



Issues of Human Interface design

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Contact Lenses

“Choosing to”
wear something



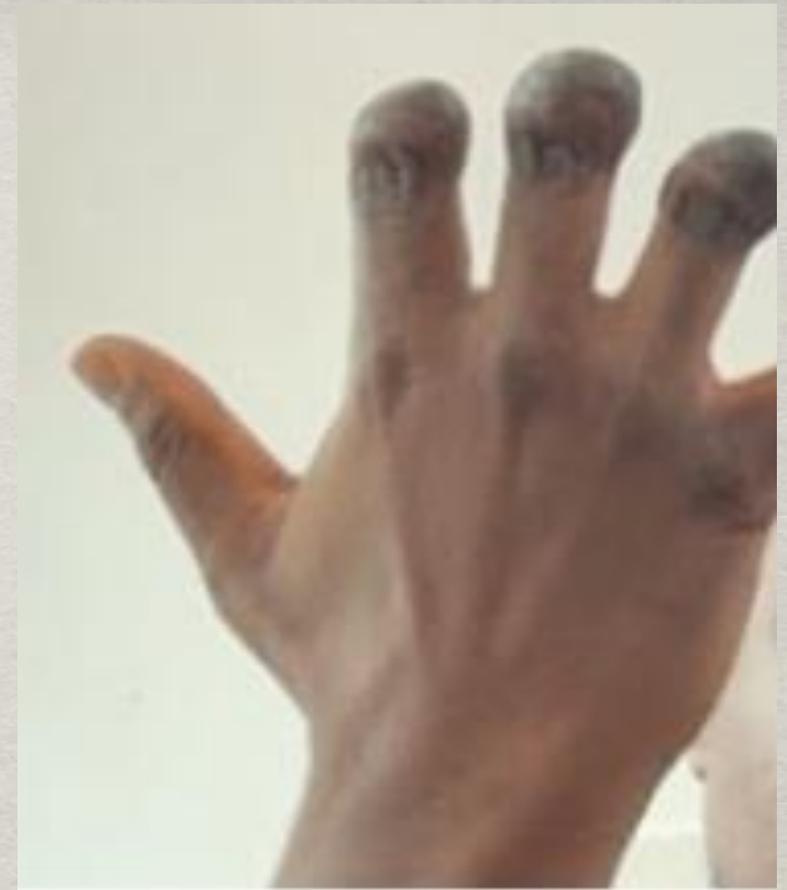
Contact lenses- The 5 C's

- Comfort
- Function
- Cosmesis
- Cost
- Cool

Rejection Rates

- ✿ Contact lenses ~ 20%
- ✿ Zappos Shoes ~ 35%
- ✿ Lower Extremity (BK and AK) prostheses ~ 10–20%
- ✿ Upper extremity (BE and AE) prostheses ~ 50%
- ✿ Partial hand prostheses ~ 75%
- ✿ Exoskeleton for paraplegia
 - Medically unable to use device: ~68% of total SCI population
 - Refusal (eligible patients): ~20–25%
 - Drop-out during rehab: ~8%
 - Long-term daily adoption: low but not well quantified

Partial Hand Amputation





Contact lenses- The 5 C's

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FootLess Jo



WHAT IS COMFORT?

- When you forget you are wearing something at all...

Comfort

- ✿ Transference of pressure
- ✿ No “noxious” stimuli (noise, vibration etc)
- ✿ Heat
- ✿ Nuisance factor
 - ✿ easy to put on and take off
 - ✿ not too bulky or cumbersome
- ✿ Weight
- ✿ Sensitivity of skin or nerve

**Comfort is
elusive**

What may be
“comfortable” one
minute may not be
the next.....

