Human Error, GenderMag &
How to Give a Talk (next week)
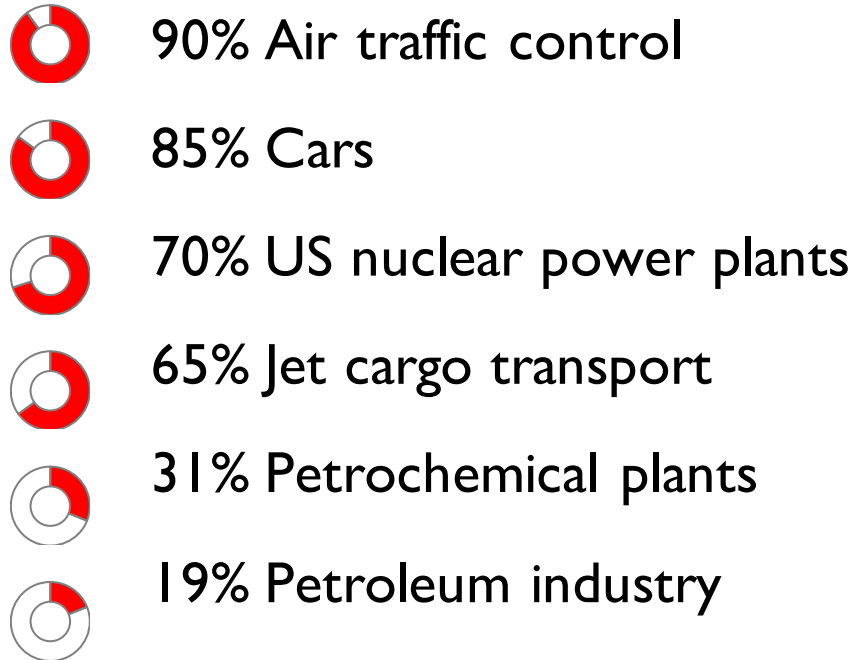
Stephen Gilbert & Amanda Newendorp

HCI
Session 3

1

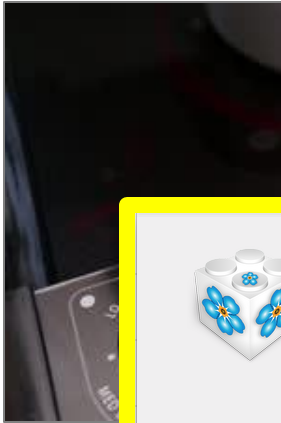# Human Error

Some slides from Sarah Wiseman, Sandy Gould | University College London

Proportion of system failures based on human error

90% Air traffic control

85% Cars

70% US nuclear power plants

65% Jet cargo transport

31% Petrochemical plants

19% Petroleum industry

Error: intenti

Budget Report

Send message

To: boss@company.com

Cc:

Bcc:

Subject: Budget Report

From: Stephen Gilbert <g...⟩   Signature: None

ForgetMeNot Attachment Reminder

You mentioned 'attach' in your email message, but no attachment is present.

Cancel   Add attachment...   Send anyway

Probabilistic Risk Assessment

$$R = P_E \times \sum_i (P_i \mid E \times C_i)$$

$P(consequence) = P(opportunity) \times$
$P(error\ given\ opportunity) \times$
$P(no\ correction\ in\ time\ given\ error)$

Probability
of an Event

Probability of
consequences
given the event

Cost of the
consequence

Related to Failure Modes and Effects Analysis (FMEA)

