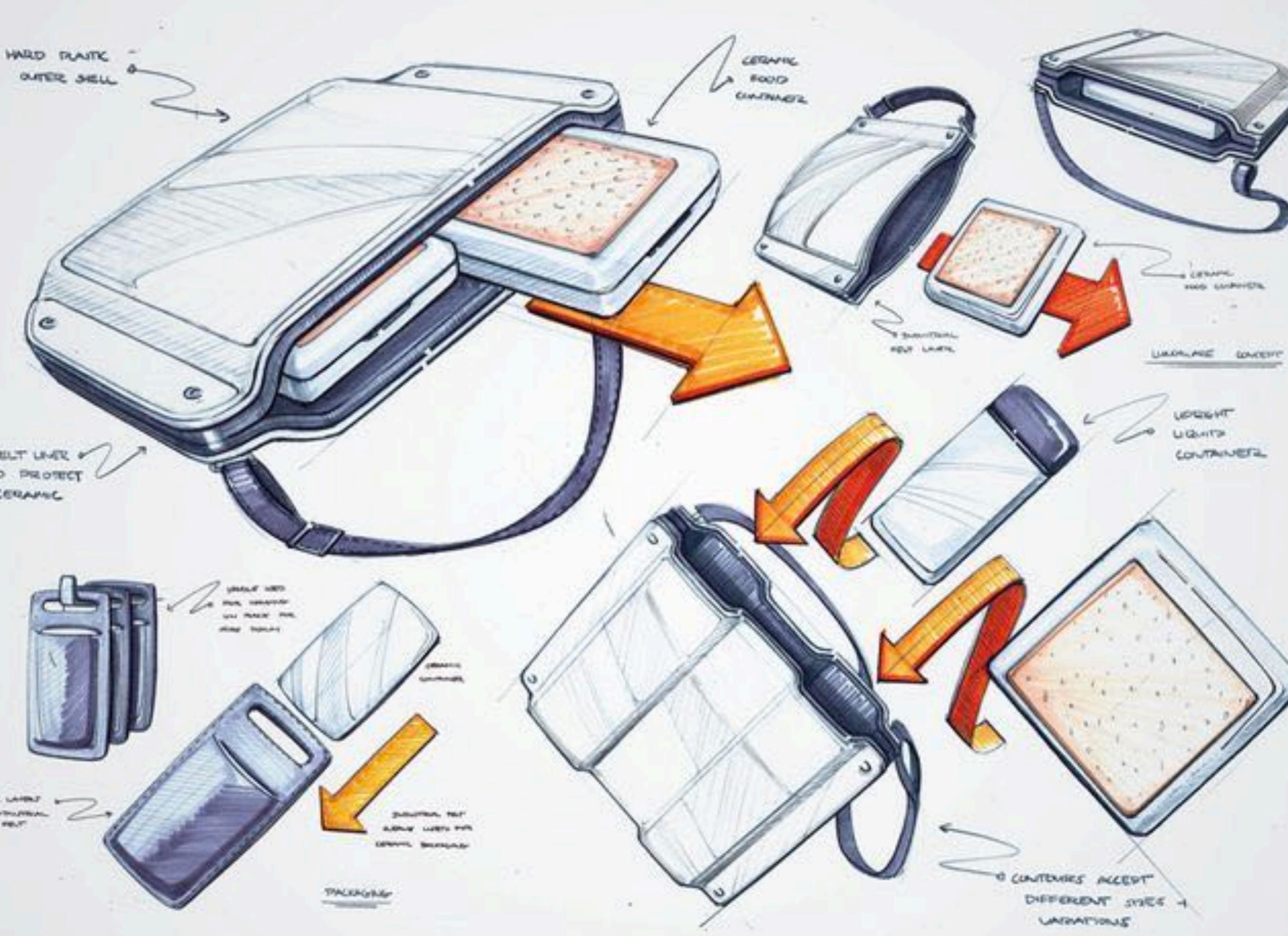


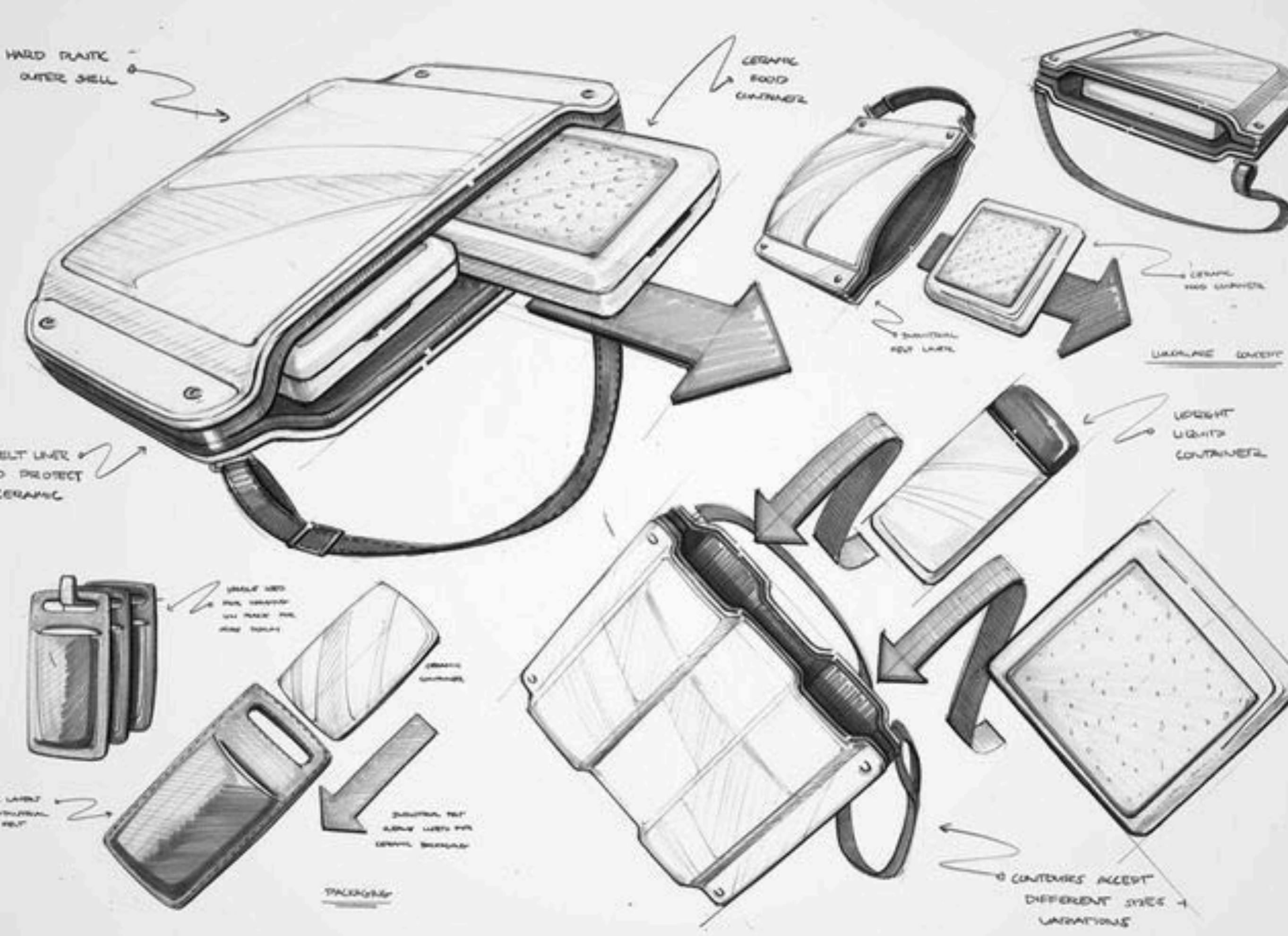
# **Interaction Design & Virtual Reality (IDVR)**