SOCKET COMFORT SCORE



Scale: 1-10

**How comfortable is
your prosthesis.**

**Under 5, Most
likely to reject.**

Function:

Task achievement

Device Availability



FUNCTION



Feedback/ Sensation

Or

Loss of Sensation



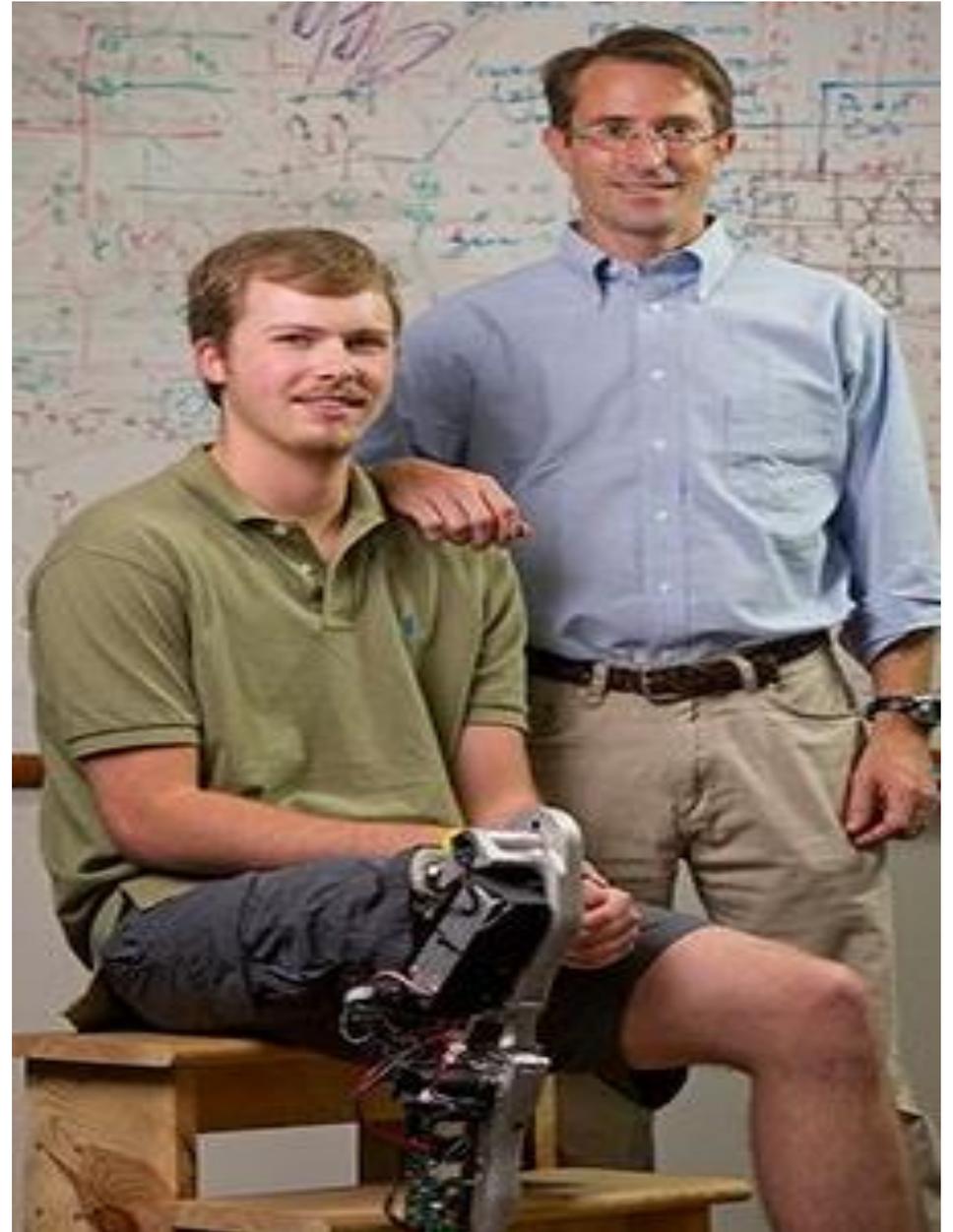
Cosmesis





Cost

- What is it worth to the consumer and...
- If it costs way more than standard care, does it provide a proportional improvement in comfort, function, cosmesis?



Cool

What is cool today may not be tomorrow.