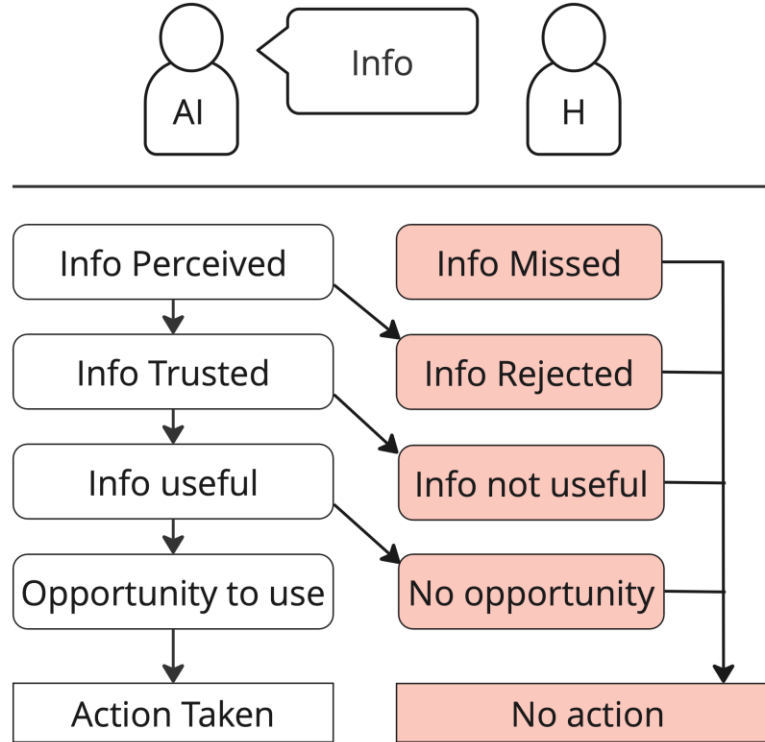# Challenges with probabilistic approach

Getting the probabilities for human perceiving, responding, deciding, etc.

Estimating probabilities of rare or unexpected events.

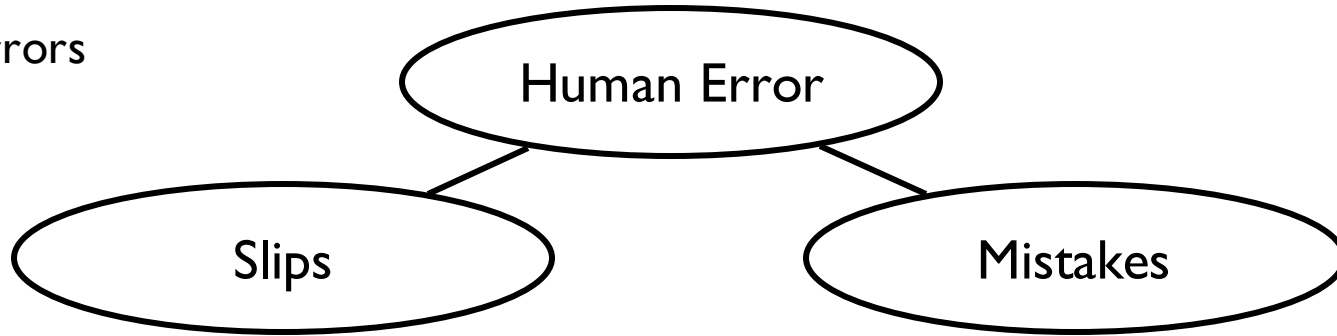It assumes many events are independent, but they're not.

Resilience Engineering

Communication Failure Modes

Newendorp, A. K., Gilbert, S. B., & Dorneich, M. C. (2024). User's AI Expertise (AIX): Measuring One's Mental Model of an AI System. Emerging Trends In Networks And Computer Communications (ETNCC), Windhoek, Namibia.

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Types of Errors

Human Error

Slips

Mistakes

Right plan.
Wrong execution.

Wrong plan.
Right execution.

I should take my umbrella tomorrow. (Doh! I forgot!)

The grocery is right next to the gas station. I'll do shopping first.

Post-Completion Errors

Forgetting the final subgoal of a task because primary goal is reached.

Byrne, M. D., & Bovair, S. (1997). A working memory model of a common procedural error. *Cognitive Science, 21*, 31-61.

