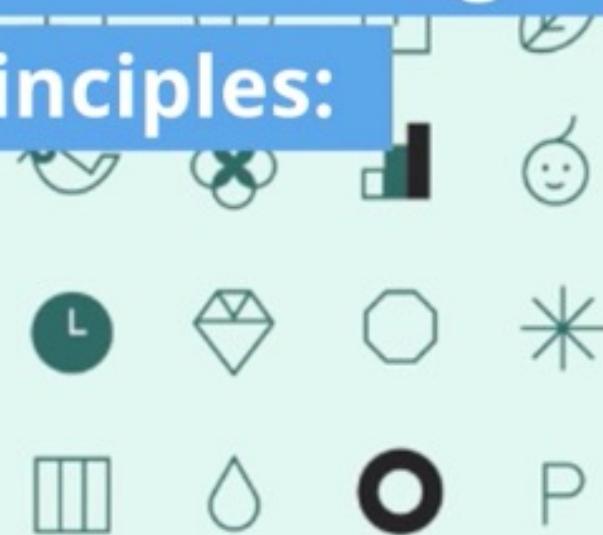
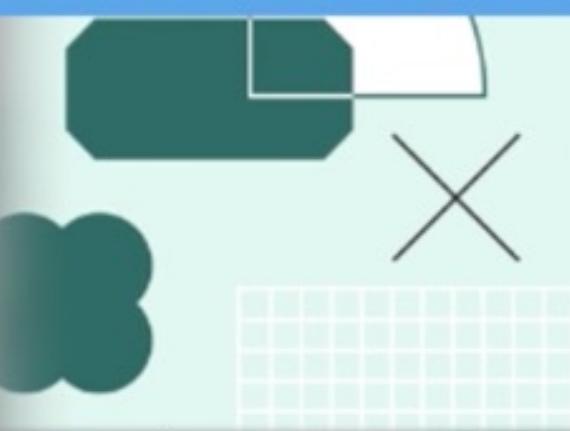


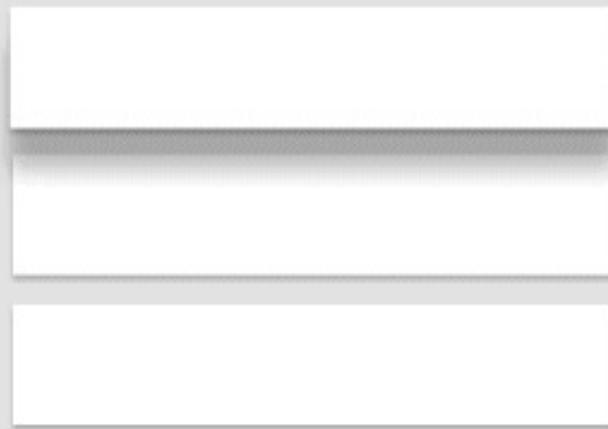
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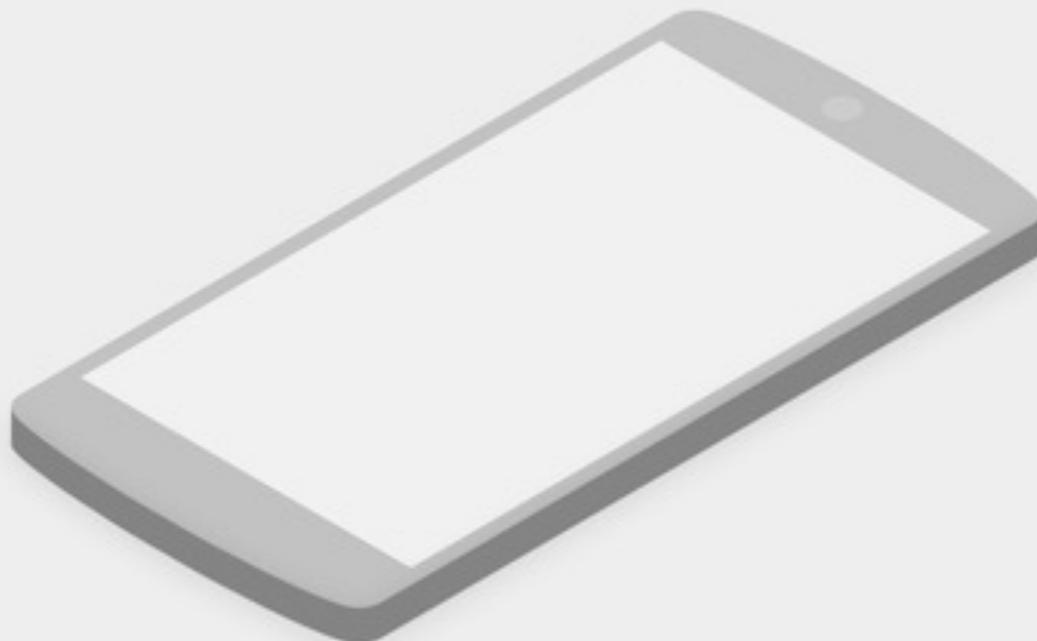
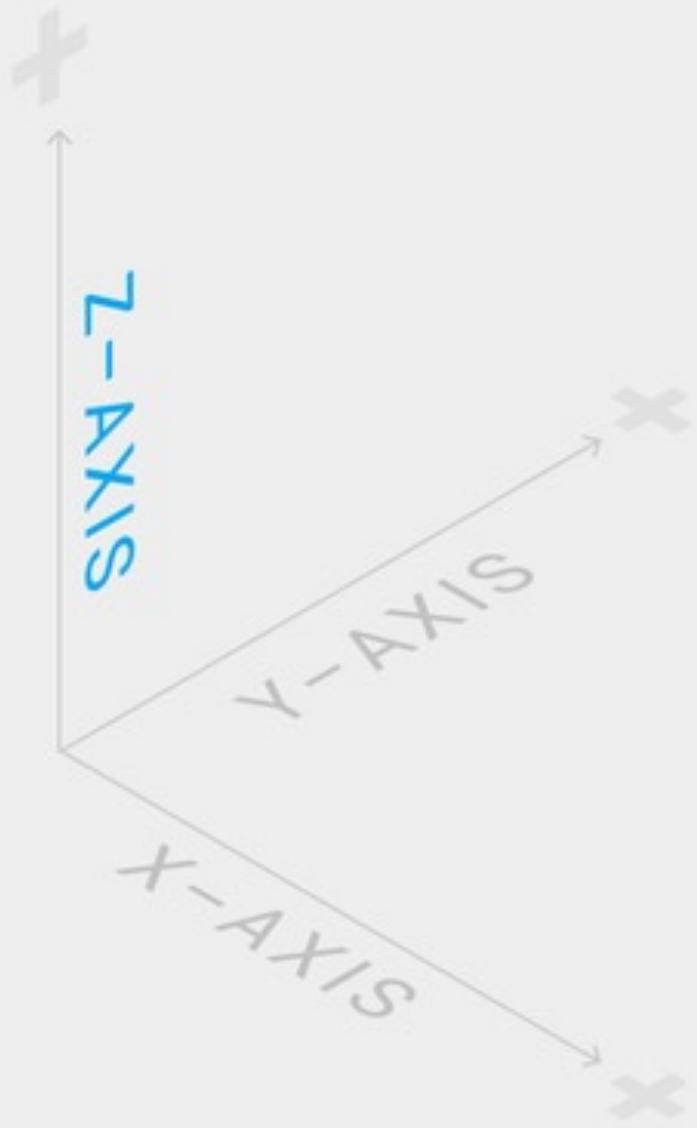
principles