User Rejection Rates

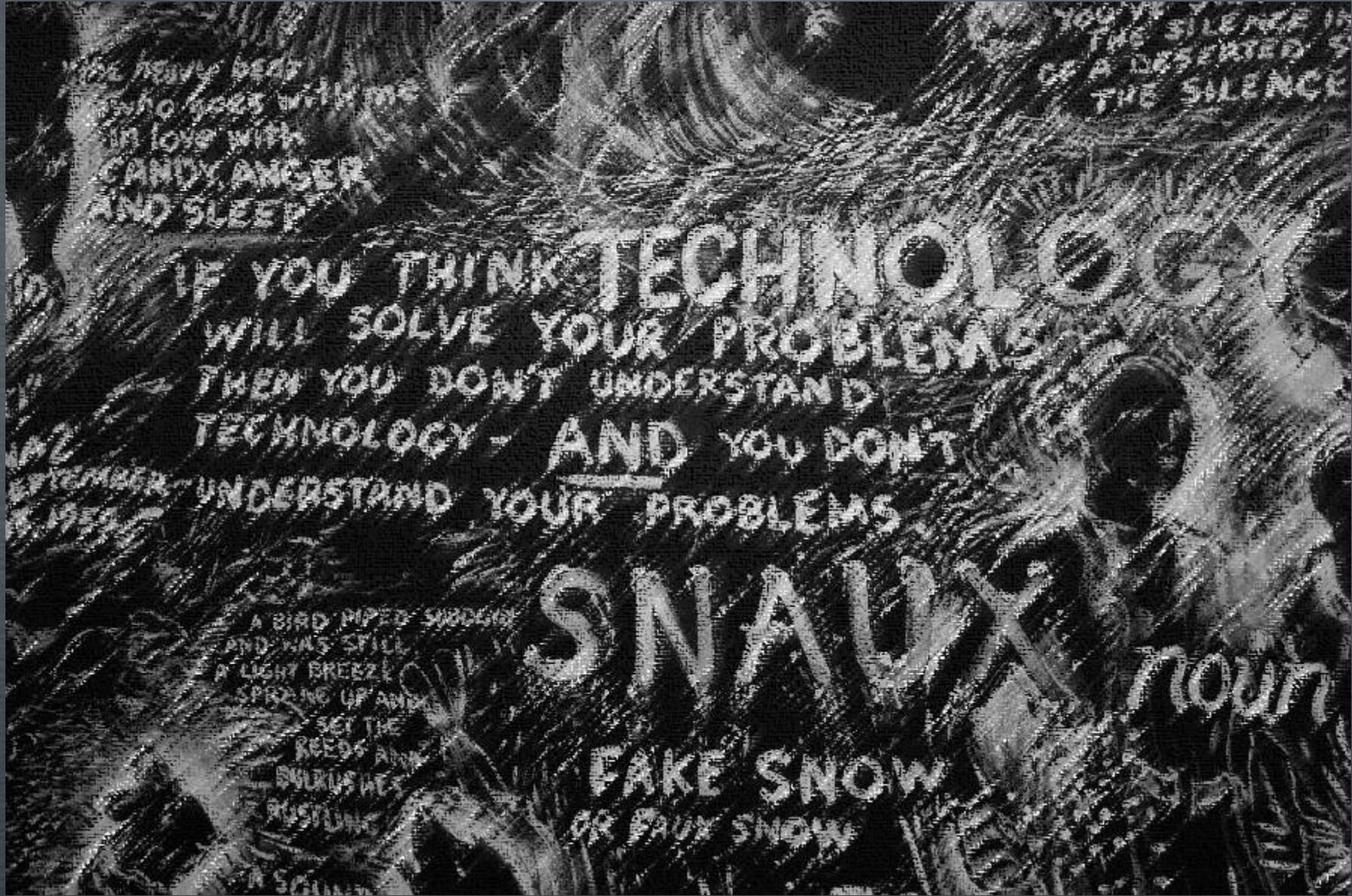


When someone stops using a device

50%+ rejection → poor usability

Salminger, 2022

- ✿ Current rates of prosthetic usage in upper-limb amputees— have innovations had an impact on device acceptance?
- ✿ The advancements of the last decade in the arena of upper limb prosthetics have not yet achieved a significant change in prosthetic abandonment