Chung, P. H., & Byrne, M. D. (2008). Cue effectiveness in mitigating postcompletion errors in a routine procedural task. *International Journal of Human-Computer Studies*, 66(4), 217-232.

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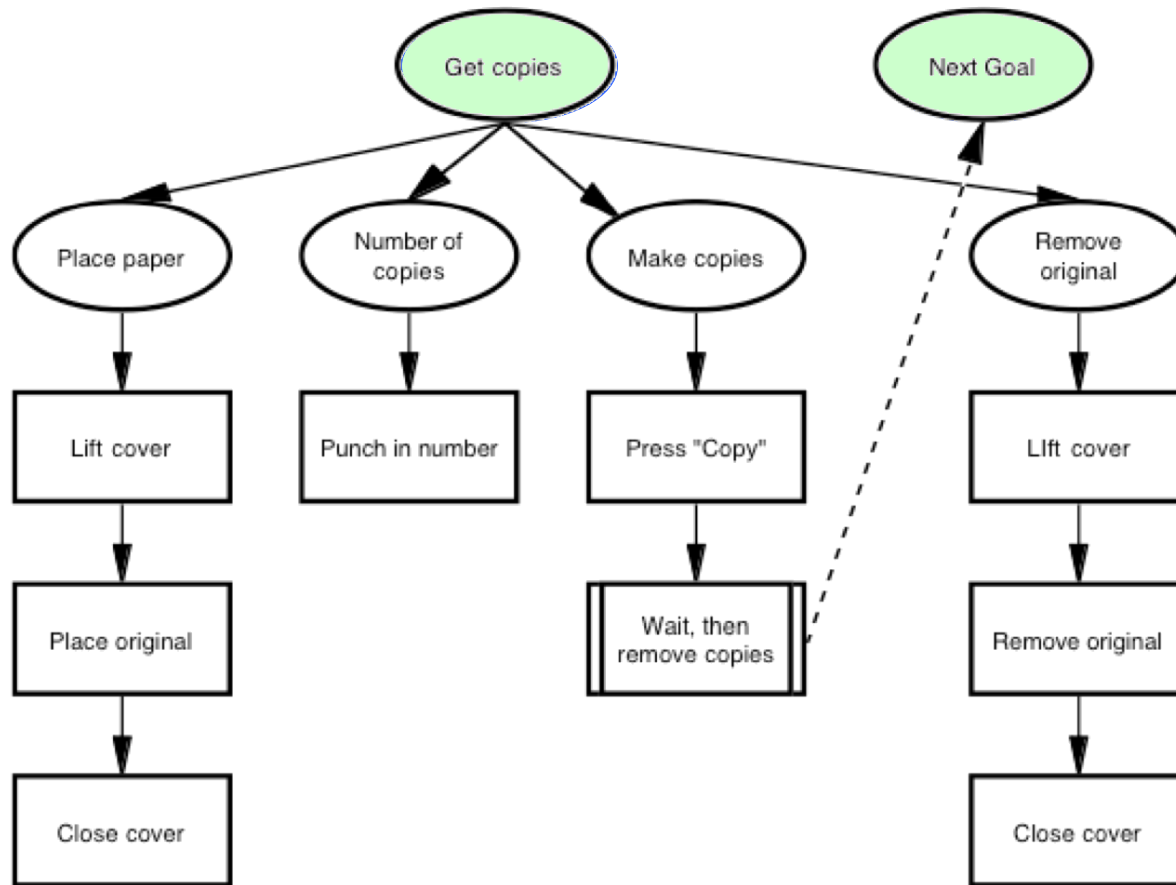
Design Implications

Remove possibility for post-completion errors.

If not feasible…

Provide very strong cues:

    Explicit

    Timely

    Visually salient

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Design Implications 2: Resiliance

Aid recovery

Make actions reversible

Make results of each action noticeable within 150 ms.