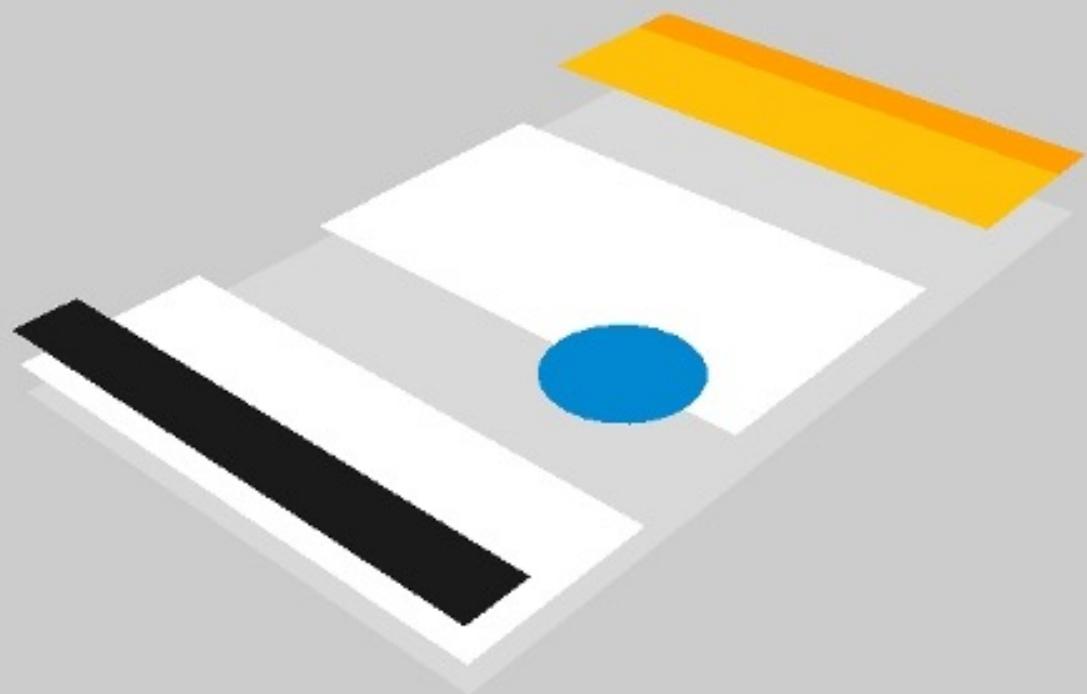
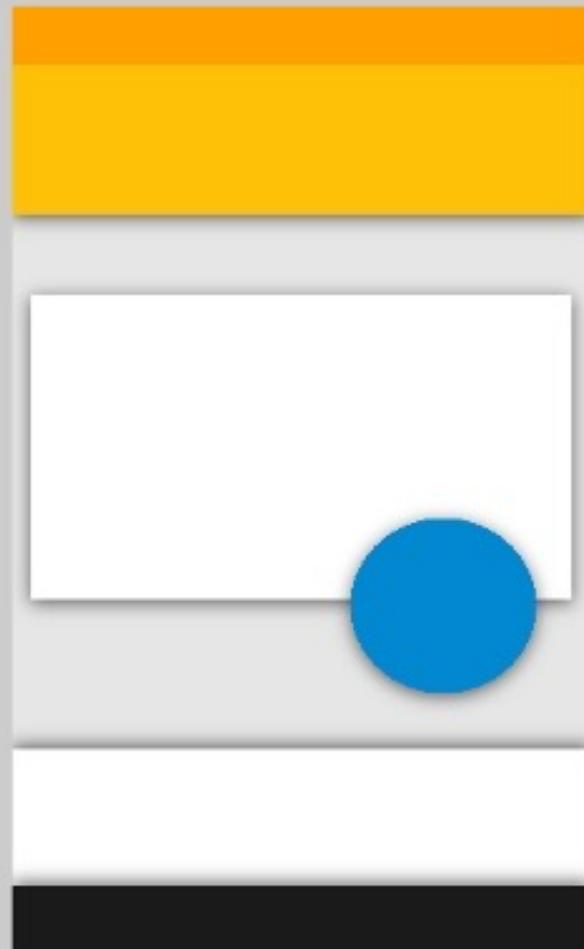
## Google based Material Design on three core principles:





Material response





### High Tea Cup

\$36

### Hopscotch Shoes

\$134

### OK Glow

\$20

1

≡ SHRINE



High Tea Cups  
\$36

6



Hopscotch Shoes  
\$133



OK GLO  
\$1

2

Q

3





LMBRJK

\$240

## Flow Shirt Blouse

Pinstriped cornflower blue cotton blouse takes you on a walk to the park or just down the hall.

MORE DETAILS



### Select size

00

02

04

06

08

10

12

(

Color



# Living Room

Succulent Plants - \$36

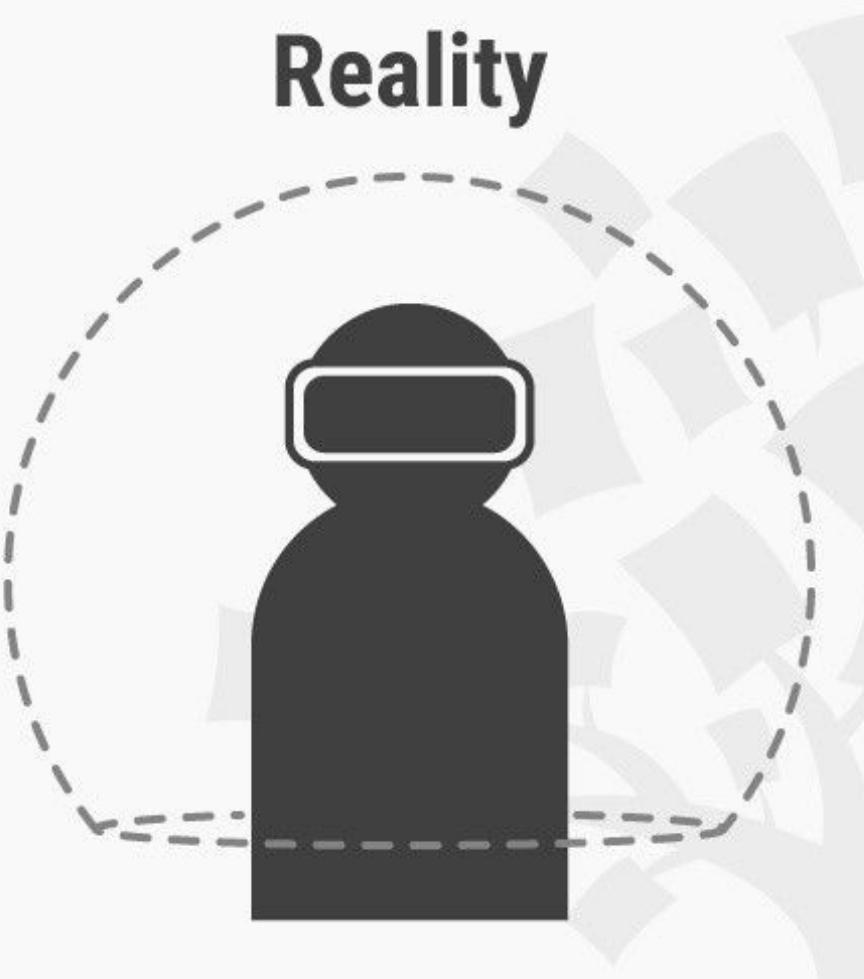
Bamboo Turntables - \$134

OK Glow Lam|

# Augmented Reality

vs.