the heavy bear
who goes with me
in love with
CANDY ANGER
AND SLEEP

YOU THE SILENCE
THE SILENCE
OF A DESERTED
THE SILENCE

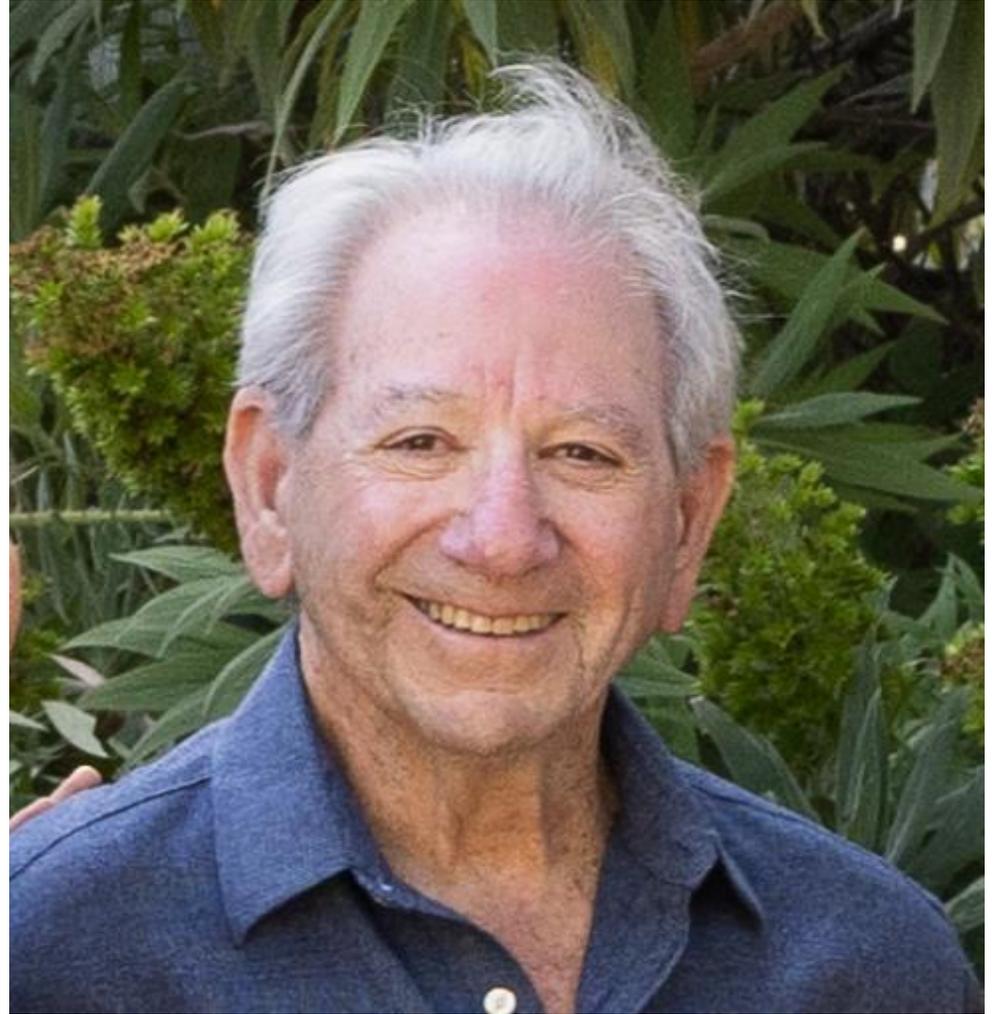
IF YOU THINK TECHNOLOGY
WILL SOLVE YOUR PROBLEMS
THEN YOU DON'T UNDERSTAND
TECHNOLOGY - AND YOU DON'T
UNDERSTAND YOUR PROBLEMS

A BIRD PIPED SUDDENLY
AND WAS STILL
A LIGHT BREEZE
SPRANG UP AND
SET THE
REEDS A
BURRISH
POSITION
A SQUAWK

SNAWLED MOUTH
FAKE SNOW
OR FAKE SNOW

Abby's project

Danny's project



Perhaps we are missing the goal..

Perhaps the goal is not walking,
not grasping, not looking good,

but

independence.



Comfortable,
functional
Independence

So how do you start

- ✿ Understand the real goals
- ✿ Do the research
- ✿ Design around the 5 c's to improve independence.

Without impact, innovation
is just an idea with
promise.

J. Rodin

HUMAN?