Bonnie John on Cancel
http://www.youtube.com/watch?v=gxiA4JTS9P8&t=0m26s

Examples: Name that error

Pizza complaint

http://youtu.be/pkAeNcNJVjA

Chaos buttons, human error and healthcare

Morning 1
http://www.youtube.com/watch?v=ifjDWKMNlIk&t=1m54s

Morning 2
http://www.youtube.com/watch?v=ifjDWKMNlIk&t=3m12s

Dominic Furniss
University College London

Individual Differences

States and traits that make people perceive or perform differently.

GenderMag:
Could software be sexist?

Dr. Margaret Burnett

GenderMag.org

https://youtu.be/txp4Cl3JGbc

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GenderMag Method

What happens if most of the programmers, designers, and managers are men, but half of the users are women?

Can we make more inclusive software without relying on stereotypes?

Bad "inclusive" design

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Good inclusive design

Redesigned backpack to fit women better

Can we do the same thing in HCI?

The Women-Specific FlexVent™ Suspension System, Certified By The American Chiropractic Association, Has Articulated Shoulder Straps, A Rounded Back Panel, Comfortable Stitch Lines And Soft-Touch Chemise Fabric

GenderMag cognitive facets

1. Risk aversion
2. Motivations
3. Computer self-efficacy
4. Information processing style
5. Learning by tinkering vs. process

Facet #1: Risk

42% 25% 26% 33% 29% 38%

Most tolerant   Middle 1/3   Most averse
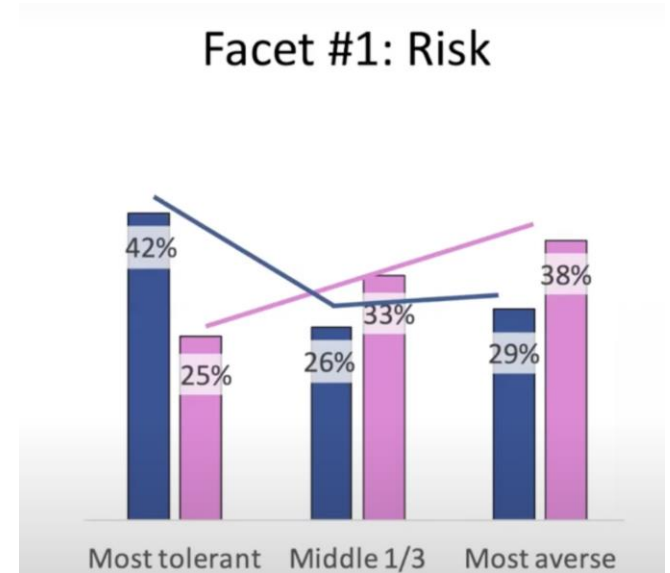
Gender-based <u>trends</u> for how these facets manifest

Personas to represent facets

Tim (Timothy/Timara)

Abi
(Abigail/Abishek)

Pat (Patrick/Patricia)

Facet #1: Risk

42%

25%

26%

33%

29%

38%

Most tolerant   Middle 1/3   Most averse
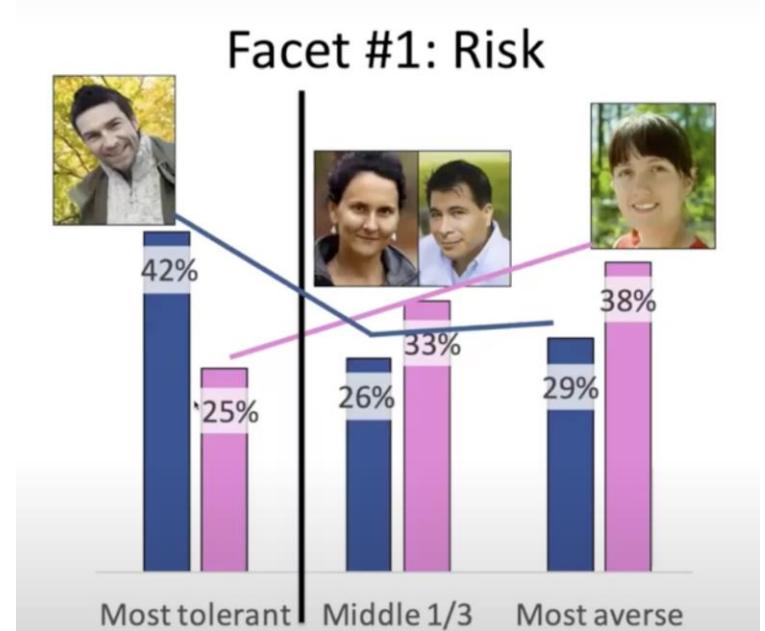
Abi persona