# Virtual Reality



INTERACTION DESIGN  
FOUNDATION

[INTERACTION-DESIGN.ORG](http://INTERACTION-DESIGN.ORG)

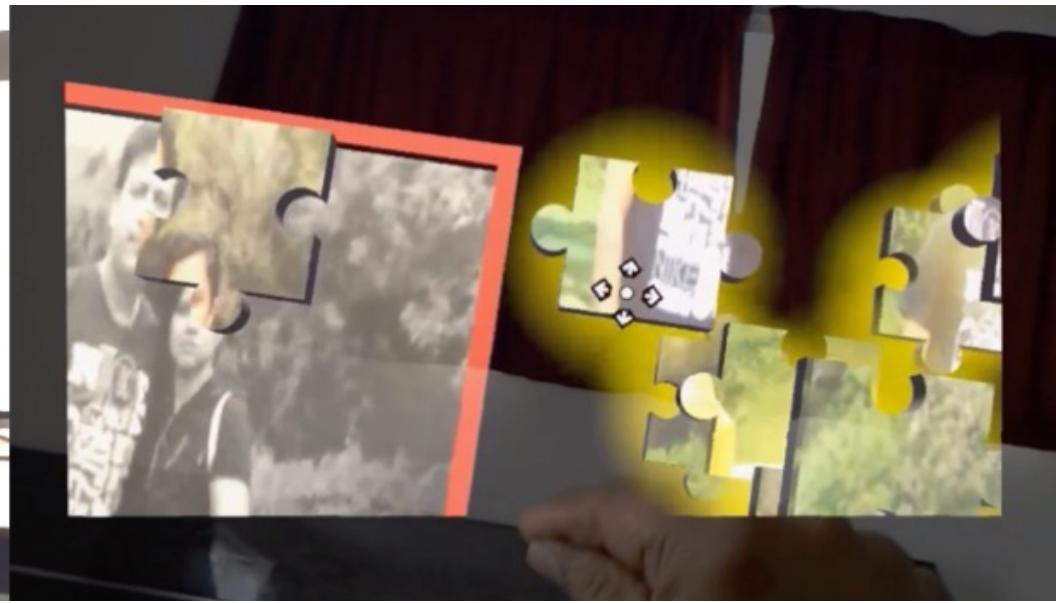




AUGMENTED REALITY APPLICATIONS





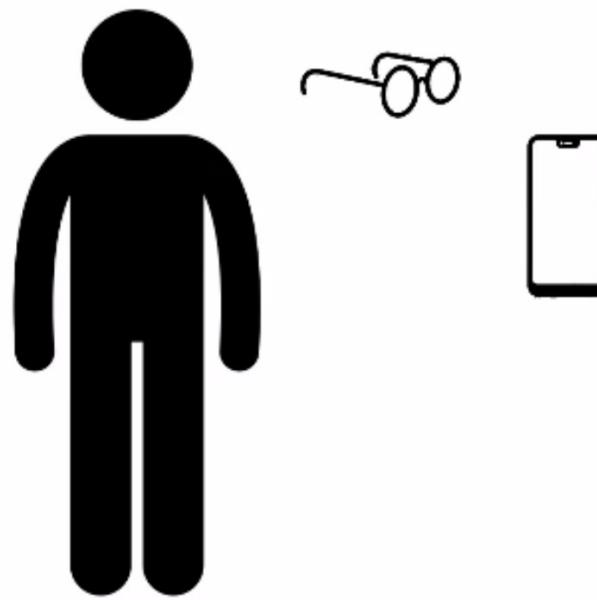


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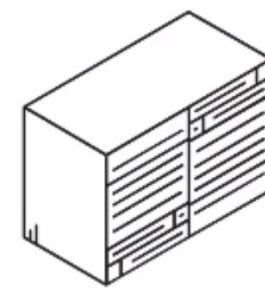




spatial.io



Human

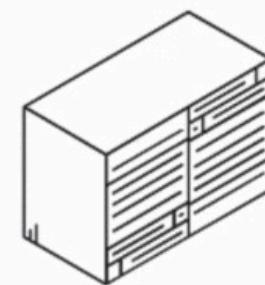


Computer

Credit: Jan Gugenheimer



Human



Computer

Credit: Jan Gugenheimer

# Why is Interaction Design difficult?

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- Interdisciplinary
  - focus on human experiences
  - fuzzy concepts such as community
- Wicked problems
- Broad skillset
  - critique
  - user needs, system requirements
  - sketching, low-fidelity design
  - visual, high-fidelity design
  - usage testing

# Case study



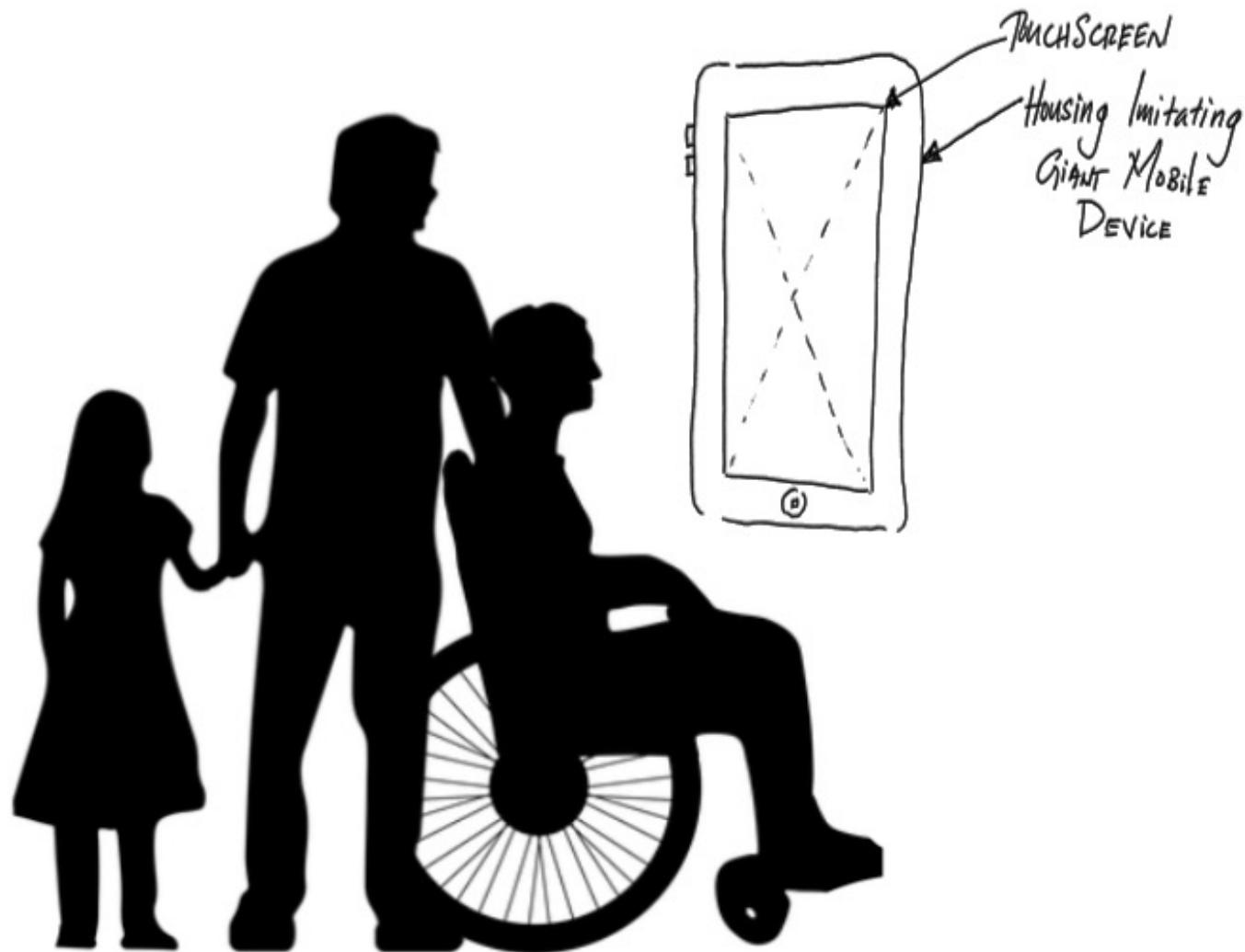
Eyes on Tāmaki. Danielle Lottridge, Ethan Plaut, Fabio Morreale  
Image: [www.aucklandnz.com/meet/plan-your-event/venue/auckland-museum-tamaki-paenga-hira](http://www.aucklandnz.com/meet/plan-your-event/venue/auckland-museum-tamaki-paenga-hira)