**Liwei CHAN 詹力韋**

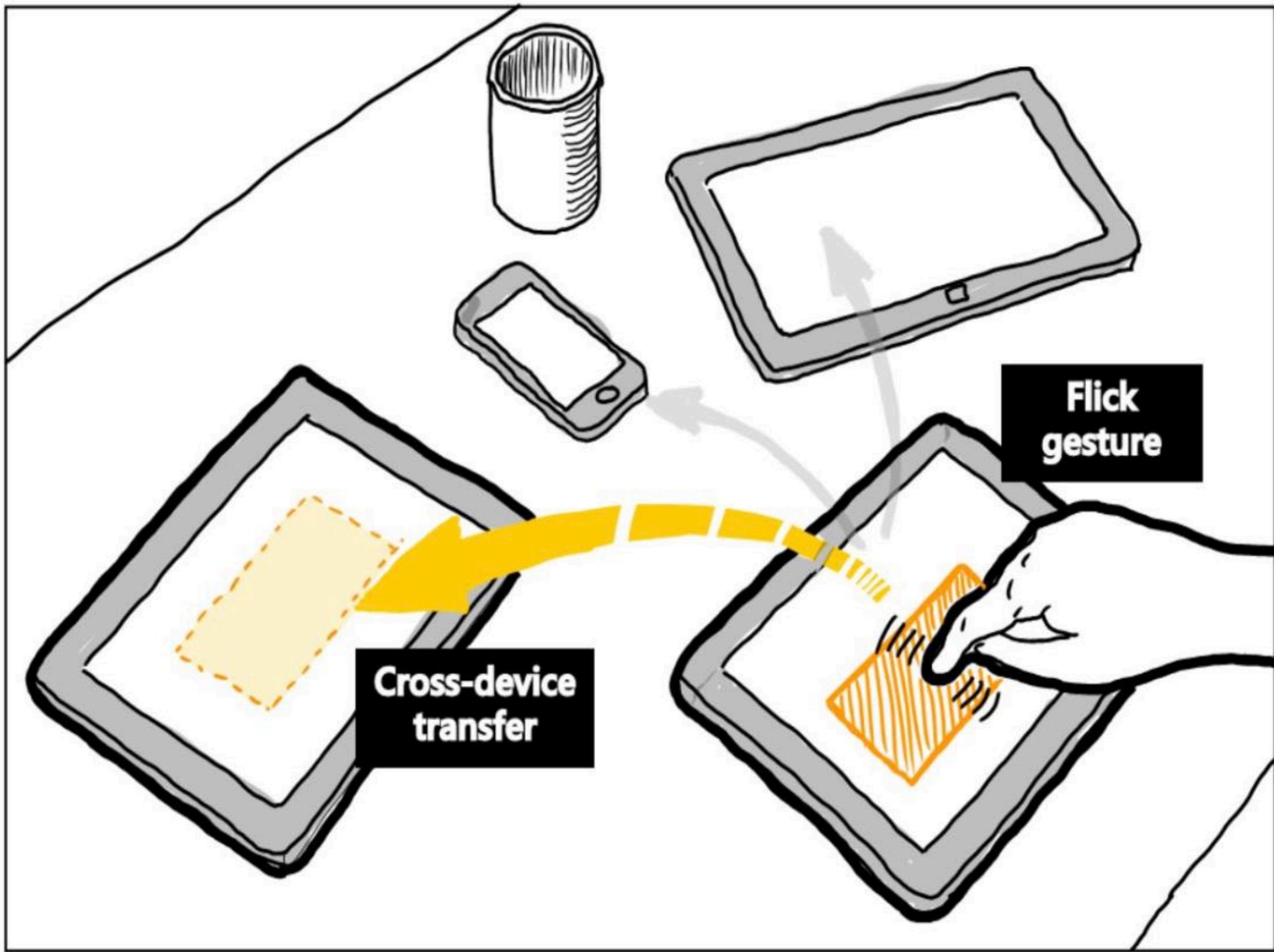
**sketching  
user  
experience**

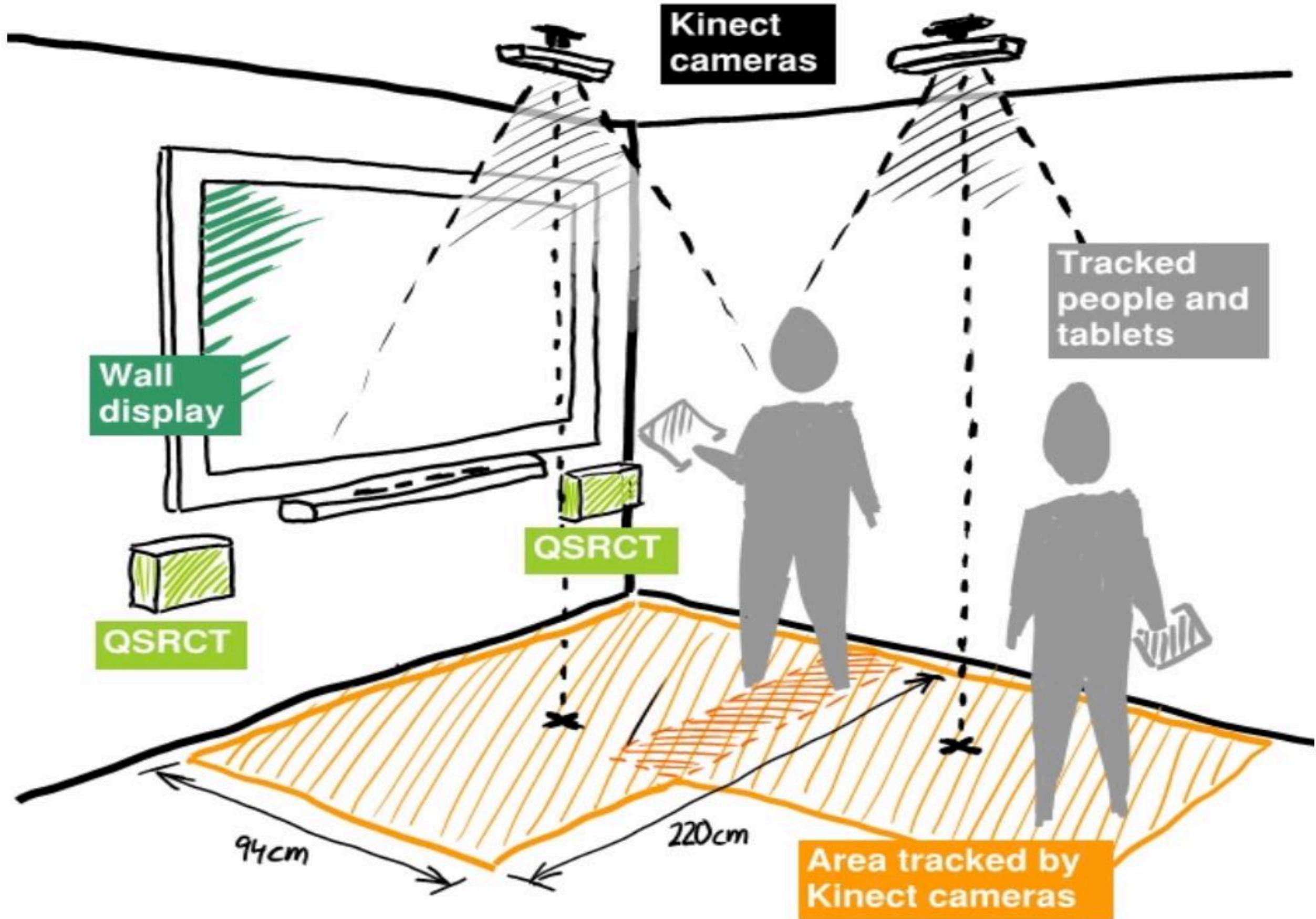
**it's not about...**

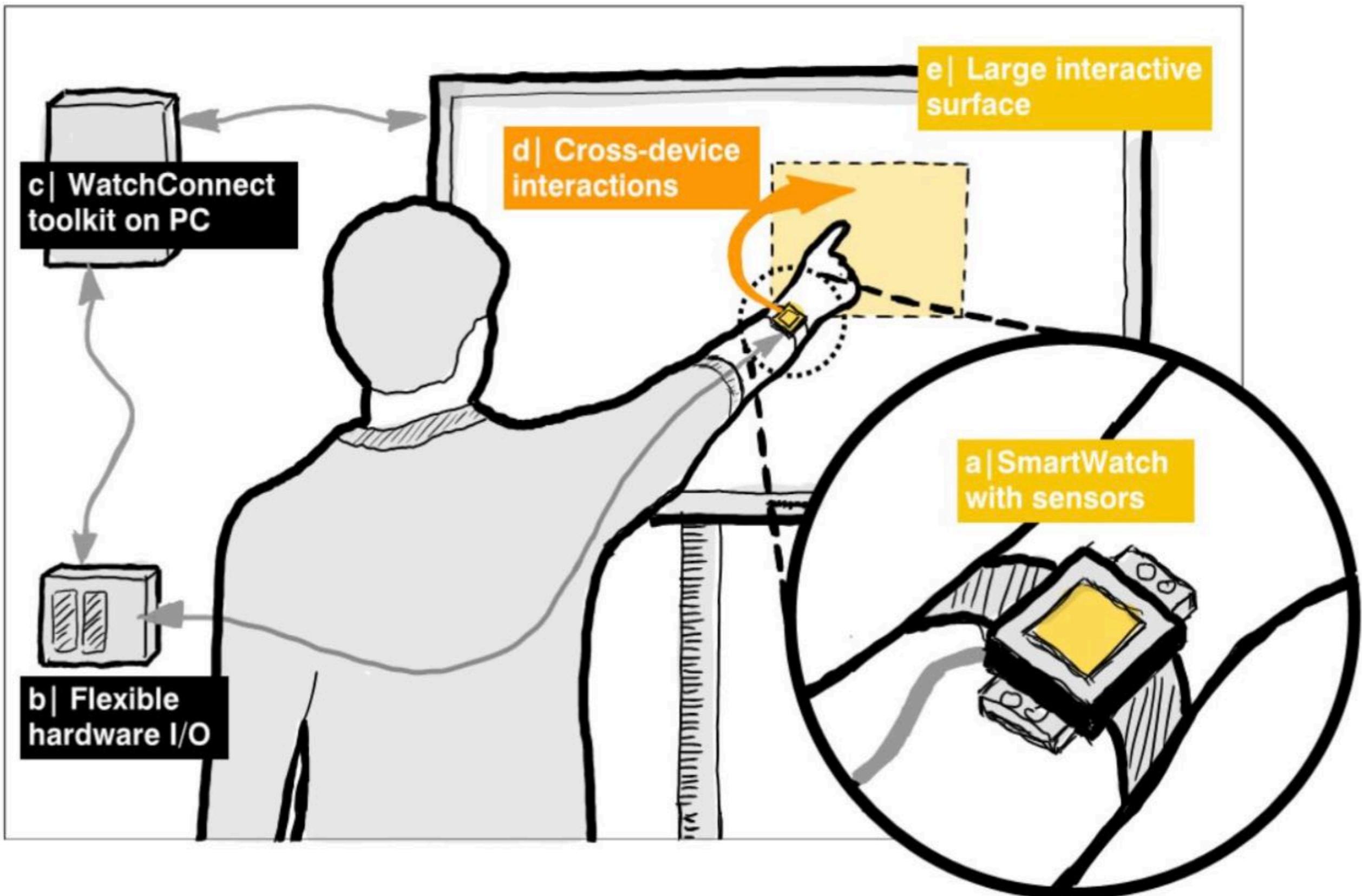


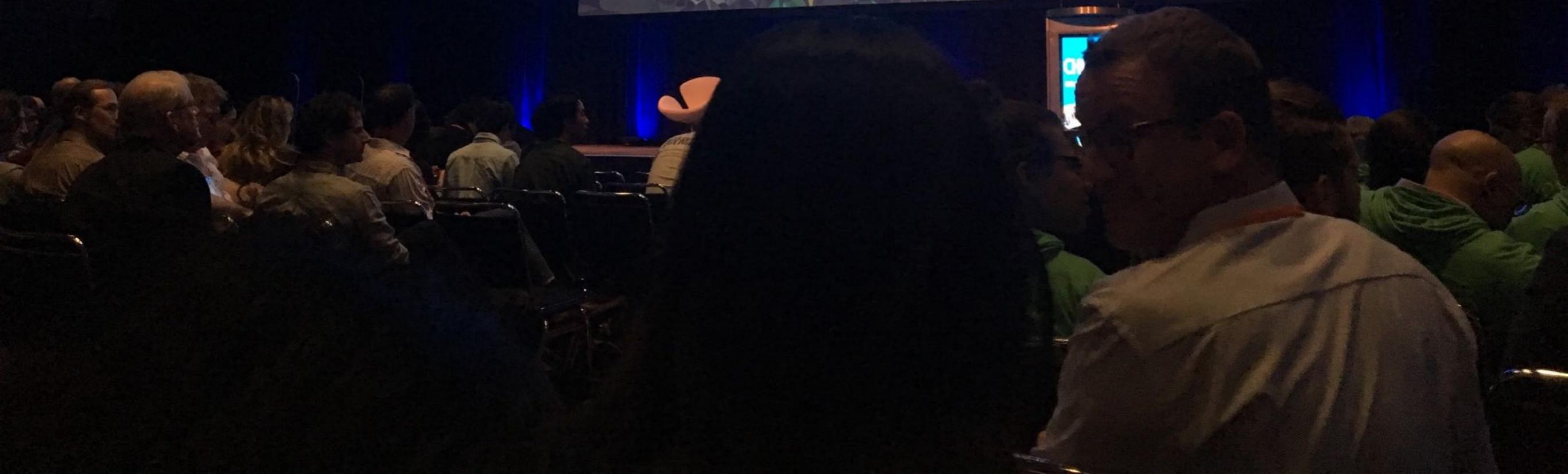


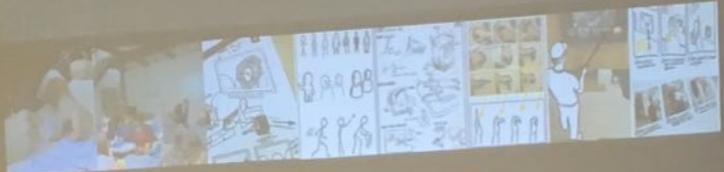
**it's about...**











## Sketching User Experiences

Hands-on Course of Sketching Techniques  
for HCI Research

Nicolai Marquardt

Course at ACM CHI 2017 in Denver, CO, USA  
nicolai.marquardt@ucl.ac.uk  
www.nicolai-marquardt.com | @NicolaiMarquardt



A woman wearing an orange short-sleeved shirt, standing near the large blue screen and looking down at some papers or a device.

A woman wearing a black jacket, seated at a table and looking towards the front of the room.

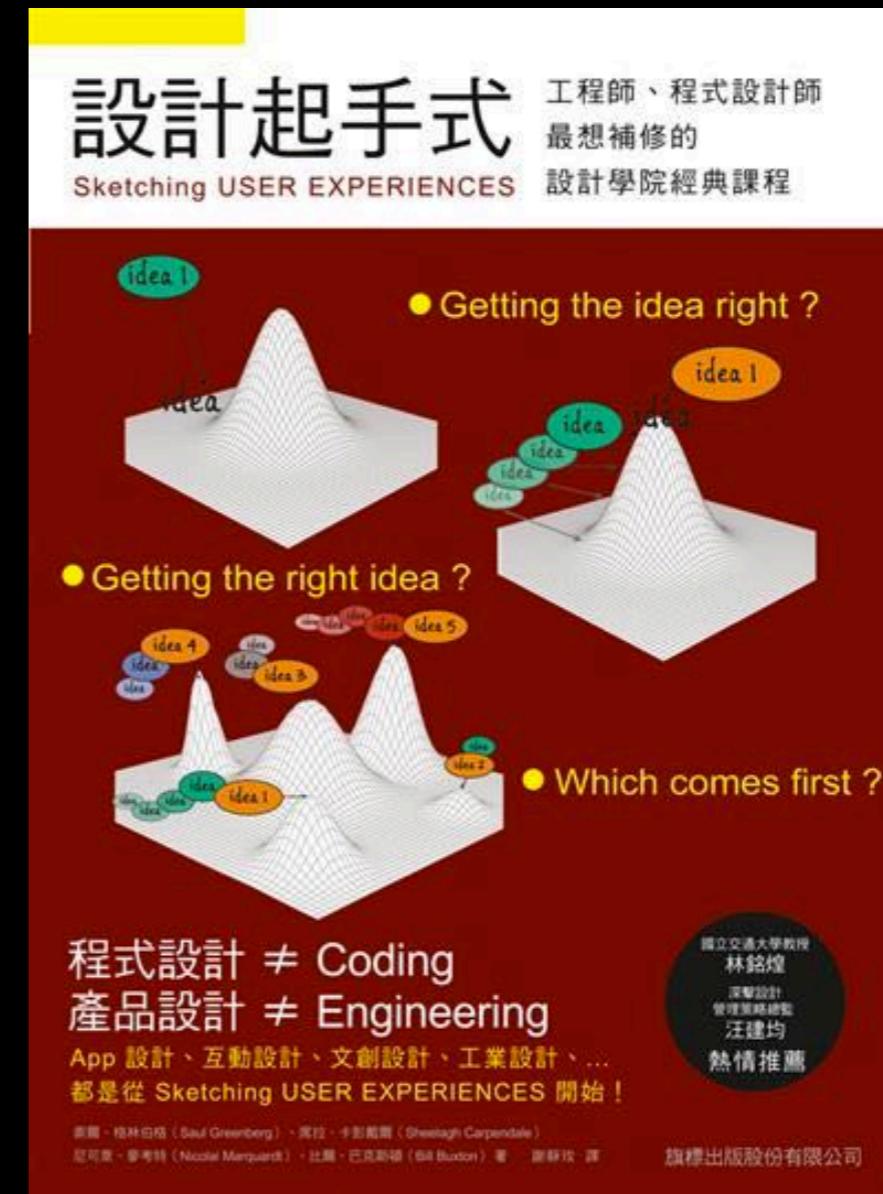
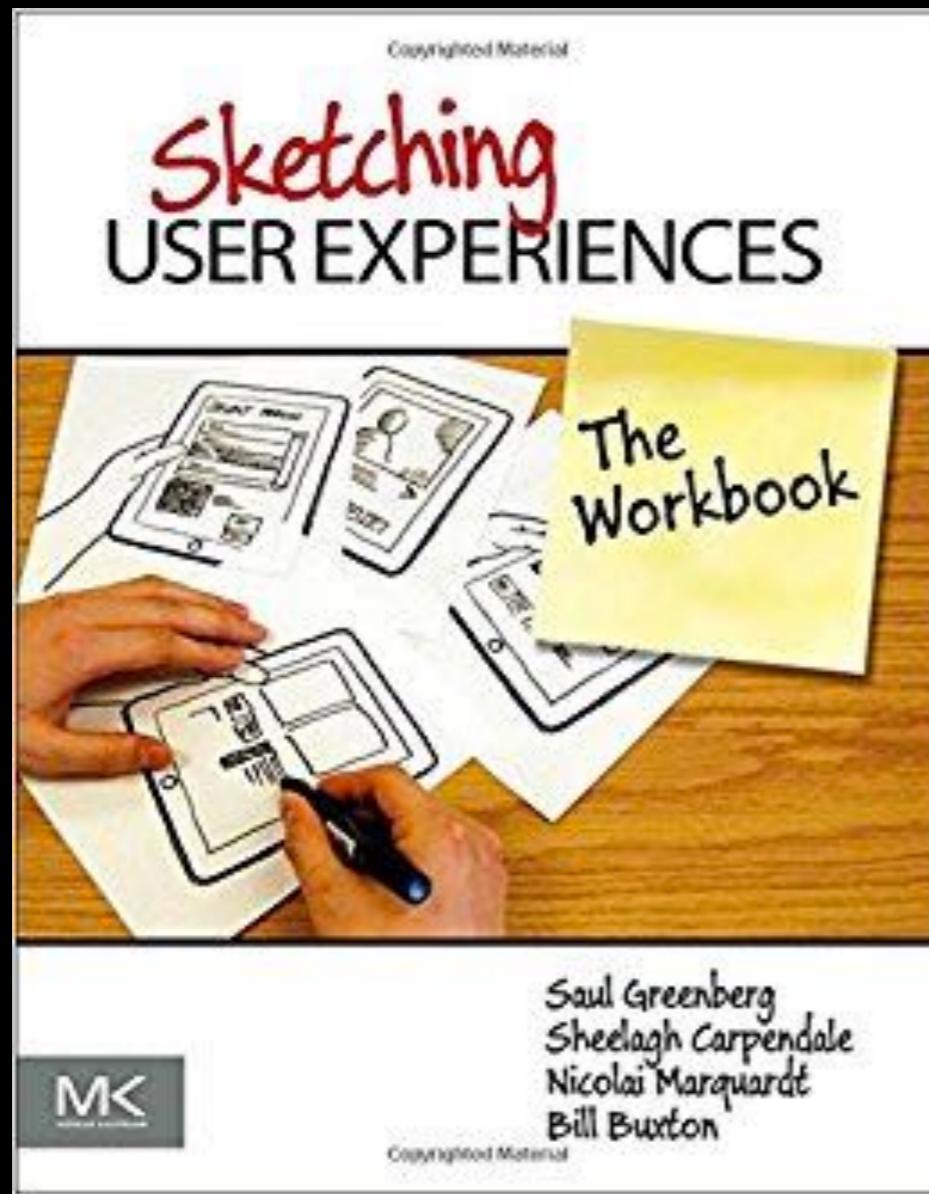




# Sketching User Experiences

Hands-on Workshop of Sketching Techniques  
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Course at ACM CHI 2017 in Denver, CO, USA



"Bill Buxton brings design leadership and creativity to Microsoft. Through his thought-provoking personal examples he is inspiring others to better understand the role of design in their own companies."

Bill Gates—Chairman, Microsoft Corp.

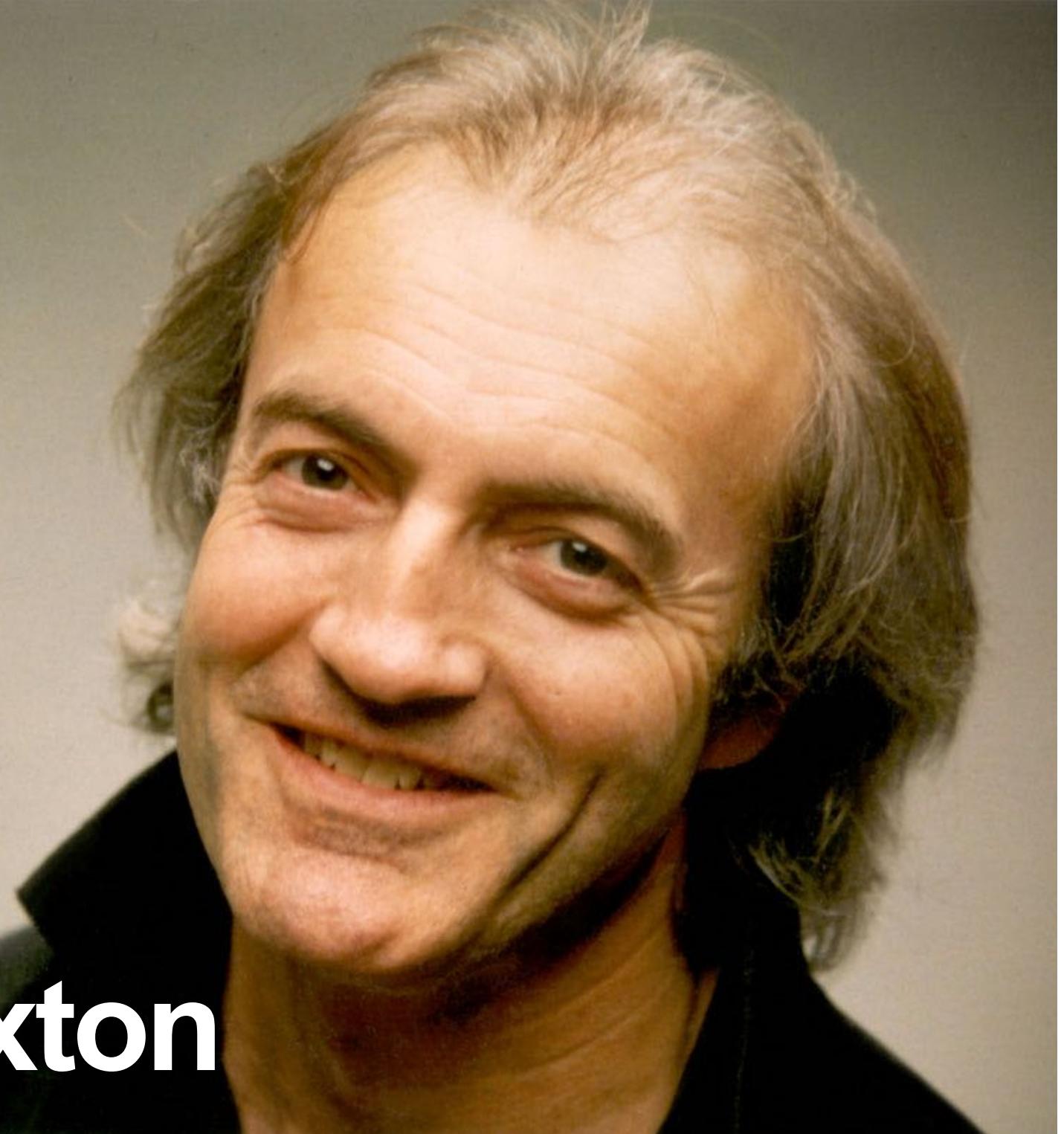
## Sketching User Experiences

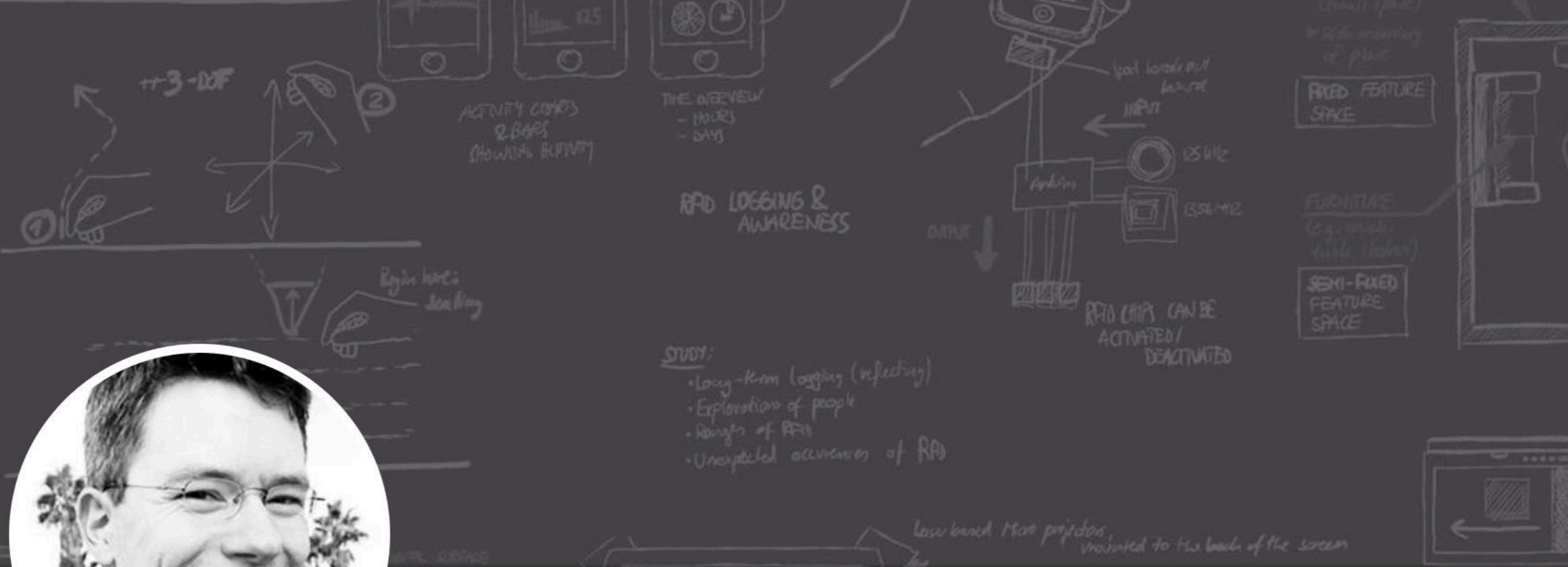
getting the design right and the right design

Bill Buxton



# Bill Buxton





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推文

推文與回覆

媒體



Nicolai Marquardt @nicmarquardt · 6月16日

Great ideas by Fanny Chevalier @zirtech about new ways for editing/sketching visual media. @uclic speaker series. @dgpToronto @Inria\_Lille

## Nicolai Marquardt

@nicmarquardt

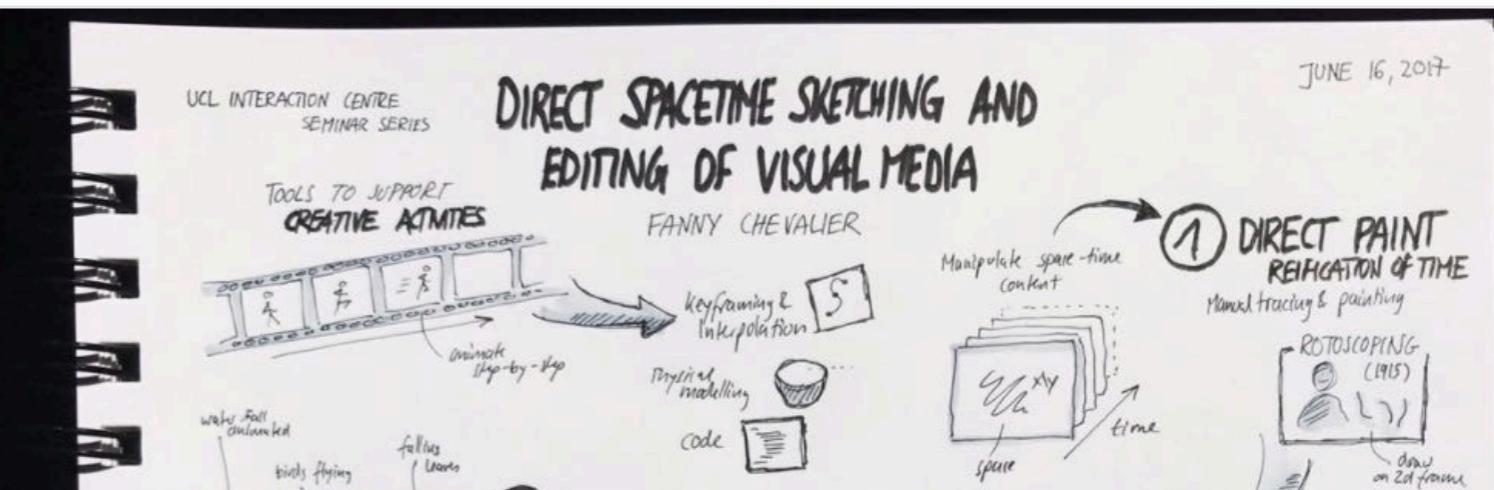
Senior Lecturer @UCL in Physical Computing | HCI @uclic @uclcs | sketching & visual thinking | Co-author of Sketching User Experiences Workbook