1. Risk-aversion: high
2. Motivation: uses technology to accomplish the task
3. Information processing style: comprehensive
4. Computer self-efficacy: low
5. Tinkering: avoids it

Abi (Abigail/Abishek)

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GenderMag Method

1. Pick a persona, e.g., Abi

Abi (Abigail/Abishek)

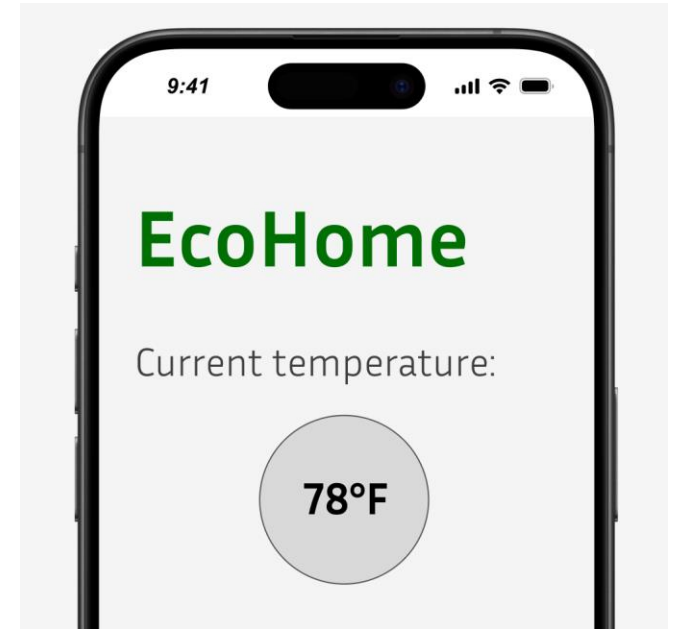IOWA STATE UNIVERSITY
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GenderMag Method

2. Give her a goal

"Use the new EcoHome app to change your thermostat setting to 75°F"

GenderMag Method

3. Ask developer for subgoal: "What were you hoping Abi would want to do first?"

Abi should go to the page to adjust the temperature.

Will Abi have that subgoal? (yes, no, maybe)

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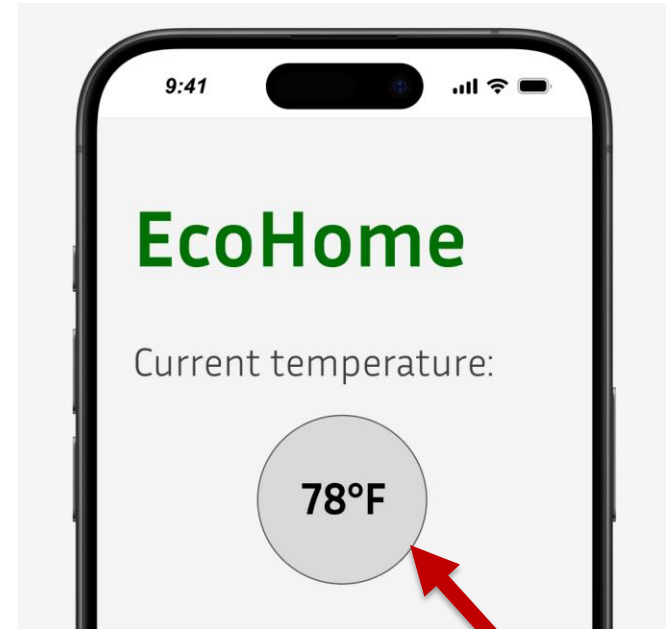VRAC Visualize • Reason • Analyze • Collaborate

GenderMag Method

4. Assume Abi has that subgoal. Ask developer what action Abi should take?

Abi should touch the circle that says 78°F to go to the temperature page.