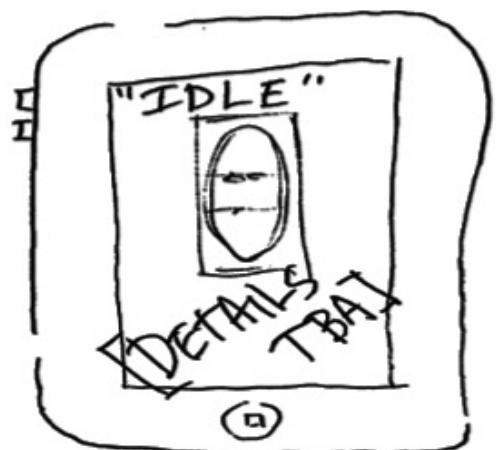
# Rarau Mai Living City

Millions of pieces of data have been crunched to create Living City, an immersive gallery of stunning data visualisations where the walls and floor are alive with projections illustrating who we are as Aucklanders and the places we inhabit. Use the interactive touchscreen to dive further into a specific location such as your own neighbourhood.

# Sketches



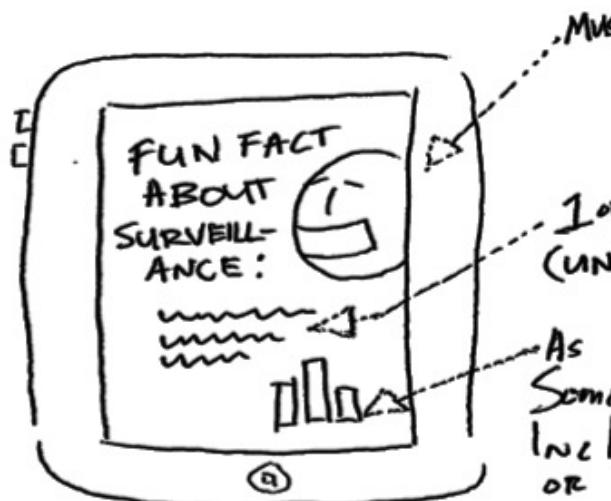
# Four Main States of the Experience:



1. IDLE STATE



2. INTERACTIVE FILTER, ETZ.



3. SATIRICAL  
"fun fact"

MUSEUM VISITOR'S  
FACE

1 or 2-Sentence  
(UN)FUN FACT

As Appropriate,  
Some Facts May  
Include MAP  
OR OTHER VIZ.

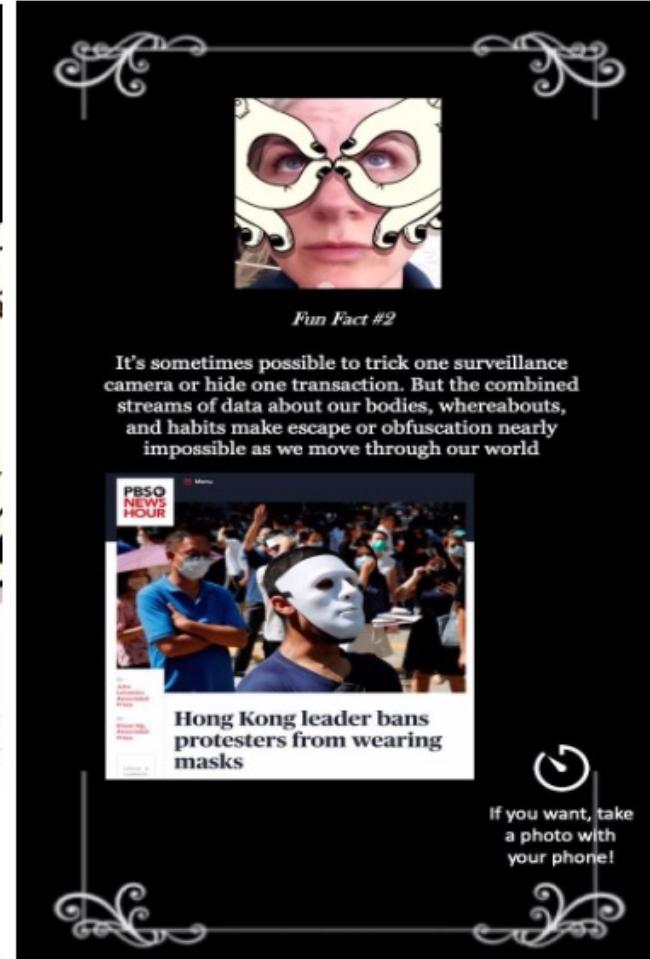


4. VOTE + INFOGR.

# Low fidelity prototypes

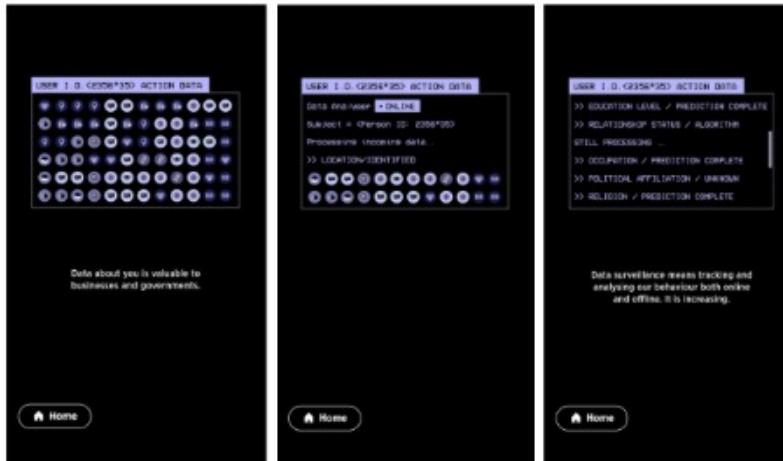
Next we'll play with filters that hide your identity.