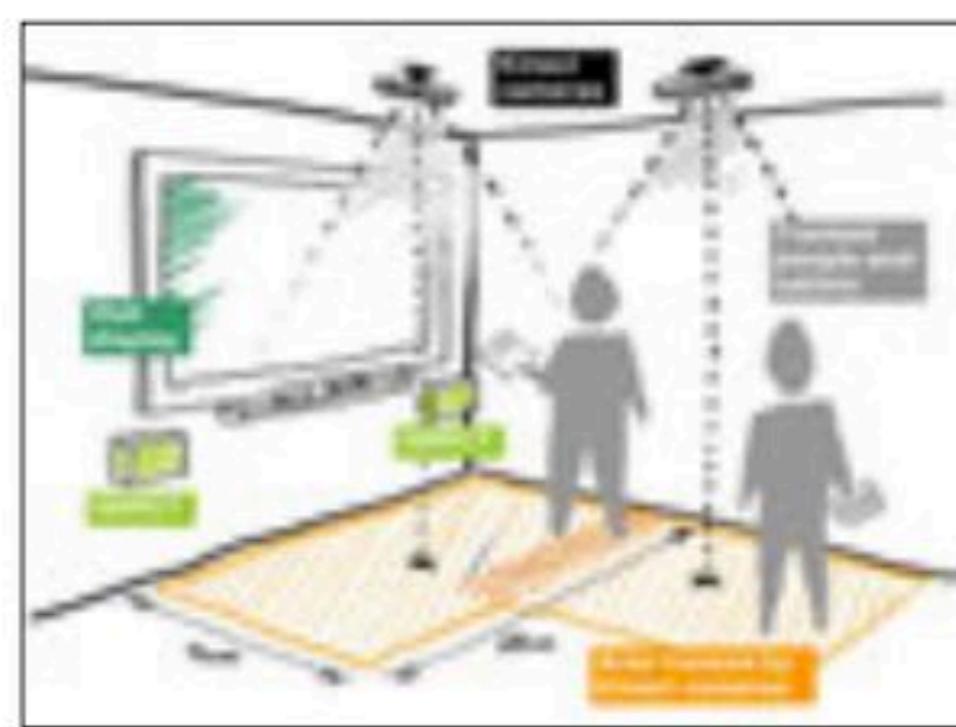
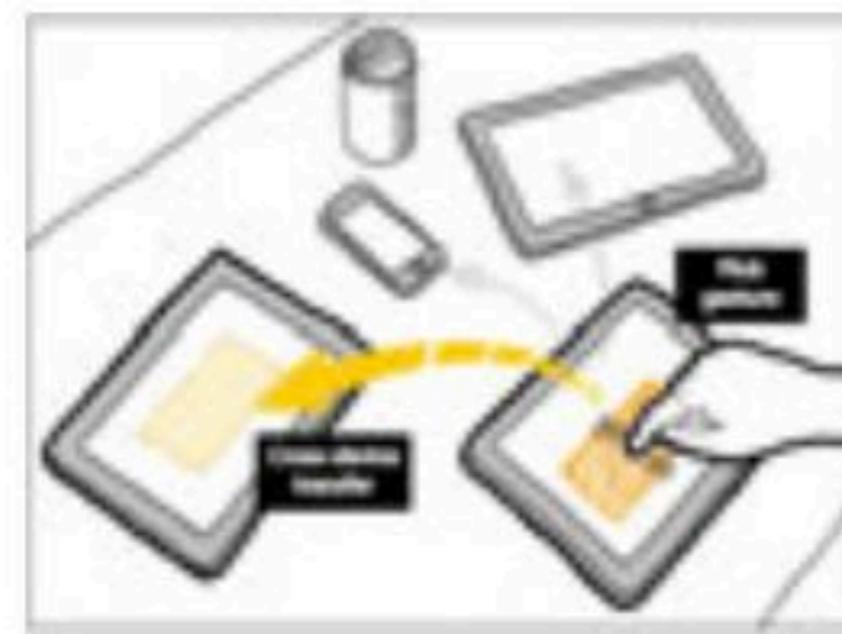
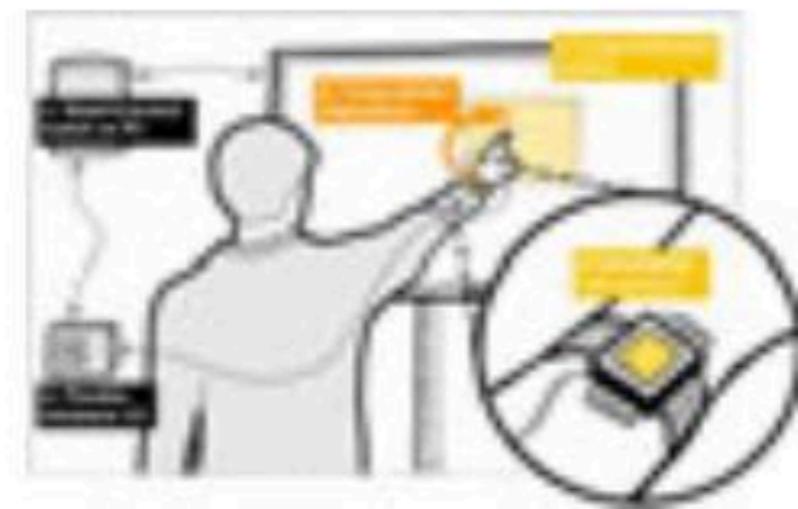
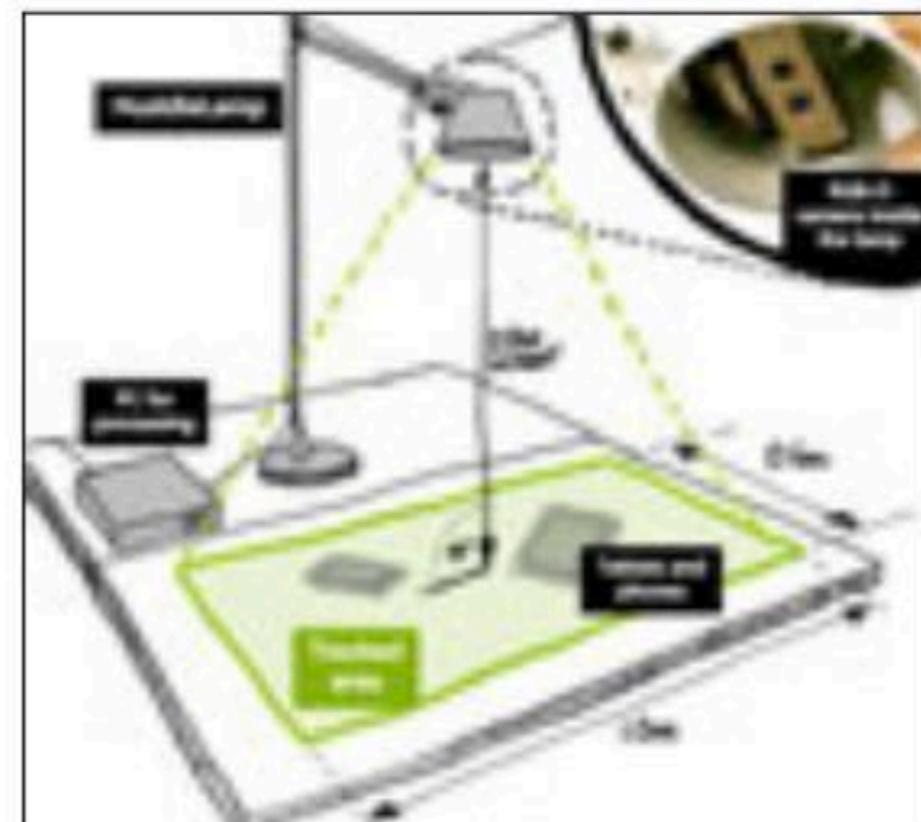
◎ London, England

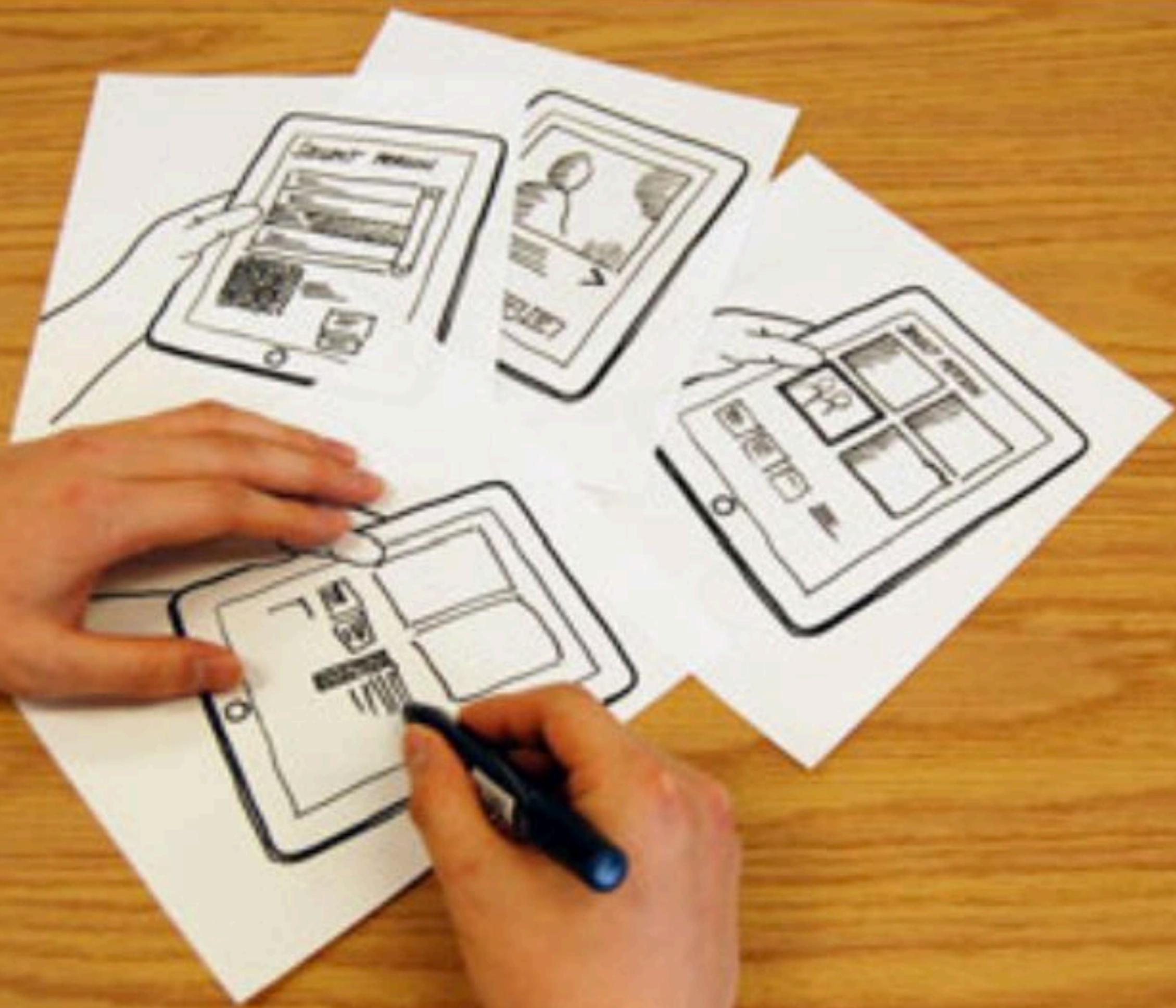
🔗 [nicolaimarquardt.com](http://nicolaimarquardt.com)

加入2009年6月

10 個相片或影片







**In this course:**  
Behind-the-scenes look  
+ hands-on activities

# Why sketching?

## **Sketching**

::allows to implement an idea without writing codes

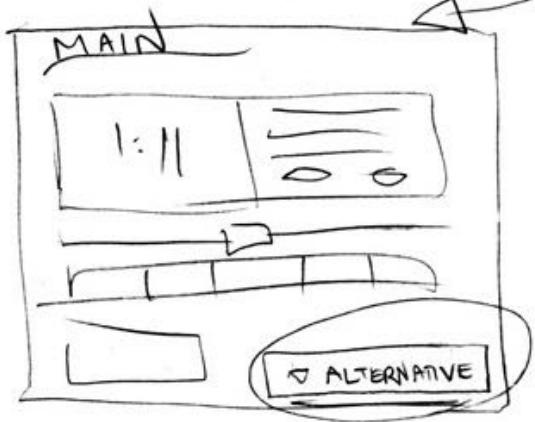
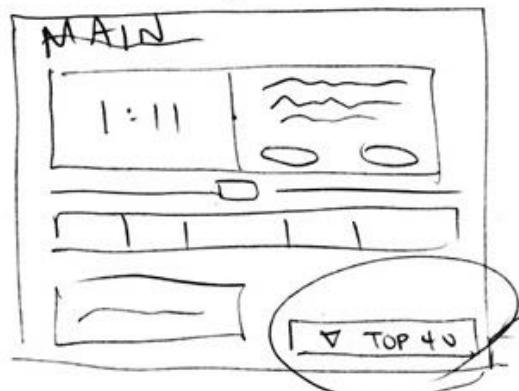


low-fi  
prototyping



high-fi  
prototyping





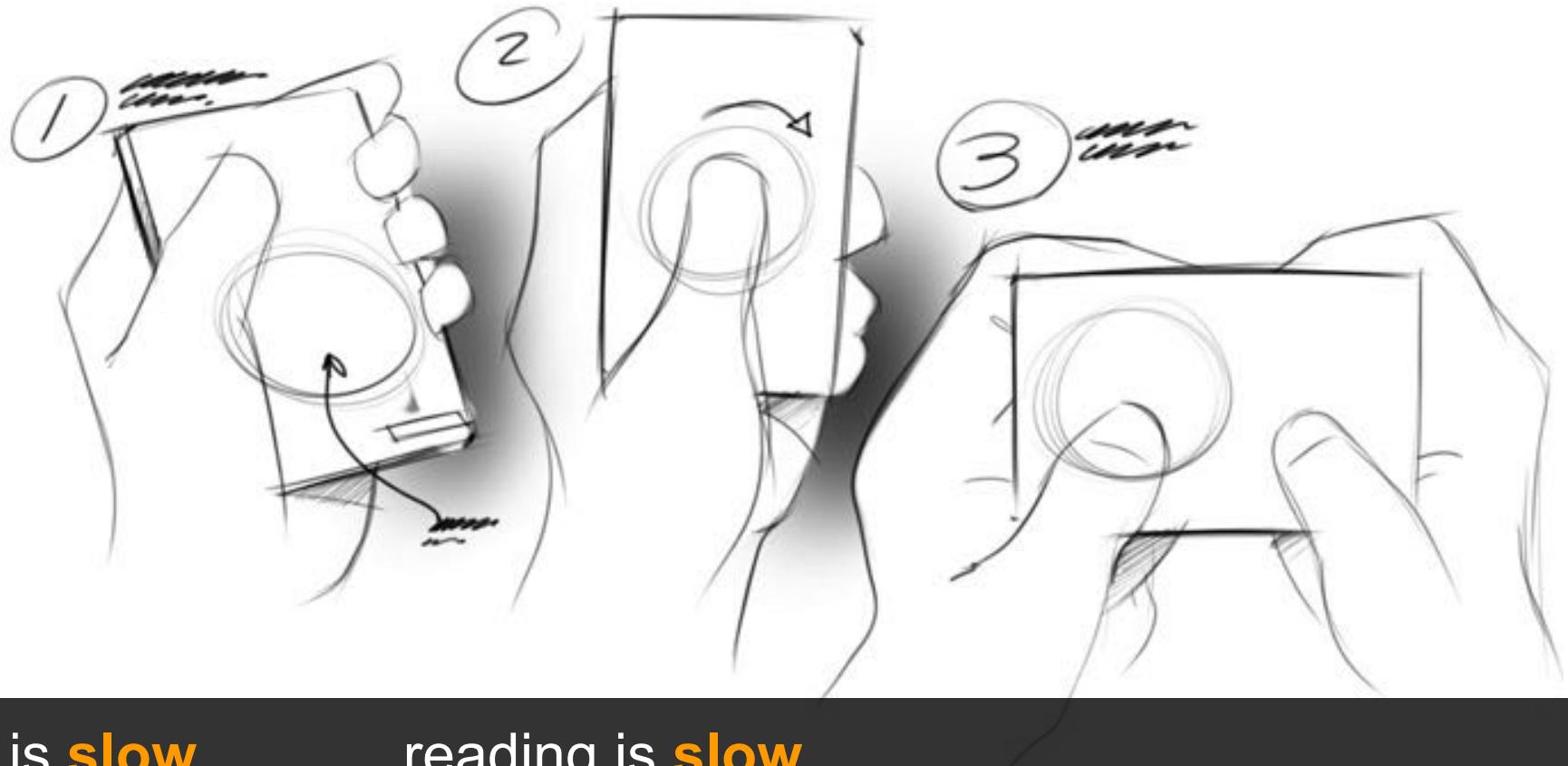
**Sketching** — Paper prototyping — Video prototyping — Functional prototyping



low-fi  
prototyping

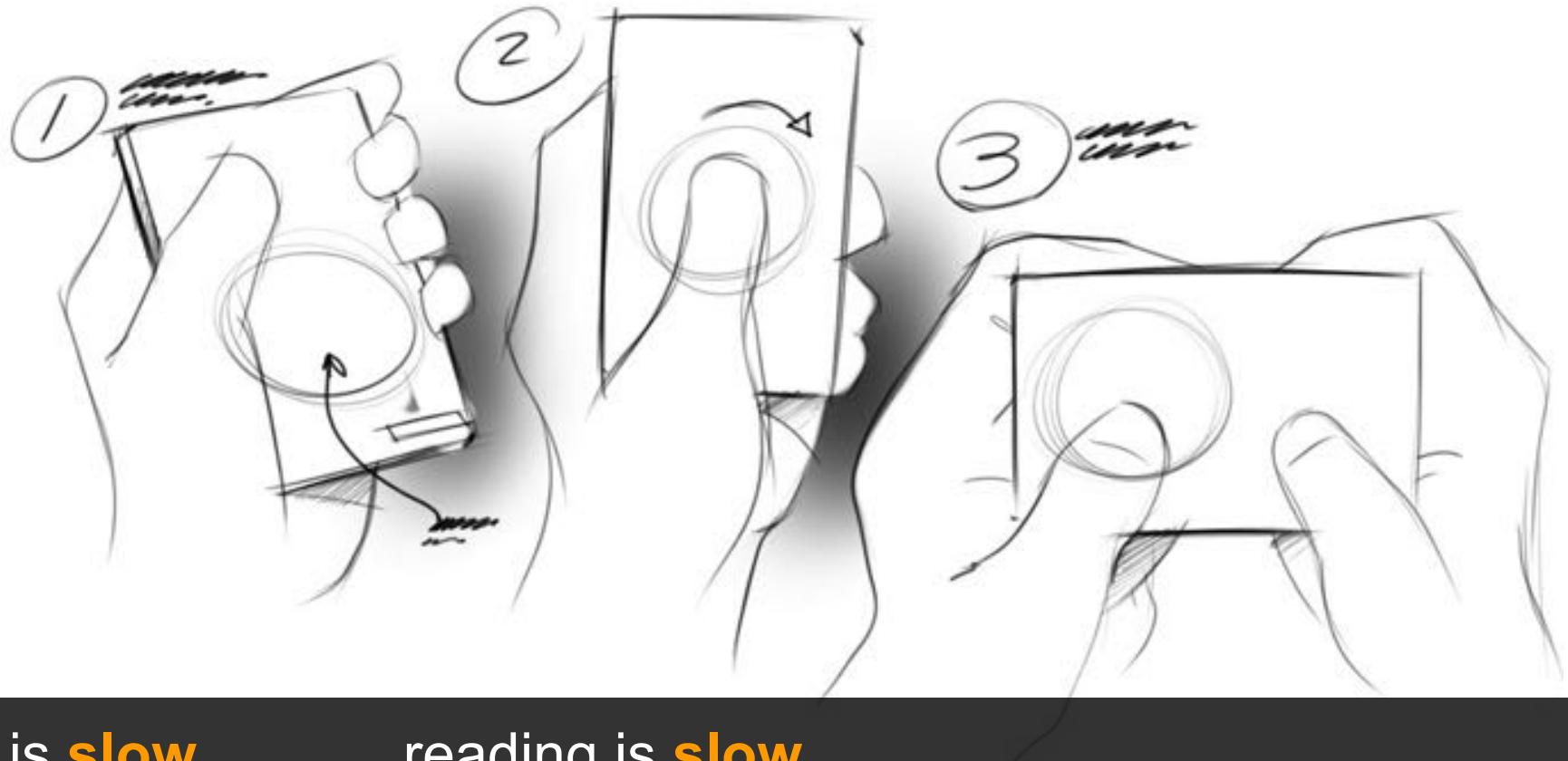
high-fi  
prototyping

- why is sketching so essential for idealization / brainstorming?  
**why not just write down** my ideas?