Will Abi take that action? (yes, no, maybe)

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GenderMag Method

5. If Abi takes the action, will Abi see progress to subgoal? (yes, no, maybe)

If Abi touches the circle that says 78°F, will she know that she's in the right place to adjust the temperature?

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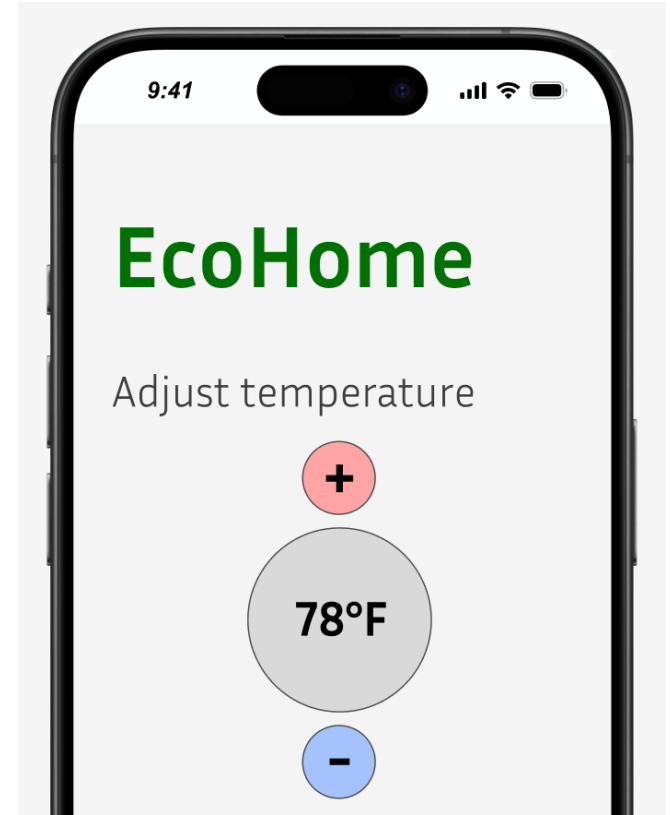
InclusiveMag and beyond

Same method can be applied to other individual differences

- SocioeconomicMag

- SeniorMag

- ChildrenMag

- ADHDMag

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GenderMag

Questions?

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How to Give a Talk

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You'll be giving a talk…

Video presentation, Demo for app

Group project presentation

In Week 9 to a [CUNY REU site](#):
- You talk to them.
- You listen to them.

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Doesn't talking come naturally?

No.

It can be scary.

It can be boring, even soporific.

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Doesn't talking come naturally?

No.

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It can be boring, even soporific.

Practice

Technique

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What are you trying to tell to your audience?

You're a passionate analytical authority.

Oh, and by the way…

Your message.

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Messages

Please have 1-3 messages to convey.

Each could be said in 30 seconds.

Facebook Participation Increases Isolation Within Rural Communities.

Our method of usability testing using bluetooth is better than existing methods.

Non-Useful Messages

I'm running out of time.

I'm sorry…

I did this, and this, and this, and that.

Typical Talk Outline

What's the problem? (Hook!)

What have you done about it? (big picture)

How are you different than other people?

What did you do really? (details)

How did you solve the problem?

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Sample outline with slide counts

Title/author/affiliation (1 slide)

Motivation and Problem Statement (1-2)
  Why should anyone care?