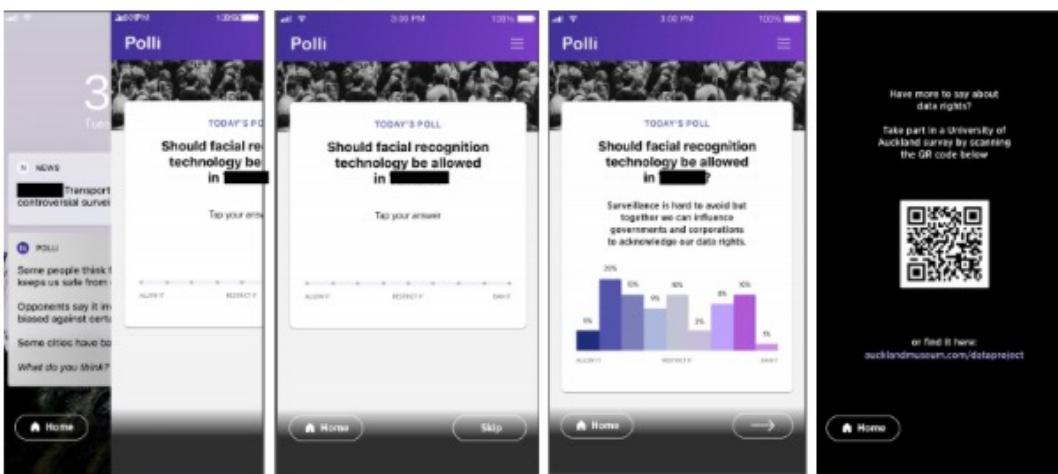
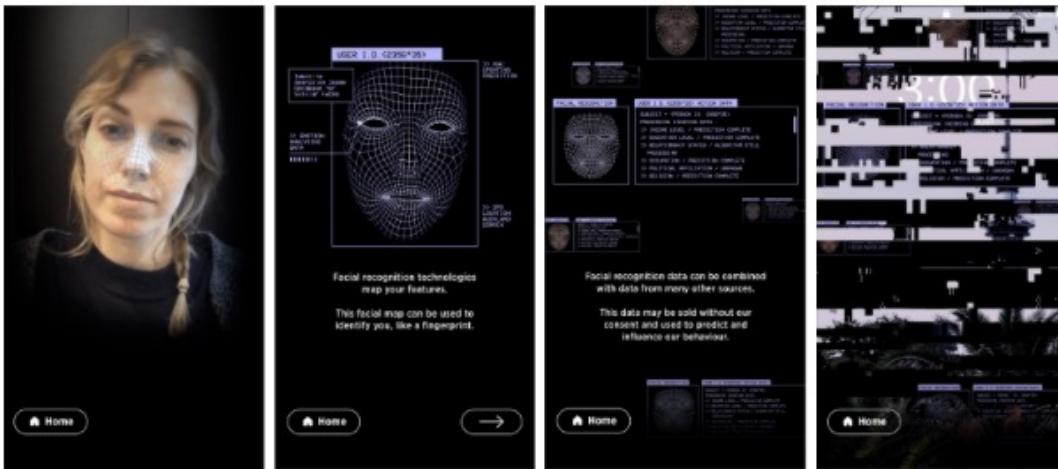
Remember all video & images used here will be deleted 😞