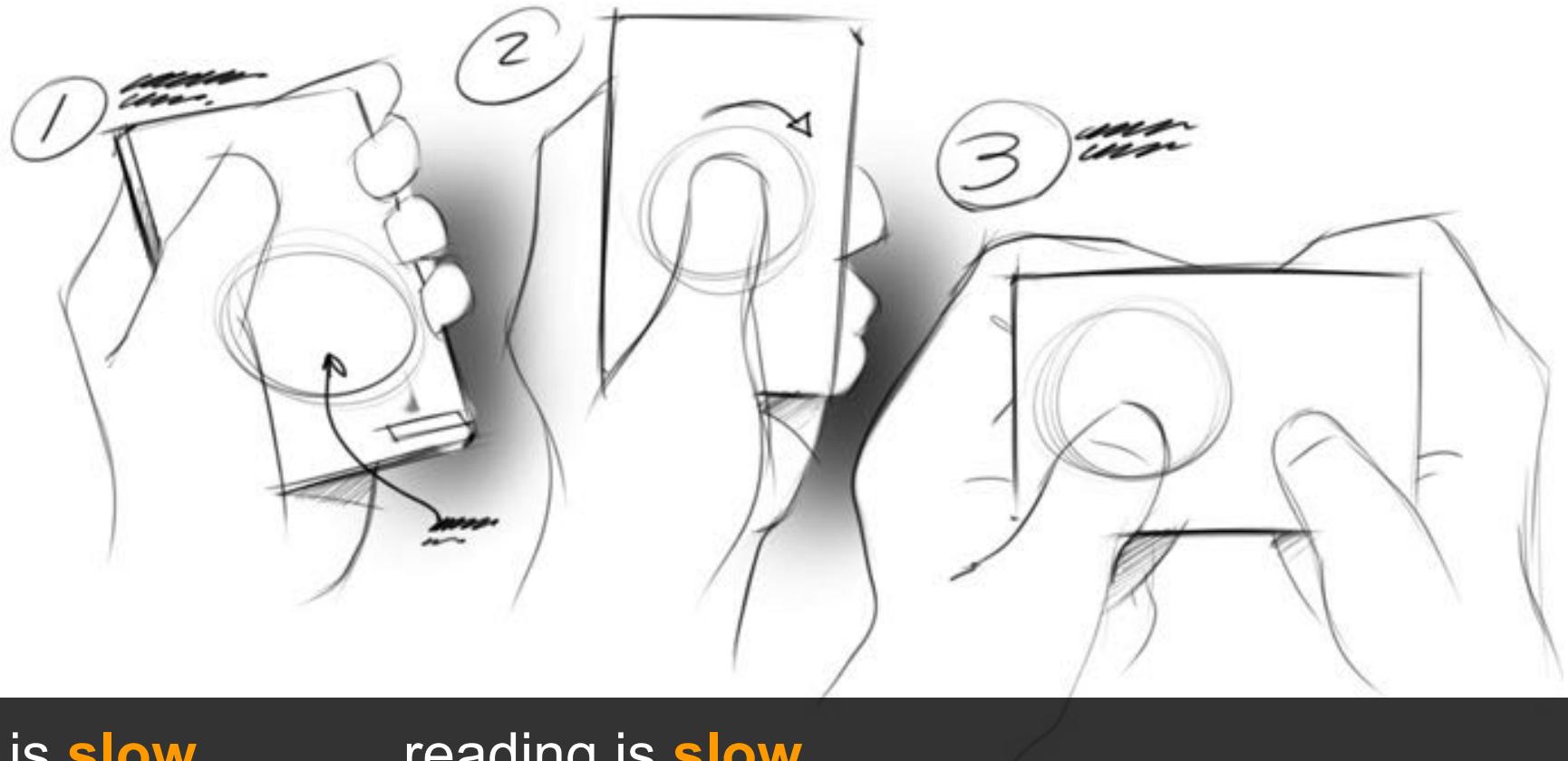
•writing is **slow**

reading is **slow**



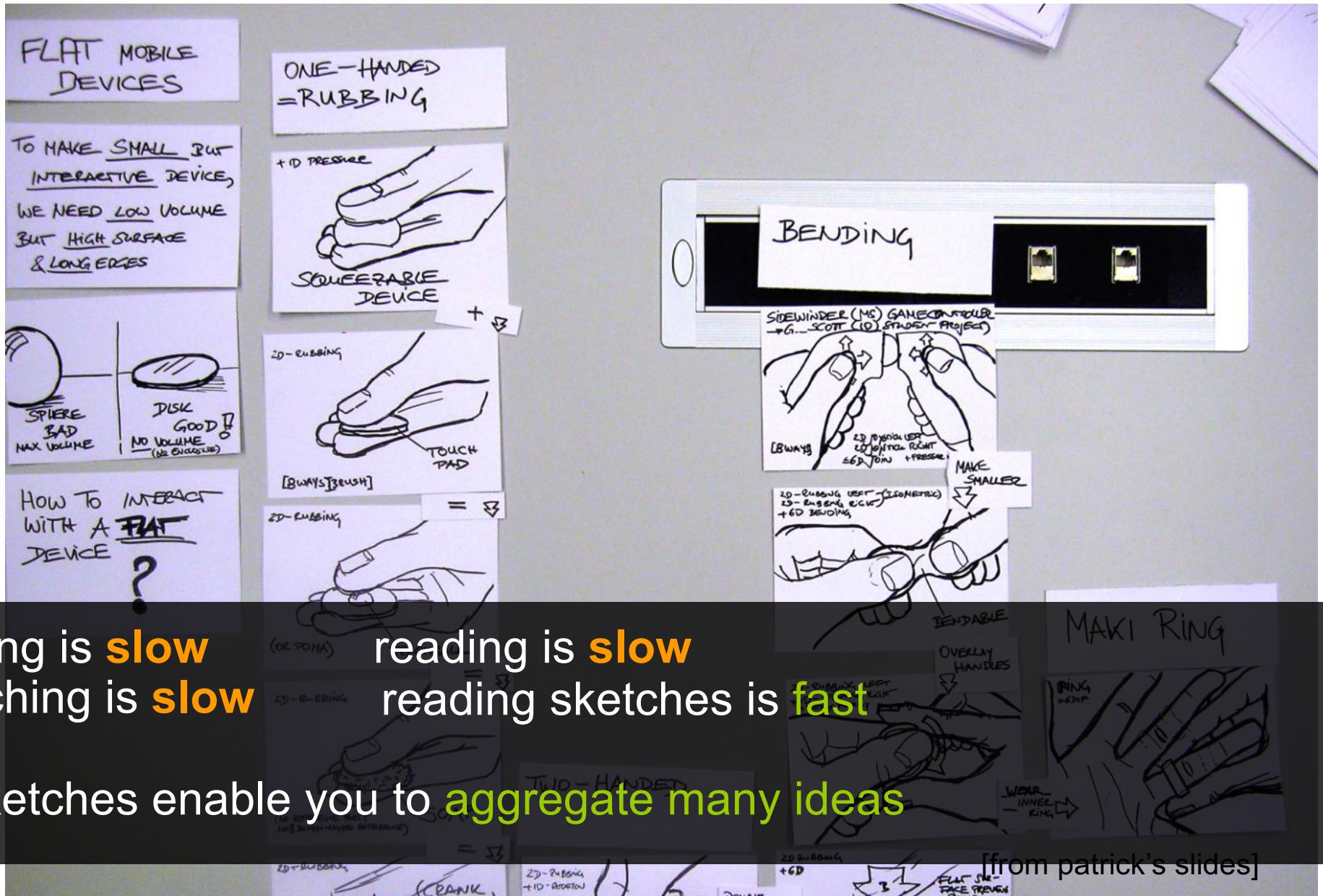
•writing is **slow**  
sketching is **slow**

reading is **slow**



•writing is **slow**  
sketching is **slow**

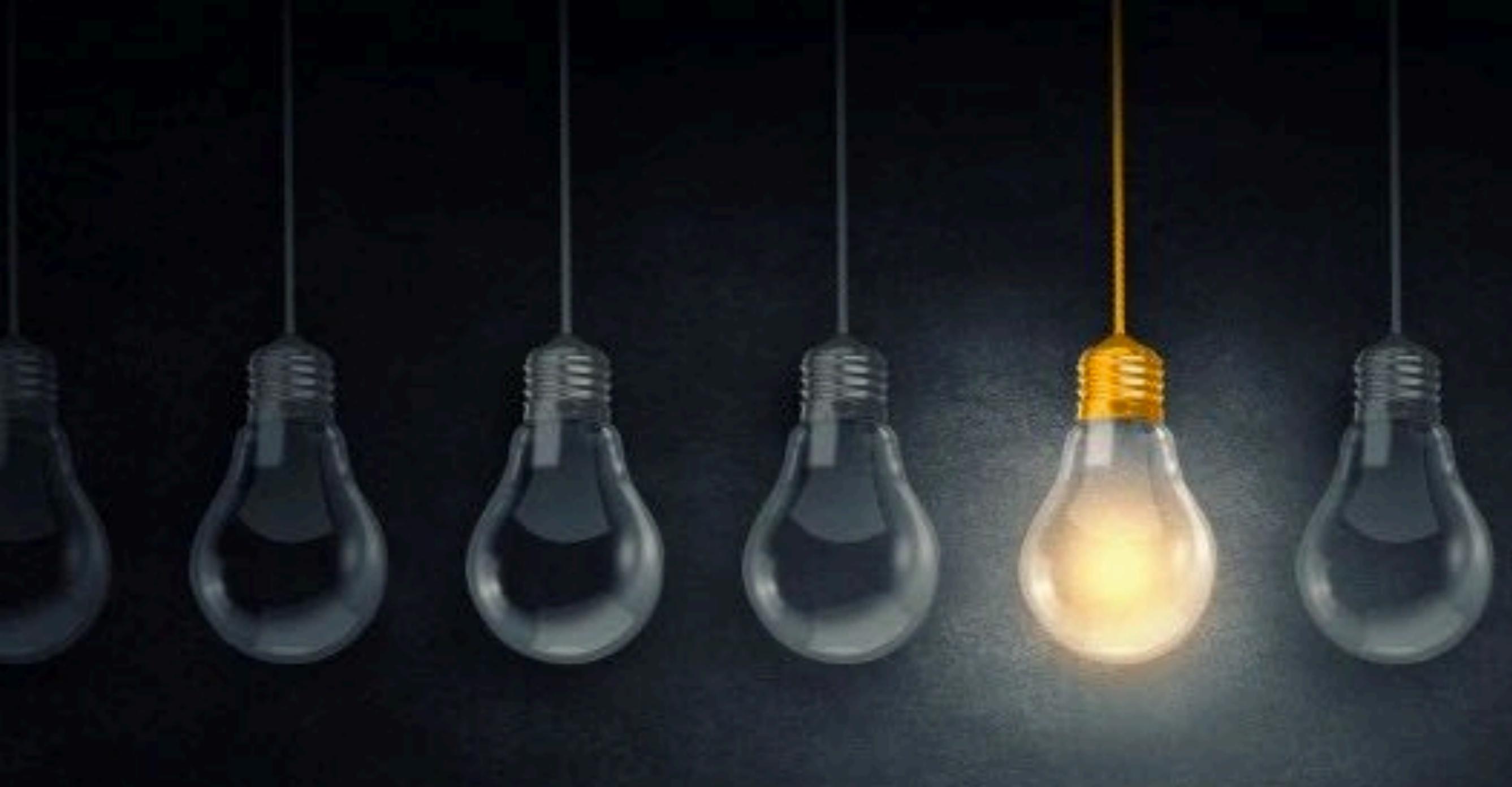
reading is **slow**  
reading sketches is **fast**



•writing is **slow**  
sketching is **slow**

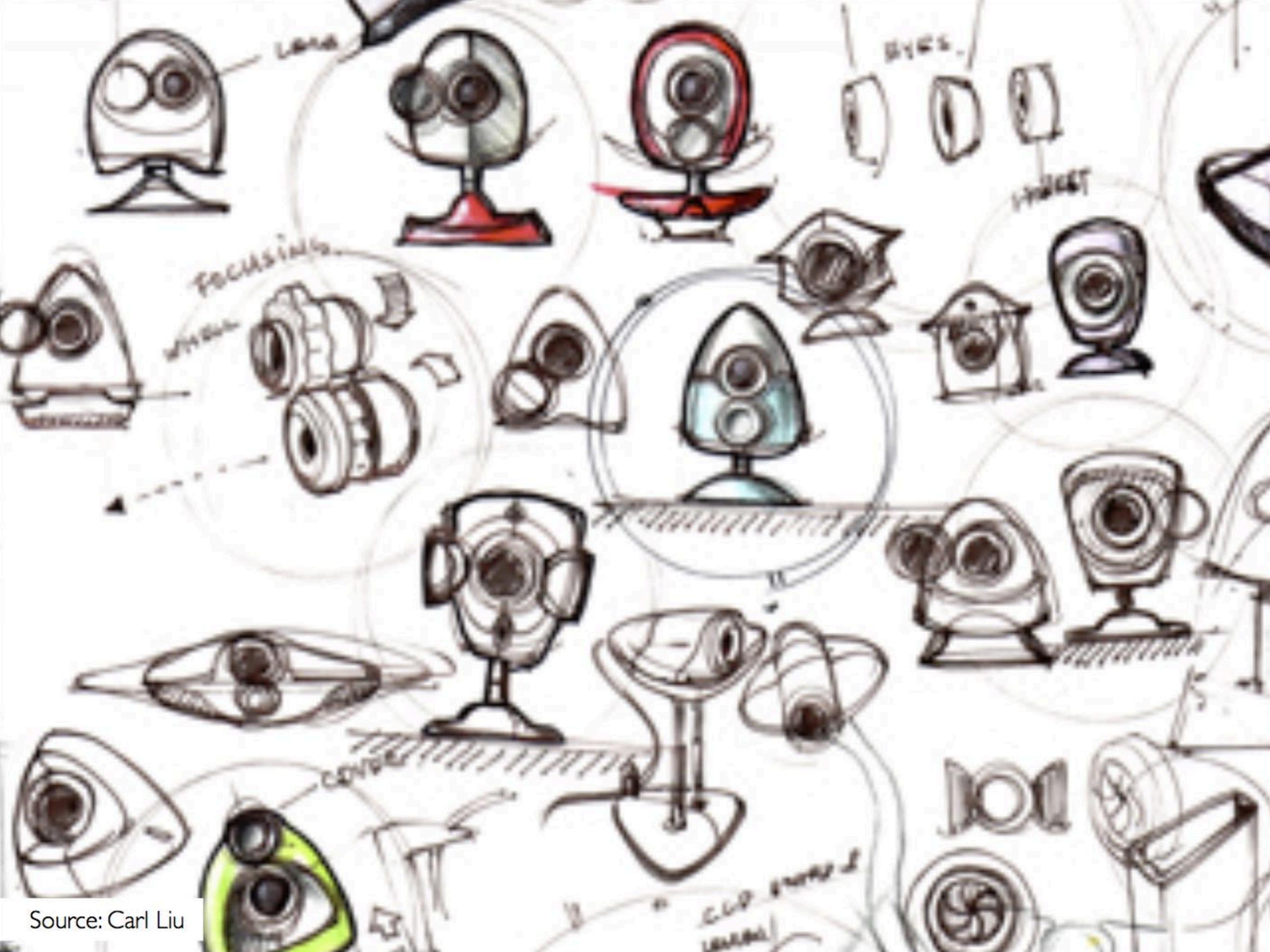
reading is **slow**  
reading sketches is **fast**

→ sketches enable you to **aggregate many ideas**



The best way to have a good idea  
is to have lots of ideas.