Outline of talk (1)
  Suggest you have an innovative solution

Related Work (0-1)
  Cover superficially or omit; what have others tried?

Methods / Results / Major Points (4-6)
  What did you do? What happened?
  Do not superficially cover all details; cover key points well. No big data.

Conclusion (1)

Backup Slides (0-3)

Don't delay the message

Worse

First, there was the mouse.

Then other interfaces…

I'm working on the iPhone…

My contribution is…

Better

A problem to be solved is…

My contribution is…

Why does this matter?

First there was the mouse…

Tell a story with Signposting

What's the problem?
What's the goal of this talk?
Where are we headed next?

Background – How does this help me?
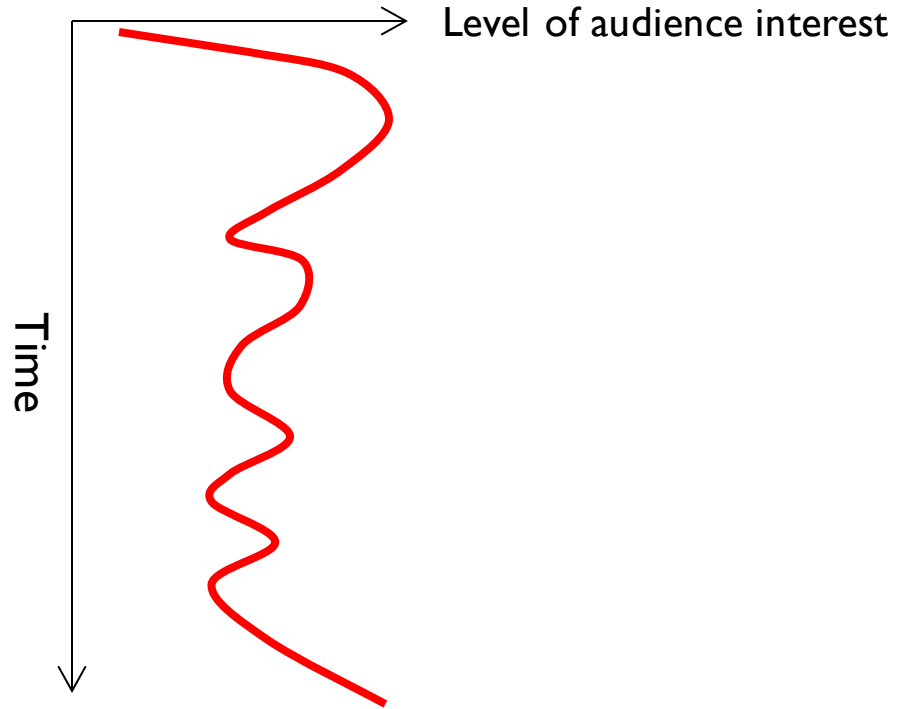
Example 1
Are we there yet?

Example 2
Are we there yet?

Example 3
Are we there yet? YES!

Summary
Implications, Next steps, Save the world
Thank you. Questions?

Level of audience interest

Time

Tips

From
Paul Edwards'
*How to Give an
Academic Talk*

(Valid even
though your talk
isn't "academic")

USUALLY BETTER	USUALLY WORSE
Talk	Read
Stand	Sit
Move	Stand still
Vary the pitch of your voice	Speak in a monotone
Speak loudly, facing the audience	Mumble, facing downward
Make eye contact	Stare at your laptop
Focus on main points	Get lost in details
Use outlines, images, and charts	Have no visual aids
Finish within your time limit	Run overtime
Rehearse	Don't practice because you're too busy working on the slides
Summarize your main points at the beginning and end	Start without an overview; trail off without a conclusion
Notice your audience and respond to its needs	Ignore audience behavior
Emulate excellent speakers	Emulate your advisor, even if s/he gives lousy talks

Tips for your Voice

Breathe right (from gut, not chest)