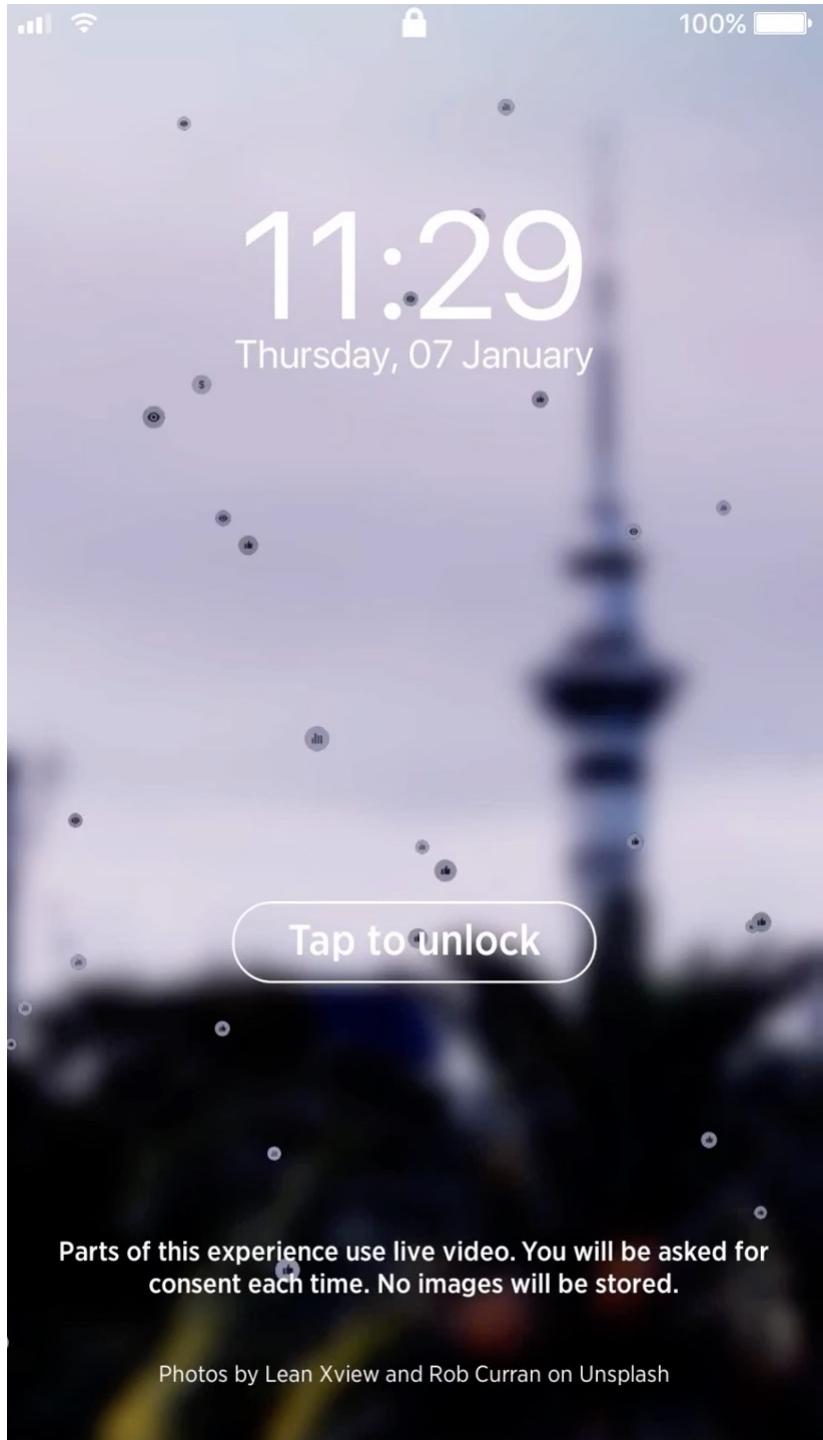


go to first high fidelity prototype

# High fidelity prototypes







Photos by Lean Xview and Rob Curran on Unsplash

# Ethics in HCI

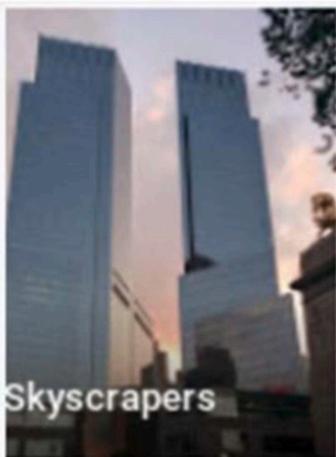
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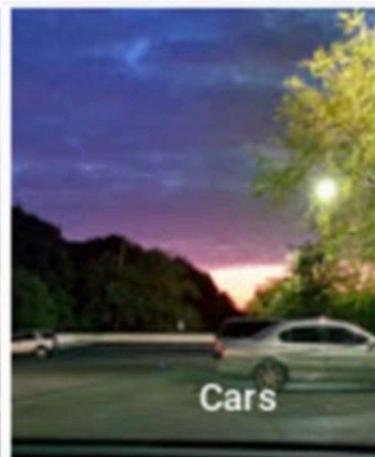
google assistant calls a restaurant



Skyscrapers



Airplanes



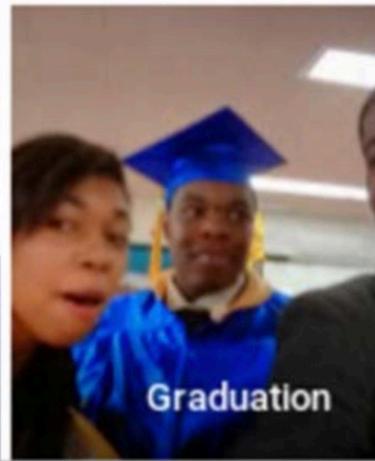
Cars



Bikes



Gorillas



Graduation



web@jalcine

@jackyalcine



Follow

Google Photos, y'all fucked up. My friend's not a gorilla.

1:22 PM - 29 Jun 2015



3,192

1,976

# NZ Passport

**X** The photo you want to upload does not meet our criteria because:

- Subject eyes are closed

Please refer to the technical requirements.

You have 9 attempts left.

Check the photo [requirements](#).

Read more about [common photo problems](#) and [how to resolve them](#).

After your tenth attempt you will need to start again and re-enter the CAPTCHA security check.

Reference number: 20161206-81

Filename: Untitled.jpg

If you wish to [contact us](#) about the photo, you



Richard Lee was told his eyes were not open when submitting an image of himself to New Zealand's online passport photo checker. Photo / Richard Lee Facebook

# “Value-Sensitive Design” by Friedman

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## User Autonomy

- Misrepresentation of the System: google assistant to restaurant
- System Capability: on/off switch
- System Fluidity: change over time
- System Complexity: able to control

## Bias

- Preexisting Bias: a spelling game for 7<sup>th</sup> graders
- Technical Bias
- Emergent Bias

# Outline

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- Ethics for research with human participants
  - Values and ethics in HCI
- 
- Reading
    - Friedman, B. (1996) Value-sensitive design. *interactions*, 3(6), 16-23.

# Ethics for research with human participants

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# The Nuremberg Code

- Nuremberg trials after WW2
- Experiments performed on concentration camp prisoners
- Concepts of
  - informed consent
  - right to withdraw
  - do no harm
  - risks must not outweigh benefits



# The Tuskegee Syphilis Study 1932-1972

- 600 low-income, African American males
- 400 infected with Syphilis
- Participants given free medical examinations but never told
- Penicillin treatment became available but participants not given treatment
- Study discontinued after public outcry



## The New York Times

### ***Syphilis Victims in U.S. Study Went Untreated for 40 Years***

By JEAN HELLER  
The Associated Press

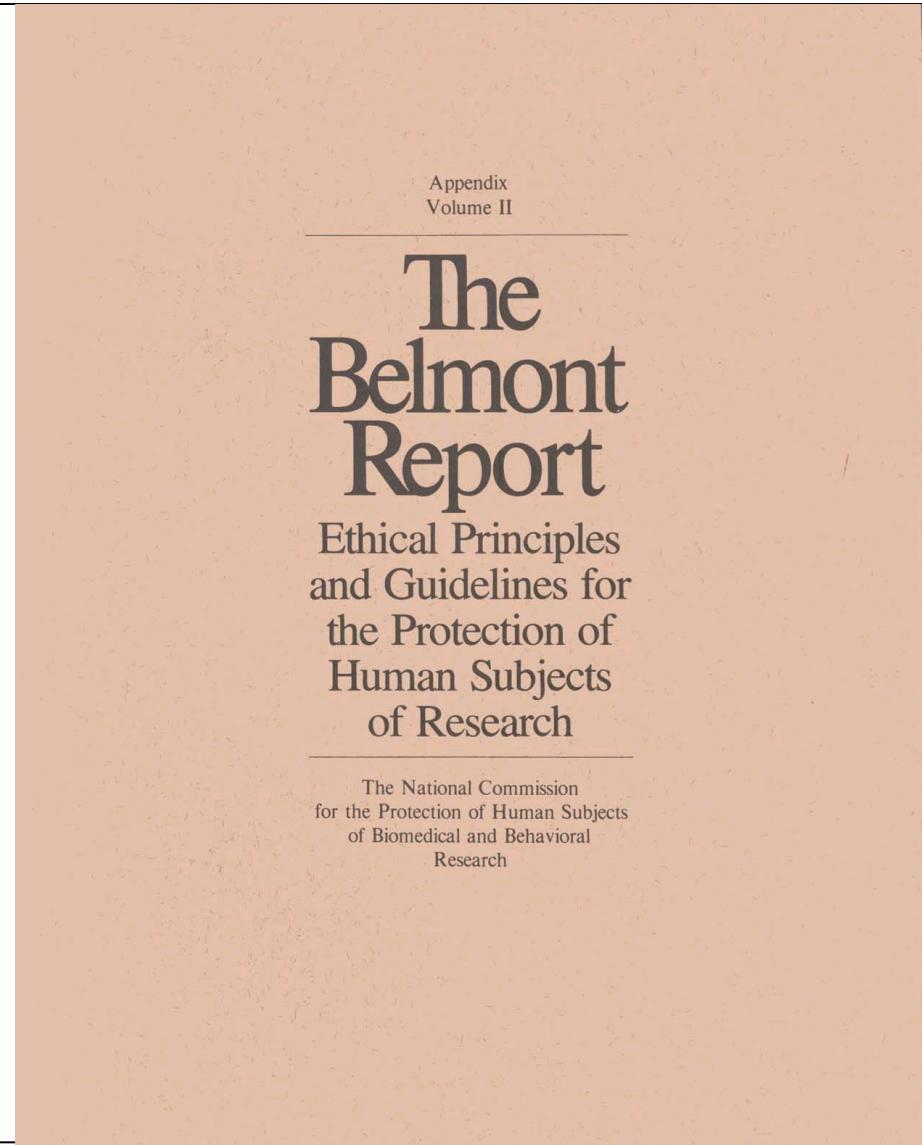
WASHINGTON, July 25—For 40 years the United States Public Health Service has conducted a study in which human beings with syphilis, who were

have serious doubts about the morality of the study, also say that it is too late to treat the syphilis in any surviving participants.