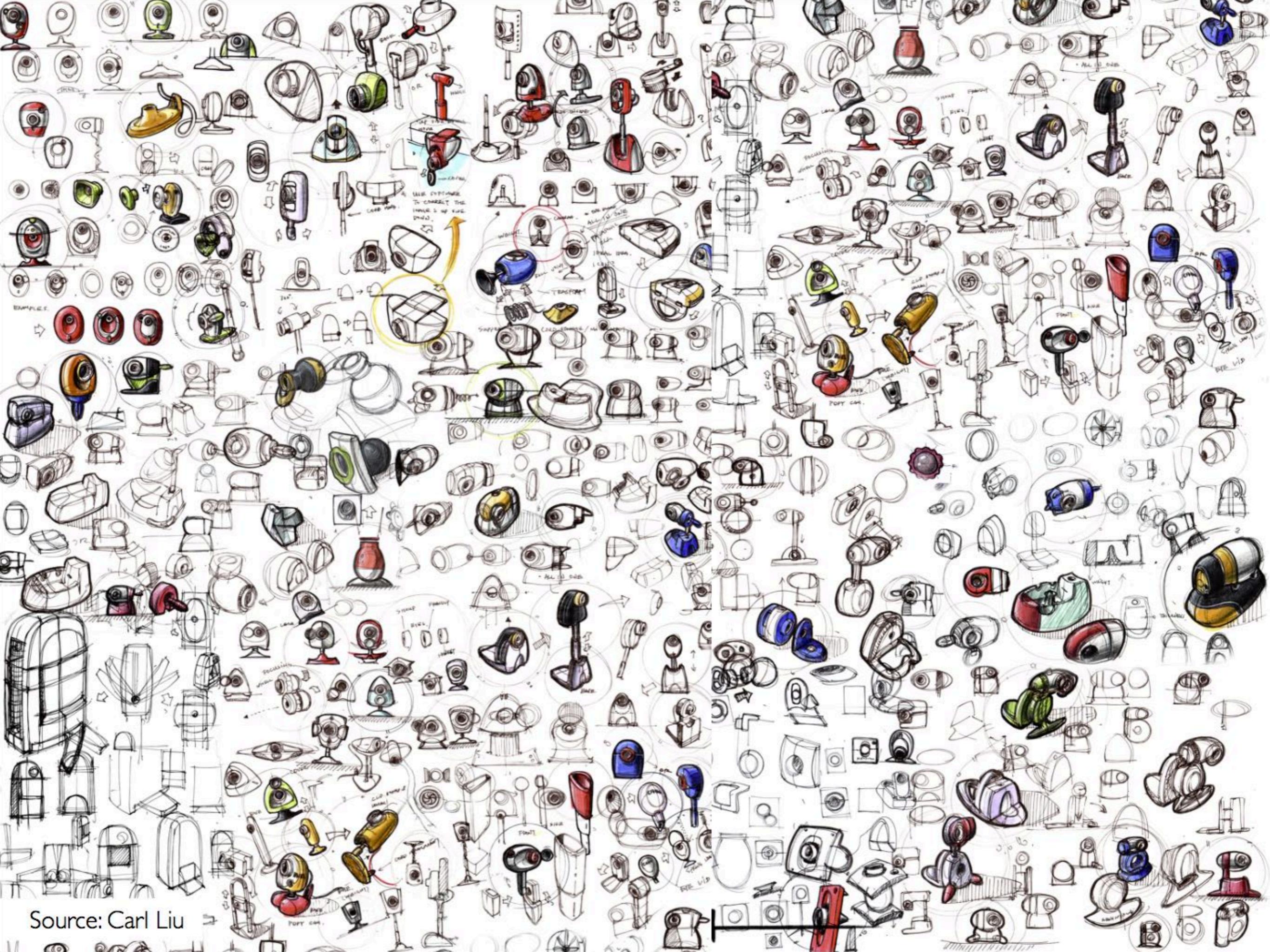
- Linus Pauling



Source: Carl Liu



Source: Carl Liu



Source: Carl Liu

# getting the design right vs. getting the right design

CHI 2006 Proceedings • Usability Methods

April 22-27, 2006 • Montréal, Québec, Canada

## (Bill Buxton)

### Getting the Right Design and the Design Right: Testing Many Is Better Than One

**Maryam Tohidi**  
University of Toronto  
Toronto, Canada  
mtohidi@dgp.toronto.edu

**William Buxton**  
Microsoft Research  
Toronto, Canada  
bill@billbuxton.com

**Ronald Baecker**  
University of Toronto  
Toronto, Canada  
rmb@kmdi.utoronto.ca

**Abigail Sellen**  
Microsoft Research  
Cambridge, UK  
asellen@microsoft.com

#### ABSTRACT

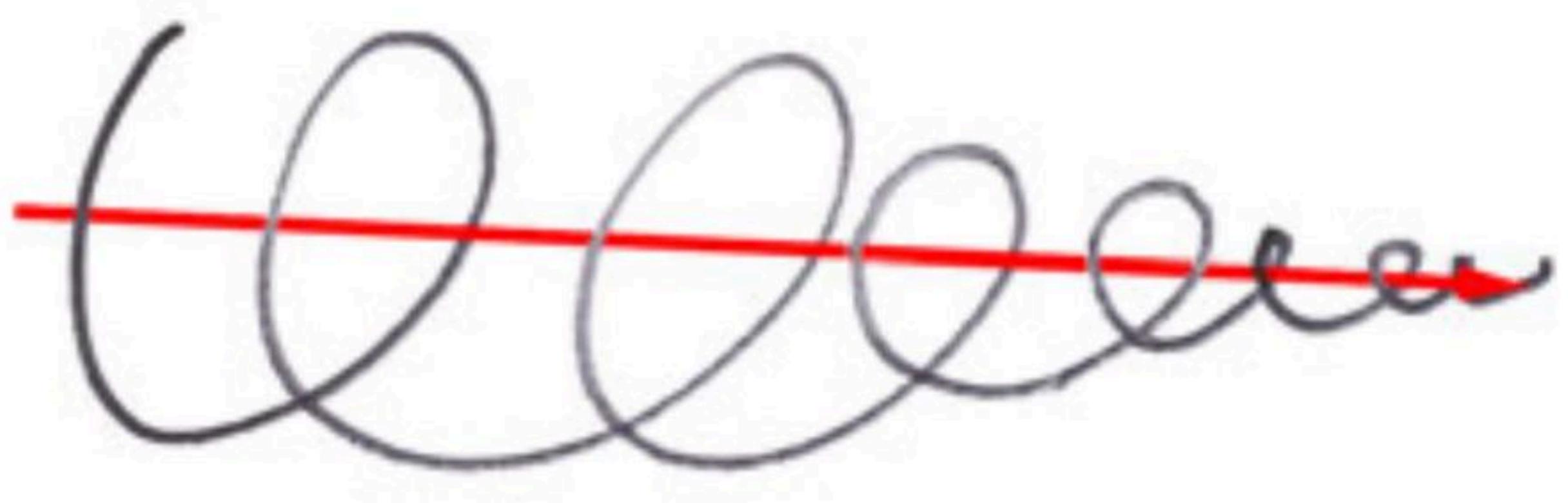
We present a study comparing usability testing of a single interface versus three functionally equivalent but stylistically distinct designs. We found that when presented with a single design, users give significantly higher ratings and were more reluctant to criticize than when presented with the same design in a group of three. Our results imply that by presenting users with alternative design solutions, subjective ratings are less prone to inflation and give rise to more and stronger criticisms when appropriate. Contrary to our expectations, our results also suggest that usability testing by itself, even when multiple designs are presented, is not an effective vehicle for soliciting constructive suggestions about how to improve the design from end users. It is a means to identify problems, not provide

Much of the often cited literature [11, 14] emphasizes the use of paper prototypes in usability testing [8]. The primary benefit in this case is to provide an inexpensive way to refine a design earlier in the process than would otherwise be possible. In this, they serve as an aid in *getting the design right*.

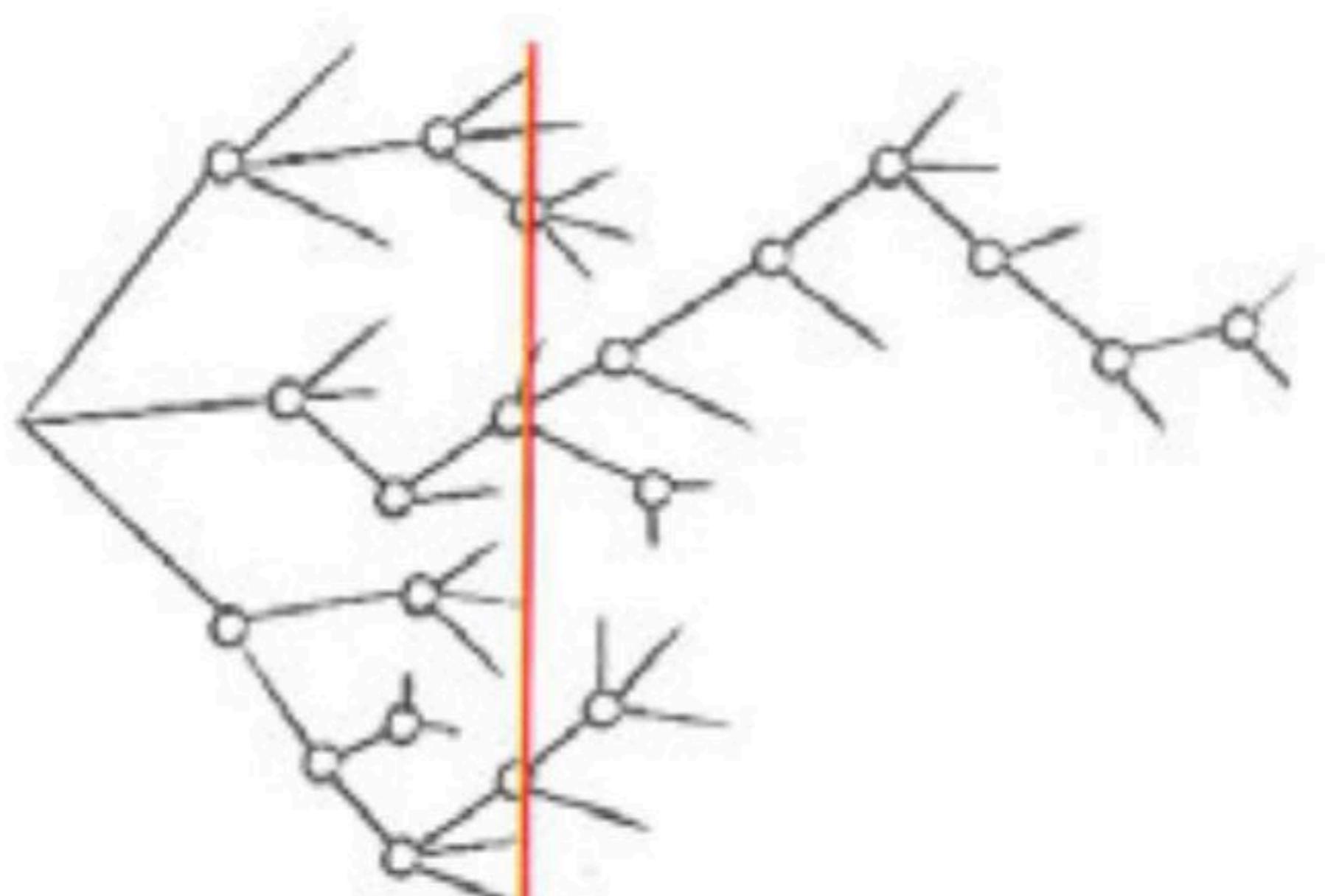
Another aspect of the relatively low cost of paper prototypes is their potential to enable the early exploration of more design alternatives than would otherwise be affordable (in time and money). Taking these two things together, an underlying question in our research is, “Can exposing users to multiple design alternatives also help us in *getting the right design?*” Besides helping us improve the usability of any particular design, can they also help us explore alternative designs?