When you inhale, your stomach should push out.
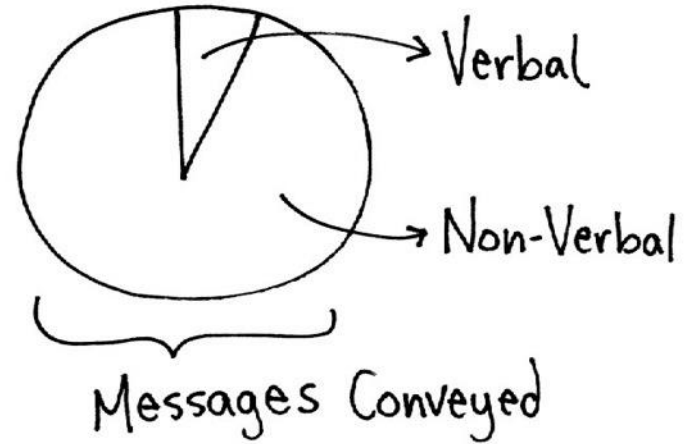
puh! tuh! kuh!

Loud and deep

We're going to try it now!

Silence

Repeat phrases

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Tips for your Body

Dancing (stand on a plastic bag)

Speed

Where to stand

Eye contact and engagement

Slide inspired by Leslie Potter

Learn from Great Speakers

TED Talks (ted.com)

Ignite talks (https://www.youtube.com/@ignite)

And from bad ones

Less is more

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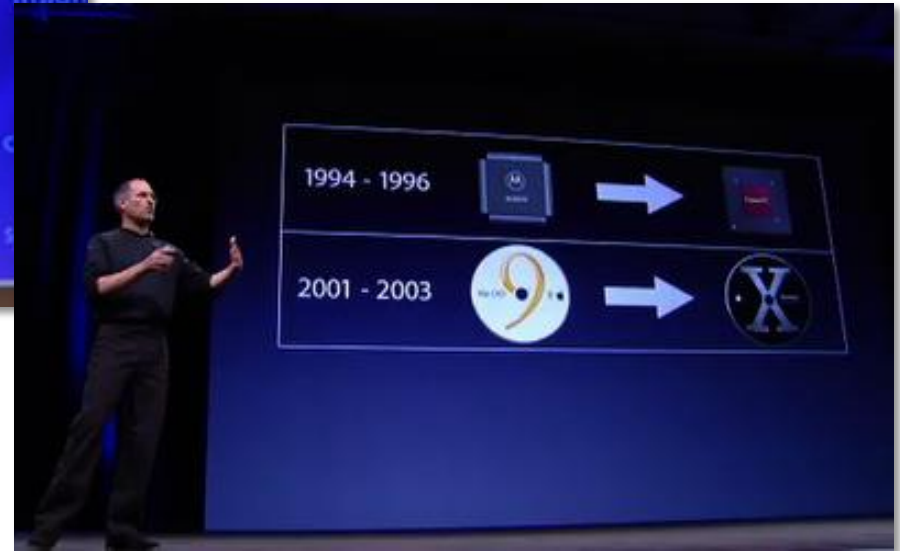
Conscious decision

Right now,

Should they look at me or the screen?

Do my words need any visual aid?

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Last tips

Use a remote control.

Avoid giving a demo live.

Don't look at the screen
     (your back's to the audience).

Don't read your slides.

Do look at someone.

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Info for CUNY presentation

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Outline

1. What problem are you addressing? Why is it important?

2. What have other people done, and how is your approach different?

3. What are you doing?

4. What have you learned so far?

5. What are the challenges you've experienced? What do you wish you knew?

Logistics

Each team has 9 min to talk and 8 min for Q&A.

Each person should speak about 3 min.

Zoom, probably with Owl.

When listening to CUNY

If you're bored, take notes, but not on your phone.

Prepare a question. Every speaker should get at least 2 questions. Post your questions in the chat if you don't get to speak them.

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