Doctors in the service say

# The Belmont Report 1978/1979

- Respect for persons.  
Protect autonomy by enabling voluntary, informed consent
- Beneficence.  
“Do no harm.” Protect welfare by minimizing risks.  
Benefits must merit risk
- Justice.  
Select participants for fair distribution of costs and benefits



# Research Ethics in NZ

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- Voluntary participation
- Informed consent
- Rights of privacy
  - Confidentiality
  - Anonymity
- Ownership of data and right to withdraw
  - NZ Privacy Act
- Risk of harm
  - Harm can be psychological (and frequently is for software projects)

# University of Auckland Human Participants Ethics Committee

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- All research involving humans needs prior approval from UAHPEC
  - All student research (supervisor applies)
  - All staff research using human data
  - Regardless of staff location or location of data collection
  - Never retroactive
- Consent Form
  - Ensures informed consent
- Participant Information Sheet
  - Tells participants about the study
- Audit / analysis of archived data
  - May be approved without individual participant consent

# Ethics in HCI

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# Therac-25



- Radiation therapy machine in 1985
- 6 people given overdoses of radiation resulting in injuries and 3 deaths
- UI allowed user to set radiation beam to low/medium/high
- User could backtrack and fix their error but if user hit “enter” fast enough a race condition could be triggered and the high setting would remain while the safety check registered as low

# Historical CSCW example



Tang, J. C. (1997). Eliminating a hardware switch: weighing economics and values in a design decision. In *Human values and the design of computer technology* (pp. 259-269).

# “Privacy by Design”



**Deutsche Telekom T-View 100 ISDN**  
type videophone meant for home offices  
and small businesses with a lens cover  
which can be rotated upward to assure  
privacy when needed (2007).

# Informed consent

# Experimental evidence of massive-scale emotional contagion through social networks

Adam D. I. Kramer<sup>a,1</sup>, Jamie E. Guillory<sup>b</sup>, and Jeffrey T. Hancock<sup>c,d</sup>

<sup>a</sup>Core Data Science Team, Facebook, Inc., Menlo Park, CA 94025; <sup>b</sup>Center for Tobacco Control Research and Education, University of California, San Francisco, CA 94143; and Departments of <sup>c</sup>Communication and <sup>d</sup>Information Science, Cornell University, Ithaca, NY 14853

Edited by Susan T. Fiske, Princeton University, Princeton, NJ, and approved March 25, 2014 (received for review October 23, 2013)

**E**motional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness. Emotional contagion is well established in laboratory experiments, with people transferring positive and negative emotions to others. Data from a large real-world social network, collected over a 20-y period suggests that longer-lasting moods (e.g., depression, happiness) can be transferred through networks [Fowler JH, Christakis NA (2008) *BMJ* 337:a2338], although the results are controversial. In an experiment with people who use Facebook, we test whether emotional contagion occurs outside of in-person interaction between individuals by reducing the amount of emotional content in the News Feed. When positive expressions were reduced, people produced fewer positive posts and more negative posts; when negative expressions were reduced, the opposite pattern occurred. These results indicate that emotions expressed by others on Facebook influence our own emotions, constituting experimental evidence for massive-scale contagion via social networks. This work also suggests that, in contrast to prevailing assumptions, in-person interaction and non-verbal cues are not strictly necessary for emotional contagion, and that the observation of others' positive experiences constitutes a positive experience for people.

computer-mediated communication | social media | big data

**E**motional states can be transferred to others via emotional contagion, leading them to experience the same emotions as those around them. Emotional contagion is well established in laboratory experiments (1), in which people transfer positive and negative moods and emotions to others. Similarly, data from a large, real-world social network collected over a 20-y period suggests that longer-lasting moods (e.g., depression, happiness) can be transferred through networks as well (2, 3).

The interpretation of this network effect as contagion of mood has come under scrutiny due to the study's correlational nature, including concerns over misspecification of contextual variables or failure to account for shared experiences (4, 5), raising important questions regarding contagion processes in networks. An experimental approach can address this scrutiny directly; however, methods used in controlled experiments have been criticized for examining emotions after social interactions. Interacting with a happy person is pleasant (and an unhappy person, unpleasant). As such, contagion may result from experiencing an interaction rather than exposure to a partner's emotion. Prior studies have also failed to address whether nonverbal cues are necessary for contagion to occur, or if verbal cues alone suffice. Evidence that positive and negative moods are correlated in networks (2, 3) suggests that this is possible, but the causal question of whether contagion processes occur for emotions in massive social networks remains elusive in the absence of experimental evidence. Further, others have suggested that in online social networks, exposure to the happiness of others may actually be depressing to us, producing an "alone together" social comparison effect (6).

Three studies have laid the groundwork for testing these pro-

demonstrated that (i) emotional contagion occurs via text-based computer-mediated communication (7); (ii) contagion of psychological and physiological qualities has been suggested based on correlational data for social networks generally (7, 8); and (iii) people's emotional expressions on Facebook predict friends' emotional expressions, even days later (7) (although some shared experiences may in fact last several days). To date, however, there is no experimental evidence that emotions or moods are contagious in the absence of direct interaction between experimenter and target.

On Facebook, people frequently express emotions, which are later seen by their friends via Facebook's "News Feed" product (8). Because people's friends frequently produce much more content than one person can view, the News Feed filters posts, stories, and activities undertaken by friends. News Feed is the primary manner by which people see content that friends share. Which content is shown or omitted in the News Feed is determined via a ranking algorithm that Facebook continually develops and tests in the interest of showing viewers the content they will find most relevant and engaging. One such test is reported in this study: A test of whether posts with emotional content are more engaging.

The experiment manipulated the extent to which people ( $N = 689,003$ ) were exposed to emotional expressions in their News Feed. This tested whether exposure to emotions led people to change their own posting behaviors, in particular whether exposure to emotional content led people to post content that was consistent with the exposure—thereby testing whether exposure to verbal affective expressions leads to similar verbal expressions, a form of emotional contagion. People who viewed Facebook in English were qualified for selection into the experiment. Two parallel experiments were conducted for positive and negative emotion: One in which exposure to friends' positive emotional content in their News Feed was reduced, and one in which exposure to negative emotional content in their News Feed was reduced. In these conditions, when a person loaded their News Feed, posts that contained emotional content of the relevant emotional valence, each emotional post had between a 10% and 90% chance (based on their User ID) of being omitted from their News Feed for that specific viewing. It is important to note

## Significance

We show, via a massive ( $N = 689,003$ ) experiment on Facebook, that emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness. We provide experimental evidence that emotional contagion occurs without direct interaction between people (exposure to a friend expressing an emotion is sufficient), and in the complete absence of nonverbal cues.

Author contributions: A.D.I.K., J.E.G., and J.T.H. designed research; A.D.I.K. performed research; A.D.I.K. analyzed data; and A.D.I.K., J.E.G., and J.T.H. wrote the paper.

The authors declare no conflict of interest.

This article is a PNAS Direct Submission.

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## TECHNOLOGY

# Everything We Know About Facebook's Secret Mood Manipulation Experiment

It was probably legal. But was it ethical?