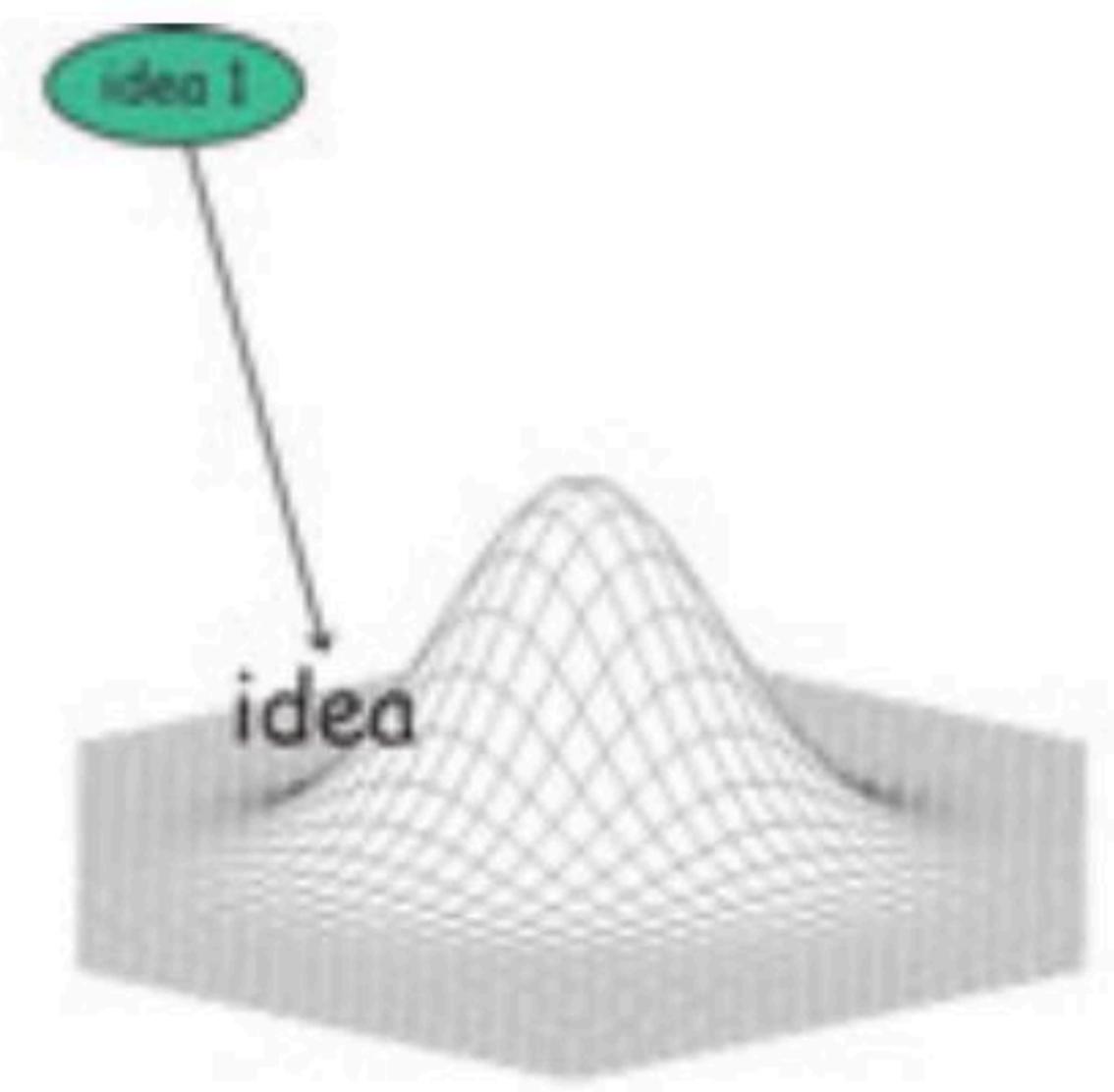
# Buxton - getting the design right



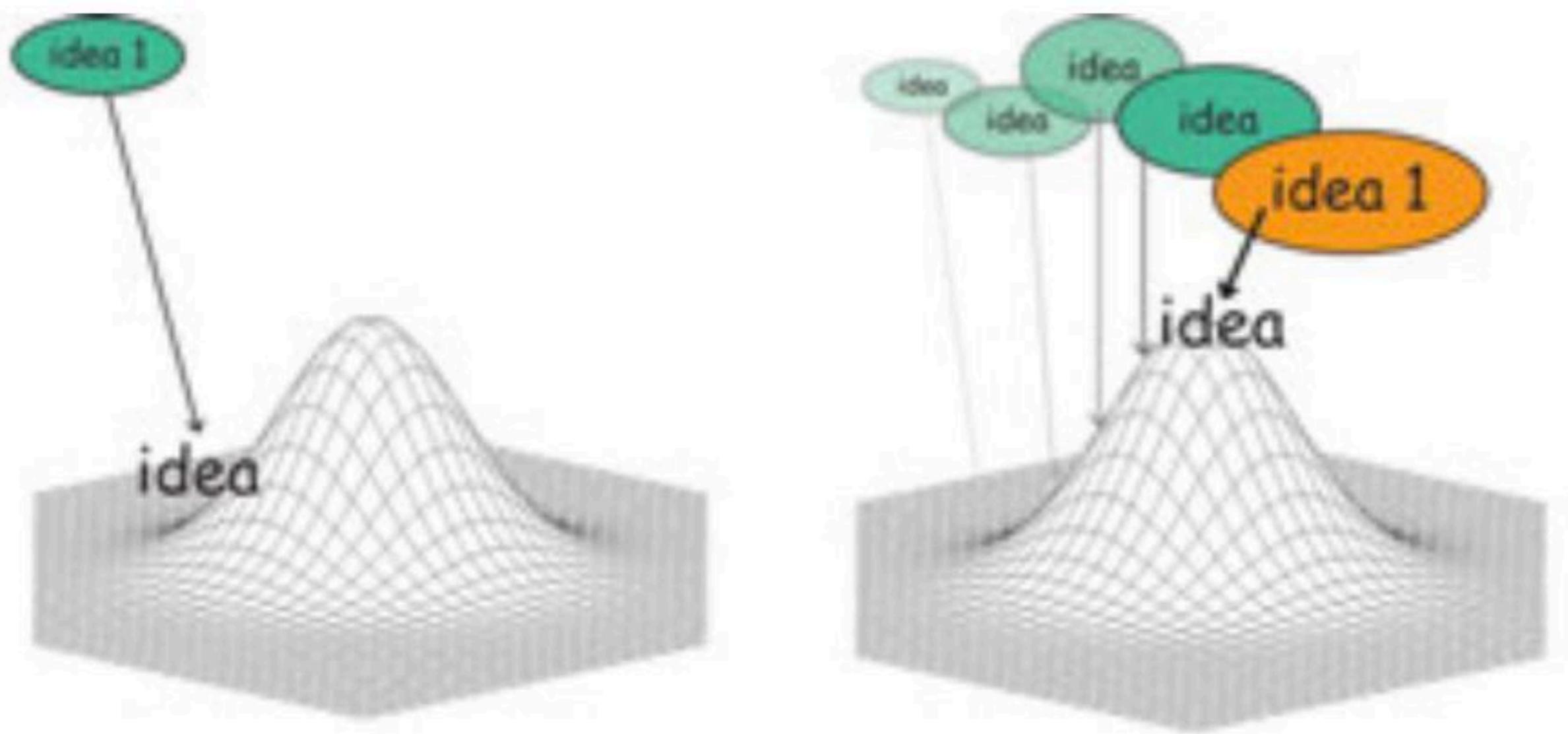
# Instead: Getting the **right** design



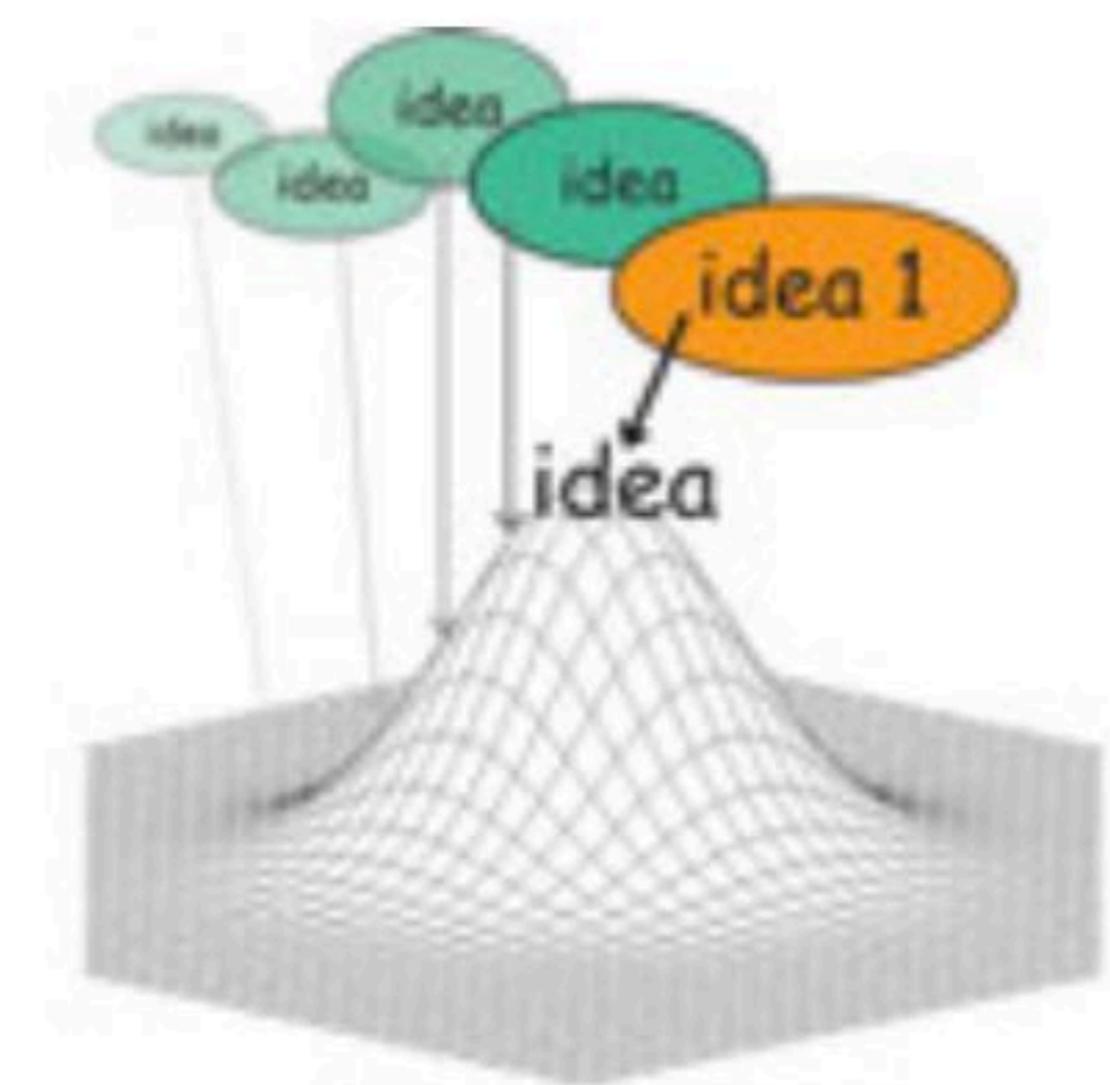
# Buxton - getting the design right

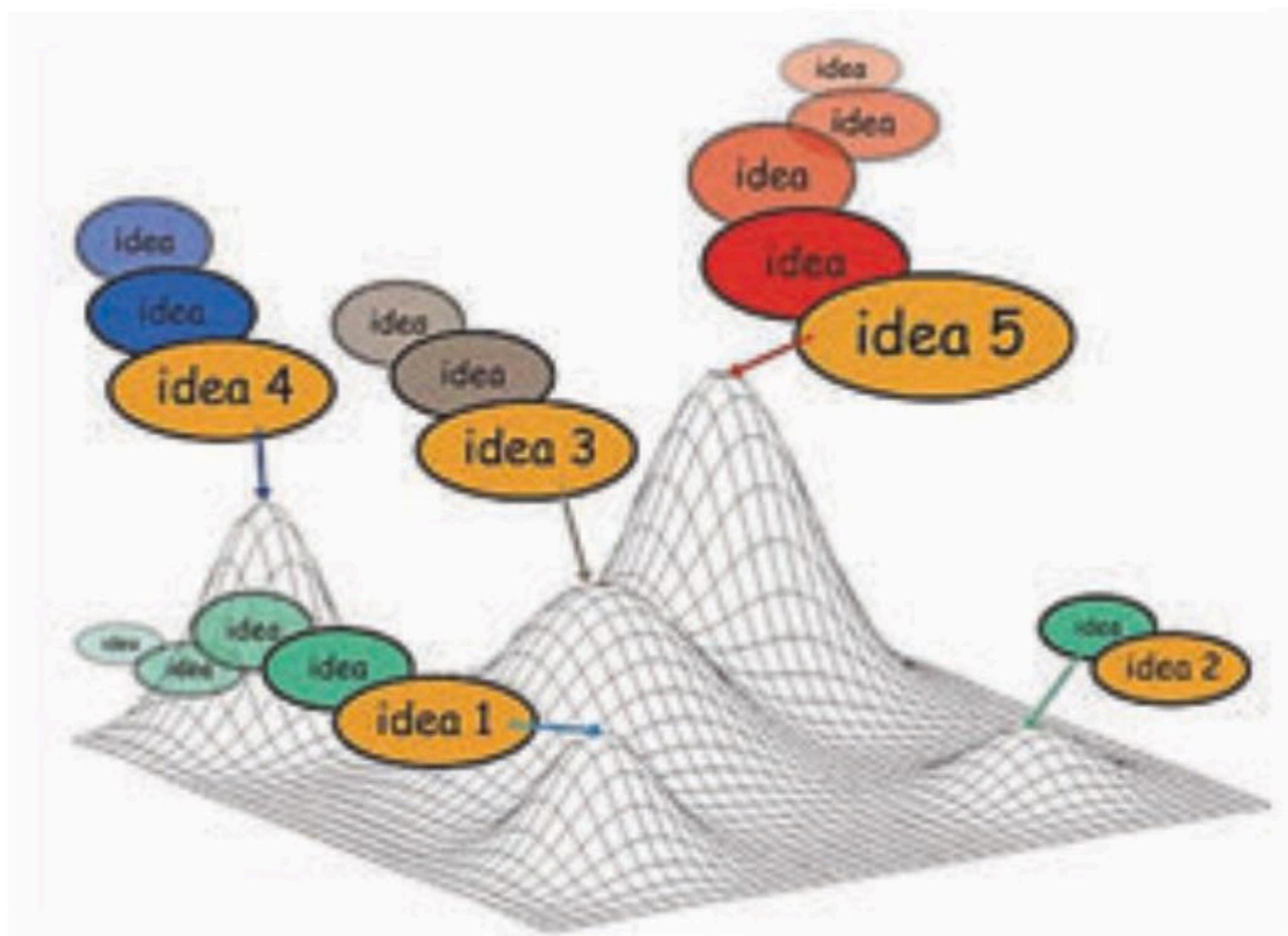


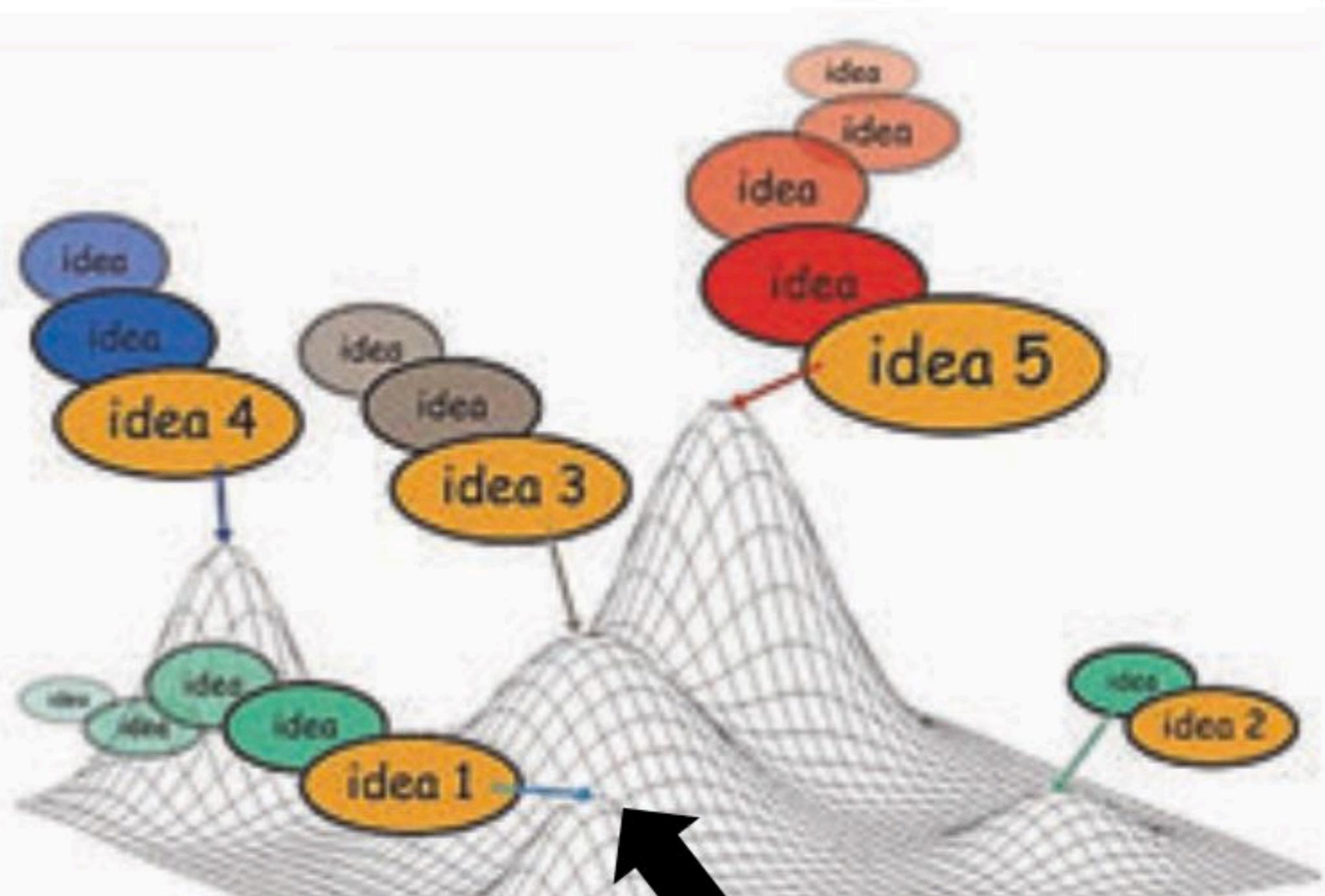
# Buxton - getting the design right



# Buxton - local versus global maxima

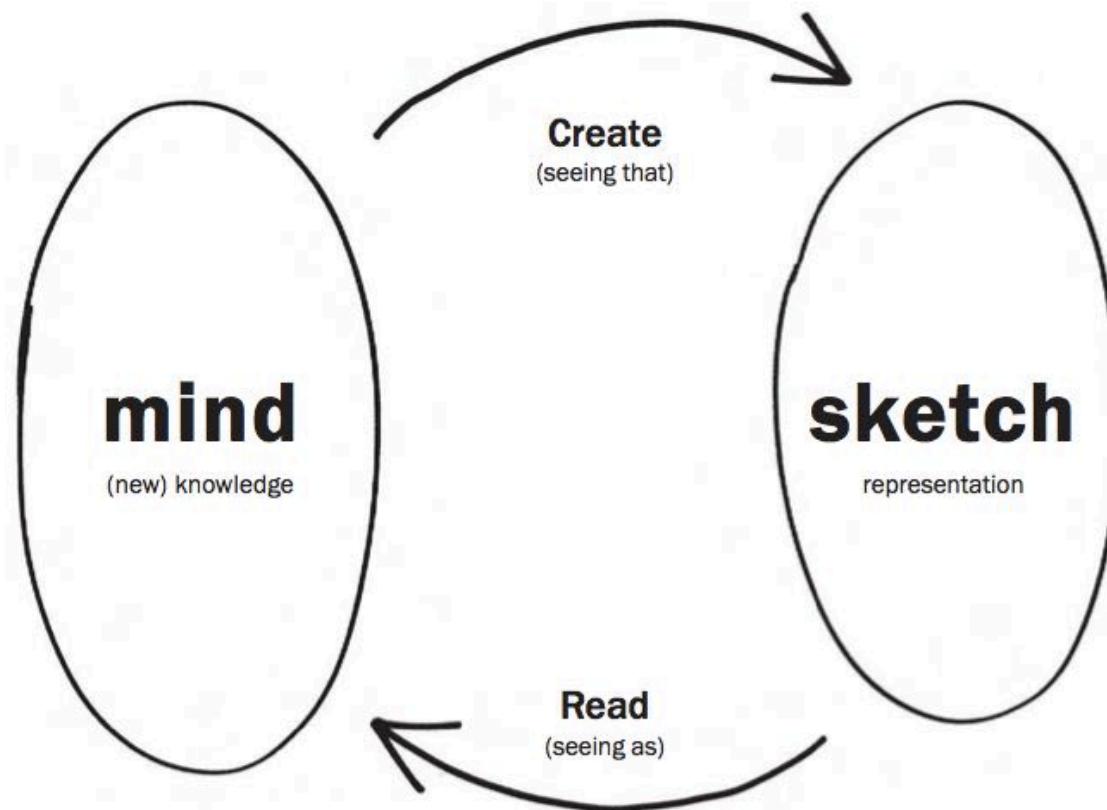






## Problem: Local Hill Climbing

another benefit to sketching is..  
**ambiguous**



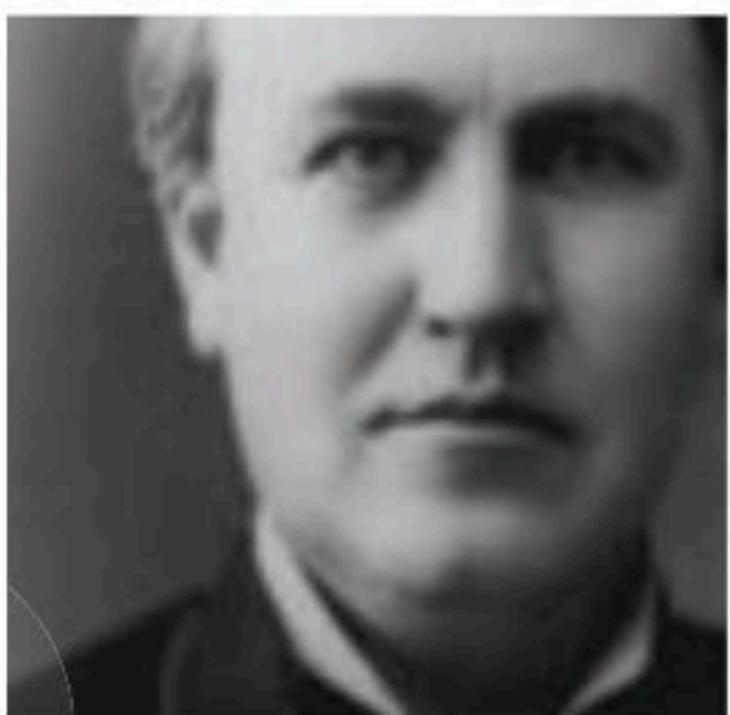
= allowing for double ideas

The “conversation” between the sketch (right bubble) and the mind (left bubble). A sketch is created from current knowledge (top arrow). Reading, or interpreting the resulting representation (bottom arrow), creates new knowledge. The creation results from what Goldschmidt calls “seeing that” reasoning, and the extraction of new knowledge results from what she calls “seeing as.”