ROBINSON MEYER JUN 28, 2014



REUTERS

*Updated, 09/08/14*

Facebook's News Feed—the main list of status updates, messages, and photos you see when you open Facebook on your computer or phone—is not a perfect mirror of the world.

# Editorial Expression of Concern and Correction

## PSYCHOLOGICAL AND COGNITIVE SCIENCES

PNAS is publishing an Editorial Expression of Concern regarding the following article: “Experimental evidence of massive-scale emotional contagion through social networks,” by Adam D. I. Kramer, Jamie E. Guillory, and Jeffrey T. Hancock, which appeared in issue 24, June 17, 2014, of *Proc Natl Acad Sci USA* (111:8788–8790; first published June 2, 2014; 10.1073/pnas.1320040111). This paper represents an important and emerging area of social science research that needs to be approached with sensitivity and with vigilance regarding personal privacy issues.

Questions have been raised about the principles of informed consent and opportunity to opt out in connection with the research in this paper. The authors noted in their paper, “[The work] was consistent with Facebook’s Data Use Policy, to which all users agree prior to creating an account on Facebook, constituting informed consent for this research.” When the authors prepared their paper for publication in PNAS, they stated that: “Because this experiment was conducted by Facebook, Inc. for internal purposes, the Cornell University IRB [Institutional Review Board] determined that the project did not fall under Cornell’s Human Research Protection Program.” This statement has since been [confirmed by Cornell University](#).

Obtaining informed consent and allowing participants to opt out are best practices in most instances under the US Department of Health and Human Services Policy for the Protection of Human Research Subjects (the “[Common Rule](#)”). Adherence to the Common Rule is [PNAS policy](#), but as a private company Facebook was under no obligation to conform to the provisions of the Common Rule when it collected the data used by the authors, and the Common Rule does not preclude their use of the data. Based on the information provided by the authors, PNAS editors deemed it appropriate to publish the paper. It is nevertheless a matter of concern that the collection of the data by Facebook may have involved practices that were not fully consistent with the principles of obtaining informed consent and allowing participants to opt out.

## PSYCHOLOGICAL AND COGNITIVE SCIENCES

Correction for “Experimental evidence of massive-scale emotional contagion through social networks,” by Adam D. I. Kramer, Jamie E. Guillory, and Jeffrey T. Hancock, which appeared in issue 24, June 17, 2014, of *Proc Natl Acad Sci USA* (111:8788–8790; first published June 2, 2014; 10.1073/pnas.1320040111).

The authors note that, “At the time of the study, the middle author, Jamie E. Guillory, was a graduate student at Cornell University under the tutelage of senior author Jeffrey T. Hancock, also of Cornell University (Guillory is now a postdoctoral fellow at Center for Tobacco Control Research and Education, University of California, San Francisco, CA 94143).” The author and affiliation lines have been updated to reflect the above changes and a present address footnote has been added. The online version has been corrected.

The corrected author and affiliation lines appear below.

**Adam D. I. Kramer<sup>a,1</sup>, Jamie E. Guillory<sup>b,2</sup>,  
and Jeffrey T. Hancock<sup>b,c</sup>**

<sup>a</sup>Core Data Science Team, Facebook, Inc., Menlo Park, CA 94025; and Departments of <sup>b</sup>Communication and <sup>c</sup>Information Science, Cornell University, Ithaca, NY 14853

<sup>1</sup>To whom correspondence should be addressed. Email: akramer@fb.com.

<sup>2</sup>Present address: Center for Tobacco Control Research and Education, University of California, San Francisco, CA 94143.

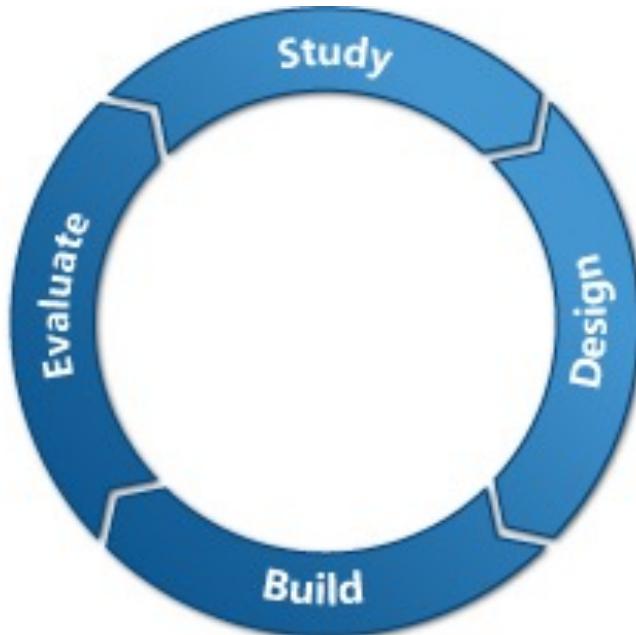
[www.pnas.org/cgi/doi/10.1073/pnas.1412583111](http://www.pnas.org/cgi/doi/10.1073/pnas.1412583111)

# Practice Problem

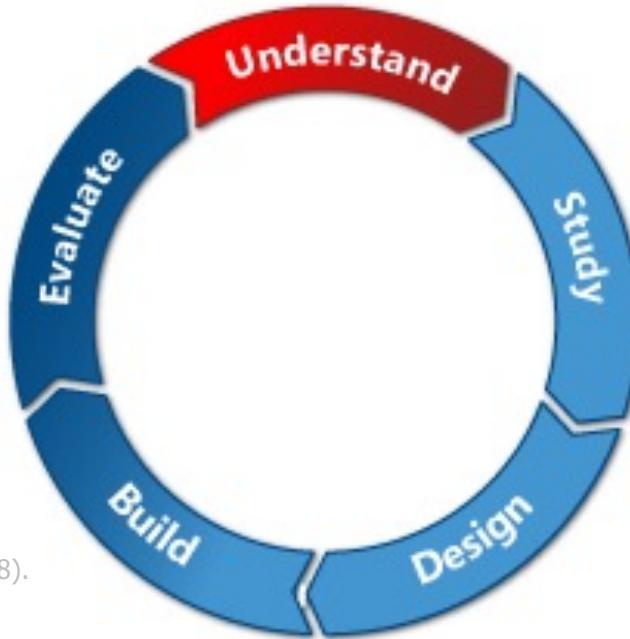
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- In 2014, a University of Cambridge psychologist recruited people to complete surveys on a Facebook app that collected information about themselves and their Facebook friends. Data from 50 million users were passed to Cambridge Analytica, a political consultancy firm.
- Were ethical research principles in the Belmont Report violated? If so, how?

# Incorporate values in design process



← The conventional user-centred, four-stage design/research model



← Extended user-centred, five-stage design/research model. The new stage entails conceptual analysis or 'understanding'

# Learning Objectives

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- Understand ethical treatment of participants and participant data, to apply to your course projects
- Understand historical turning points for ethics in research with human participants and for ethics in HCI

# What's next

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- Project plan “check-in’s” 4-5pm today
  - Group 16 for G1 with Gerald: 4:10-4:25pm
  - Group 1 for G2 with Gerald: 4:25-4:40pm
  - Groups 6 and 13 for G3 with Gerald: 4:40-4:55pm
- Project plan presentations due next week