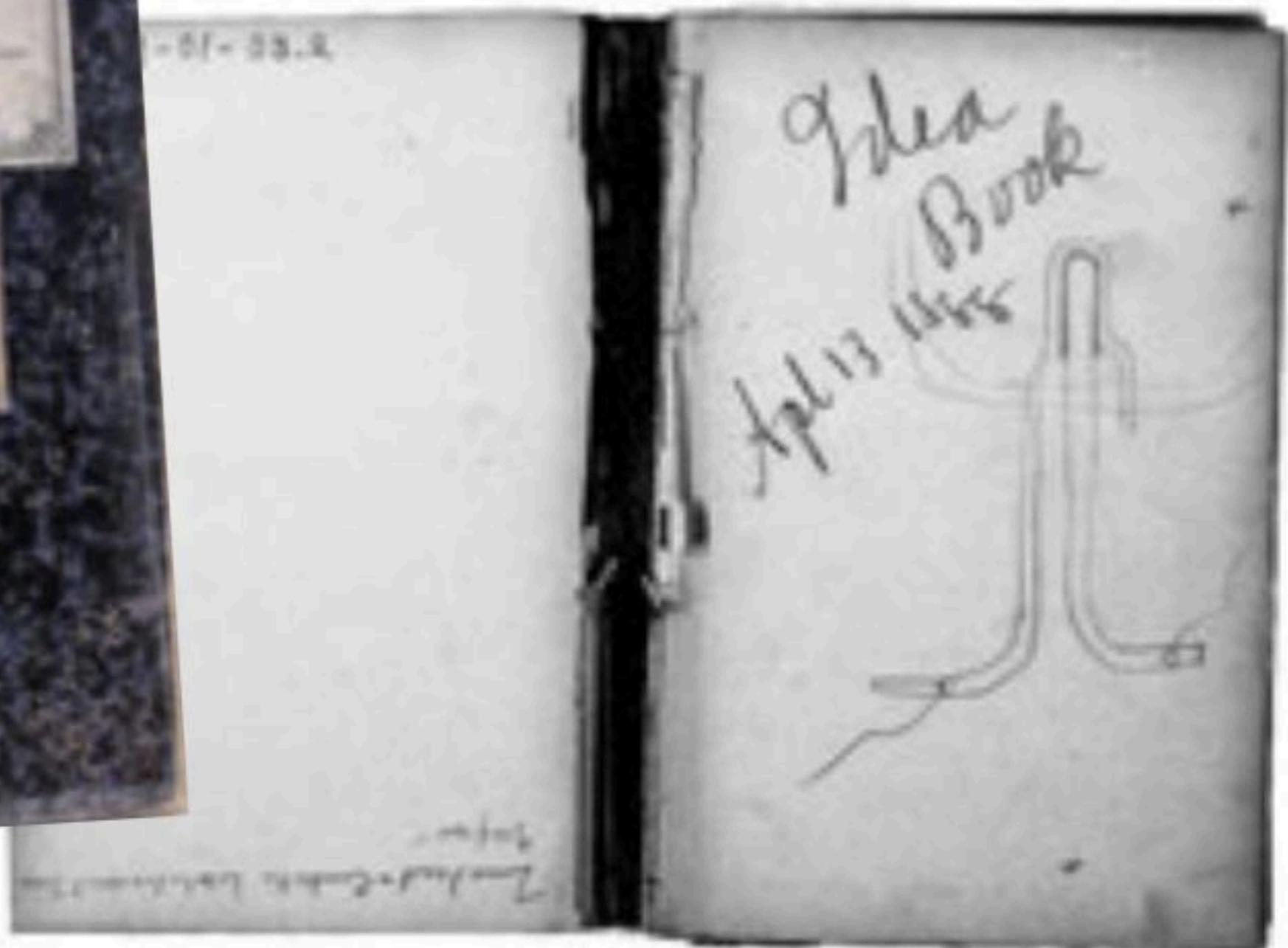
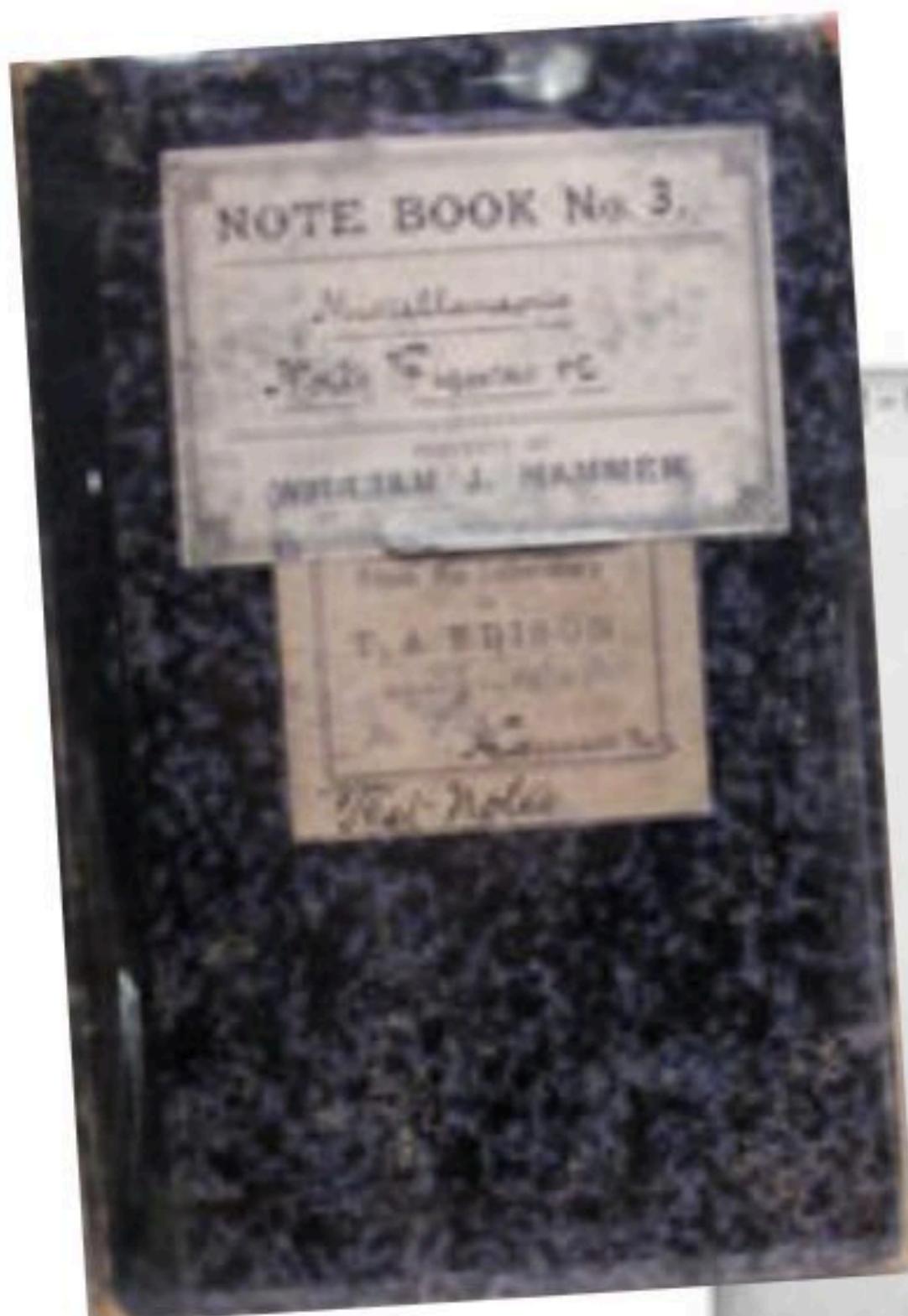
[Bill Buxton, sketching user experience]

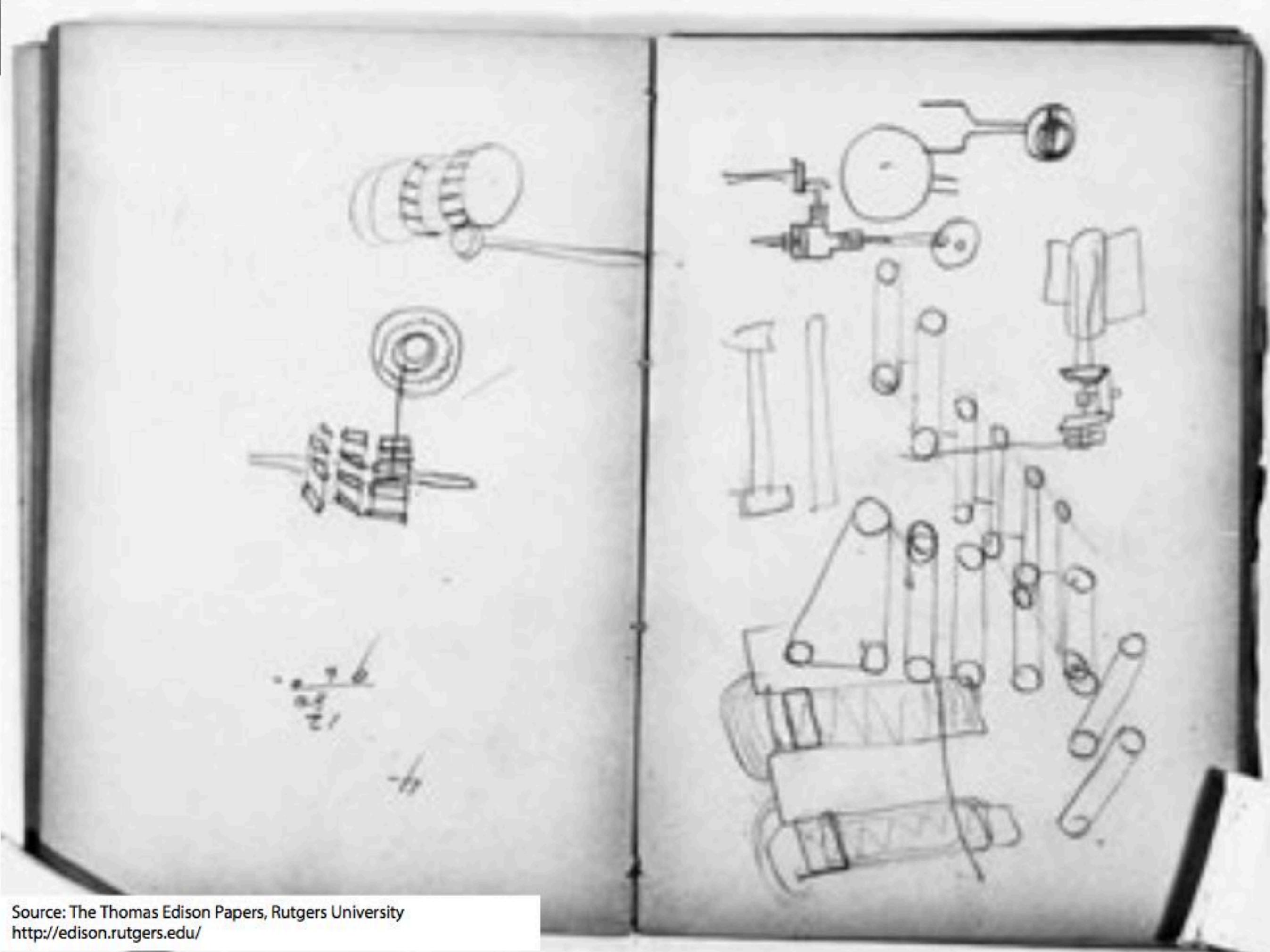
# Motivation:

## A short story about visual thinking and sketching

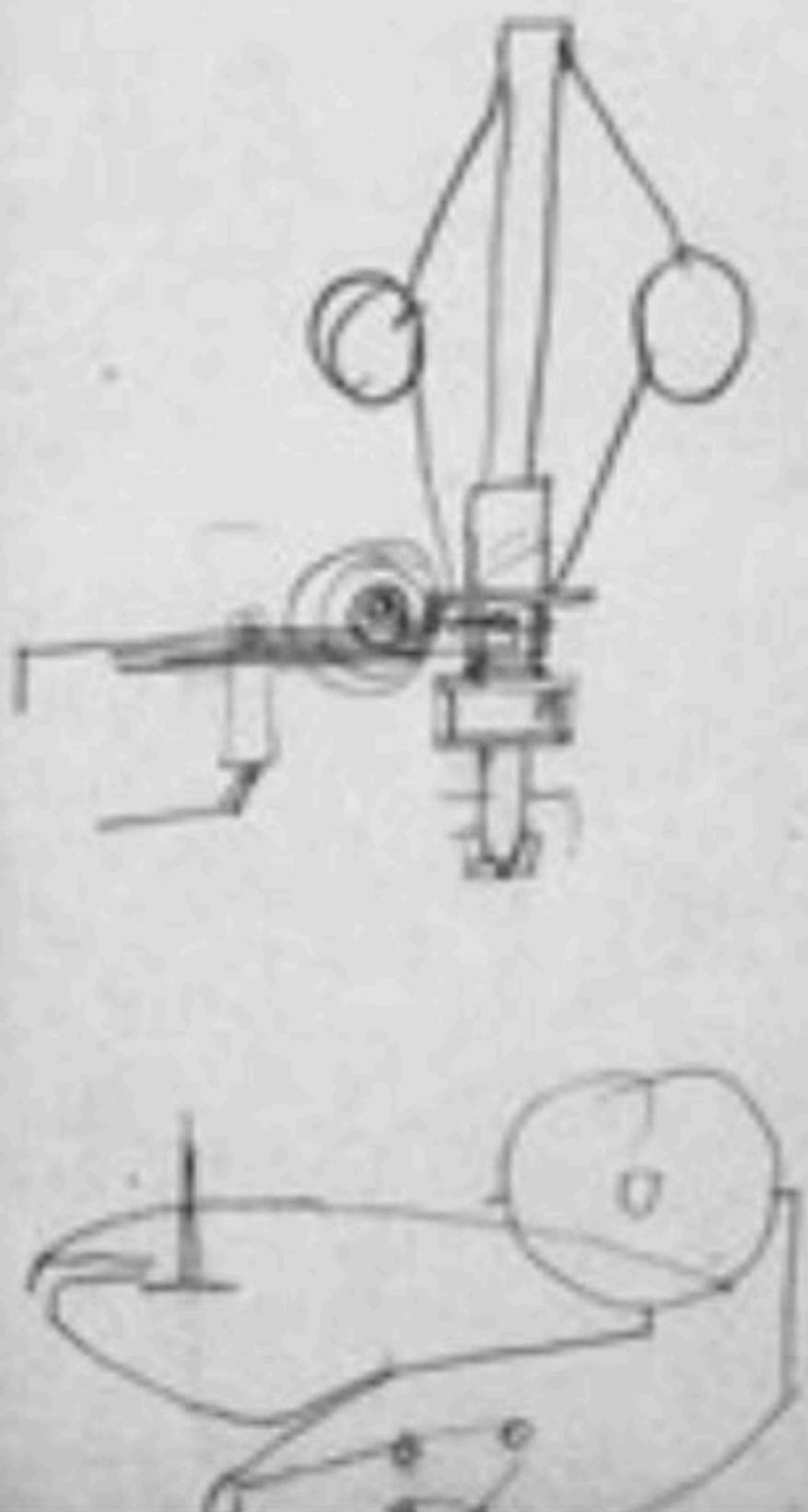


# Thomas Alva Edison | Inventor

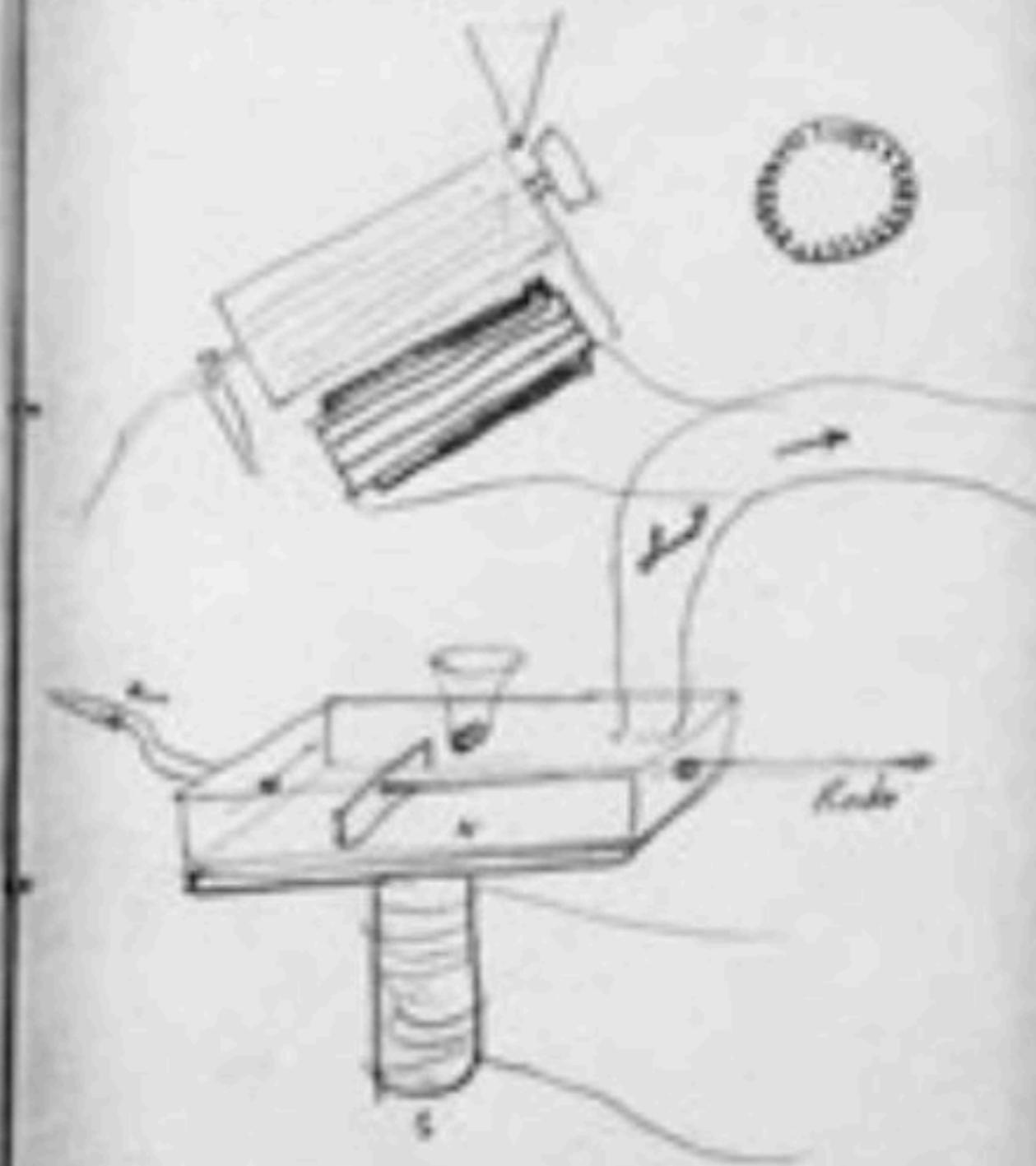




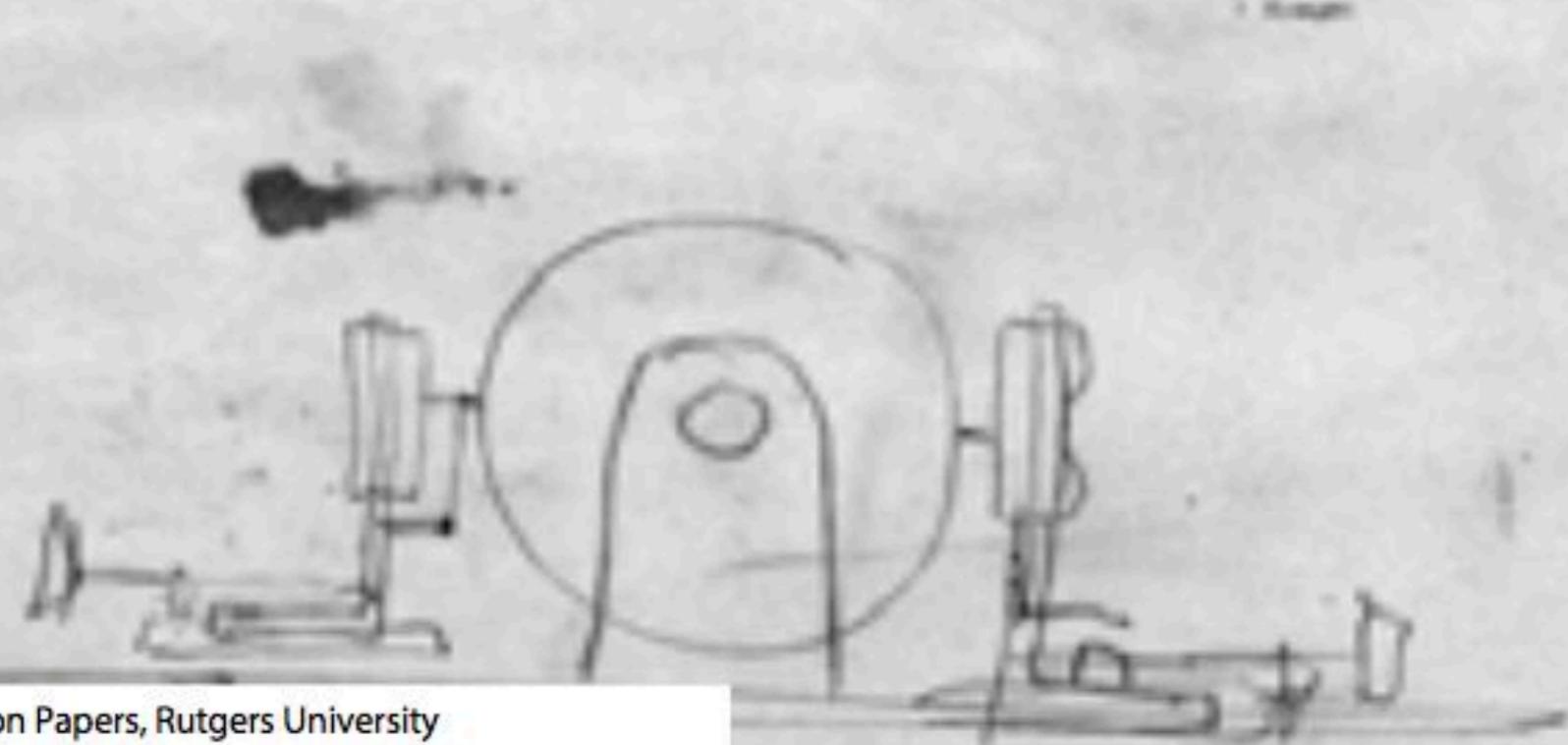
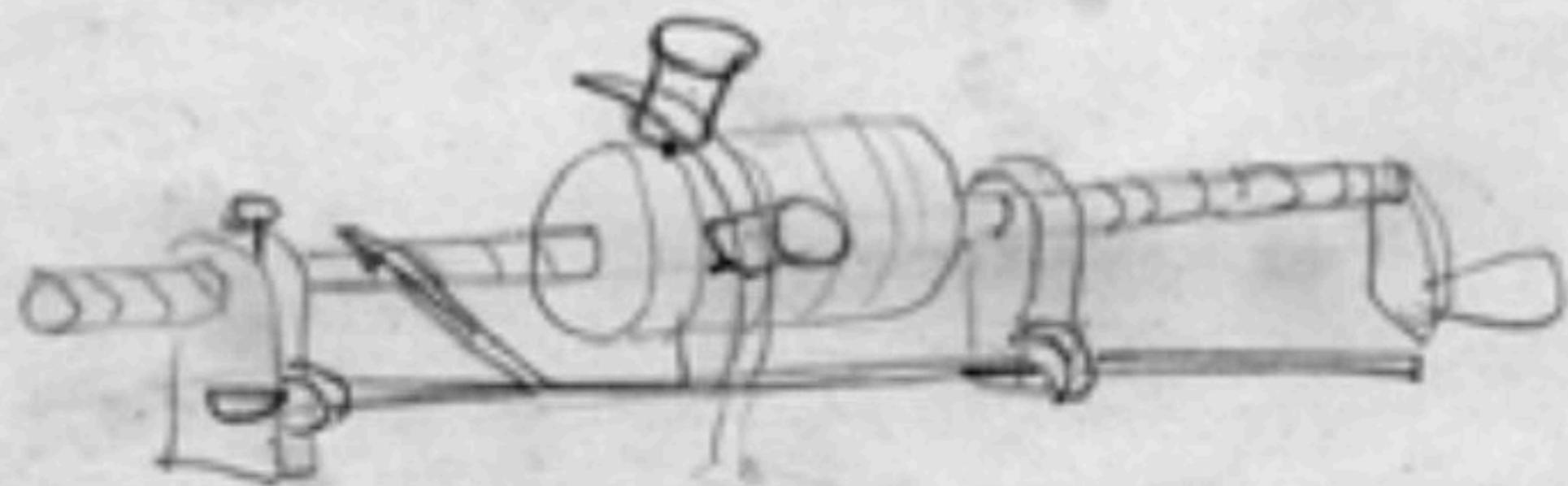
Pm

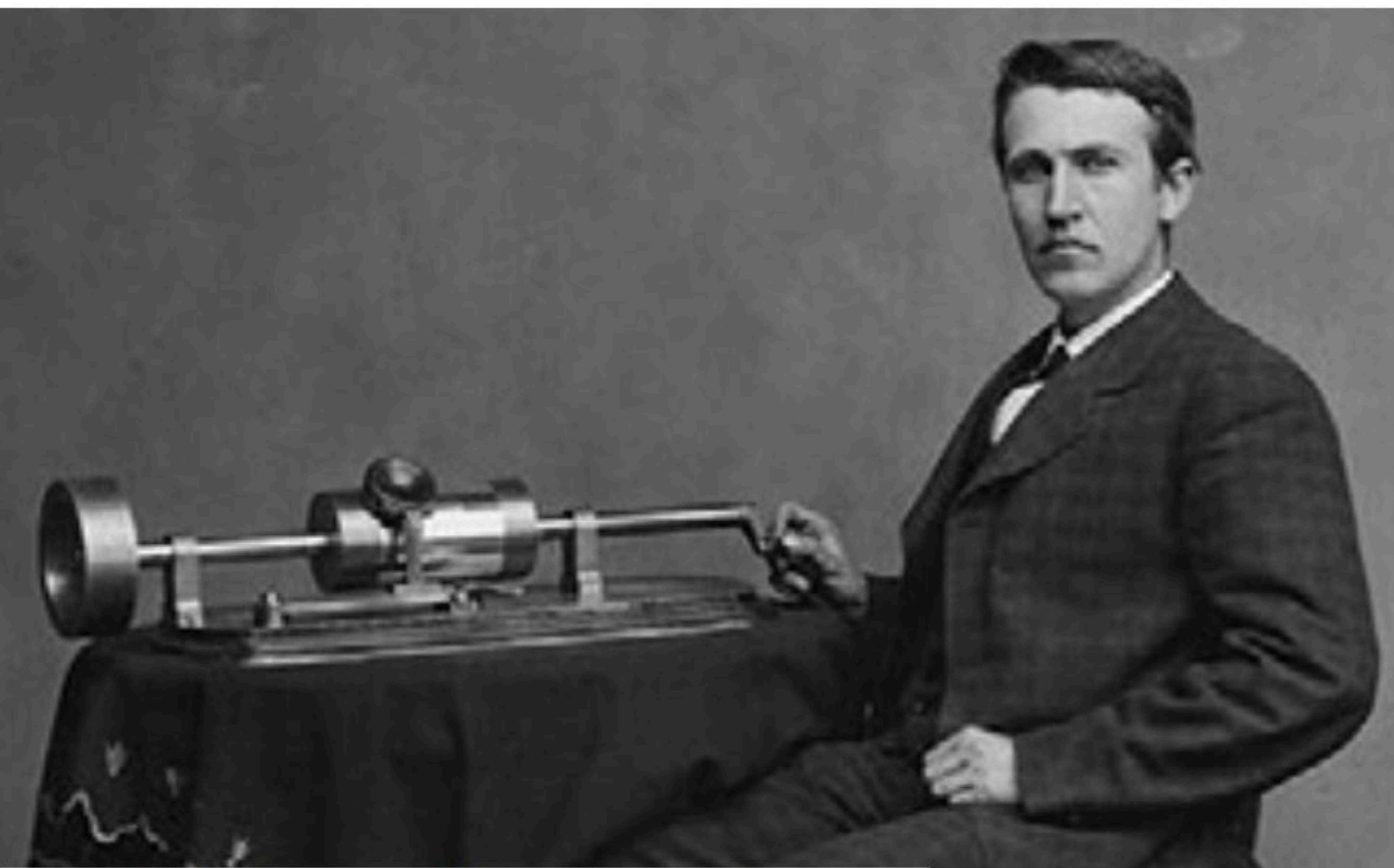


Concord April 29, 89



Char Balschke  
J. F. Kline.

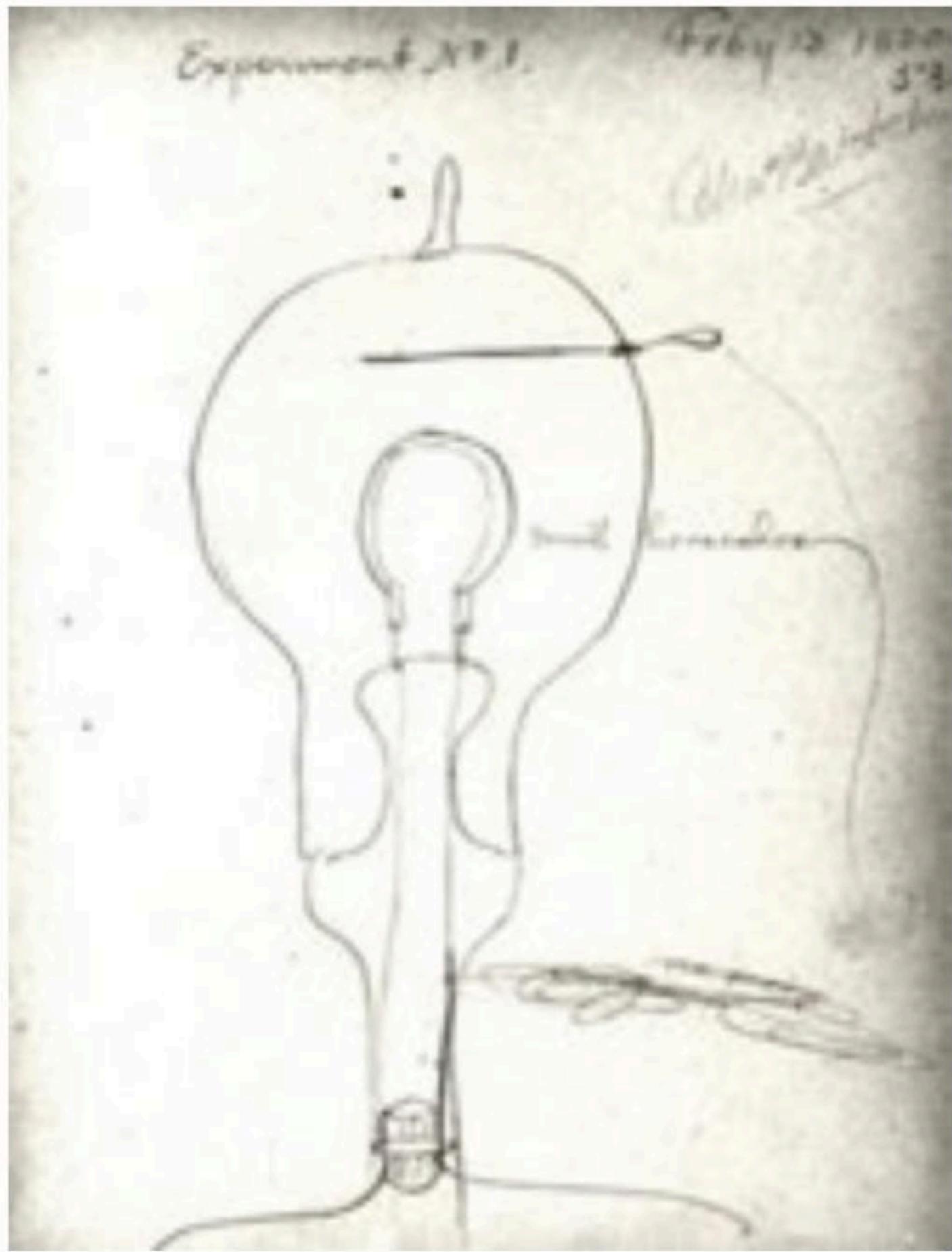
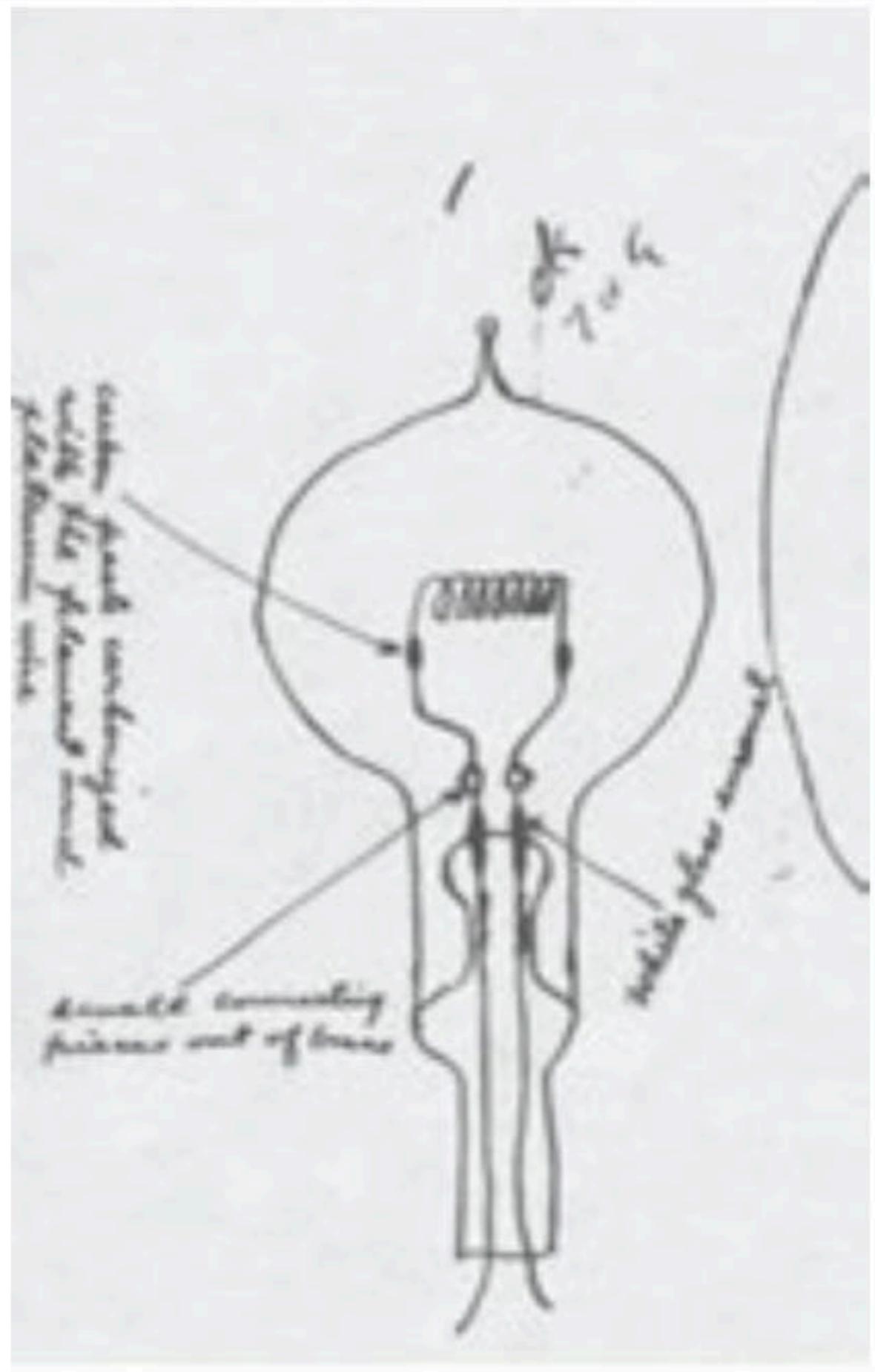




Source: Levin C. Handy (<http://hdl.loc.gov/loc.pnp/cwpbh.04326>) - United States Library of Congress's Prints and Photographs division, digital ID cwpbh.04044.

forms of spiral





Edison and his staff  
created over

**2500**

notebooks with  
200-300 pages each



# Why is sketching useful?

- **Early ideation**
- **Think through ideas**
- **Force you to visualize how things come together**
- **Communicate ideas to others to inspire new designs**
- **Active brainstorming**



# Characteristics of Sketches



Clear vocabulary

Plentiful

Suggest and explore rather than confirm

Quick and inexpensive

Timely, when needed

Disposable

Minimal detail and distinct gesture

Ambiguous

Appropriate degree of refinement

**But:** “I can’t draw...”

**“Sketches do not have to be pretty, beautiful, or even immediately understandable by others. However, you should be able to explain your sketches and ideas when anyone asks about them.”**

Saul Greenberg et al.



University College London  
Interaction Centre

# Sketching Tips and Tricks

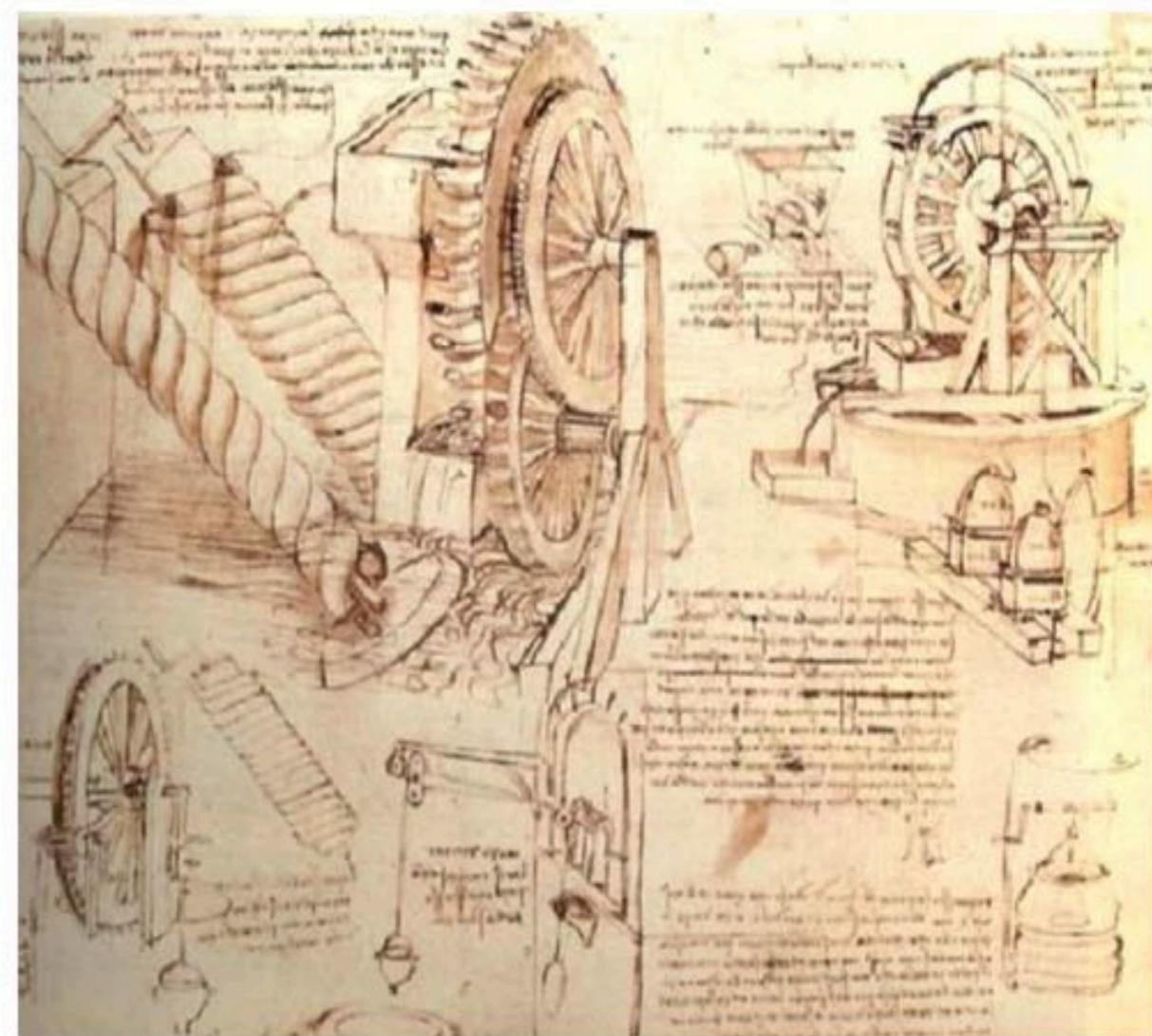
Sketching Tip 1:  
Don't use pencils but **pens**  
and **markers** instead



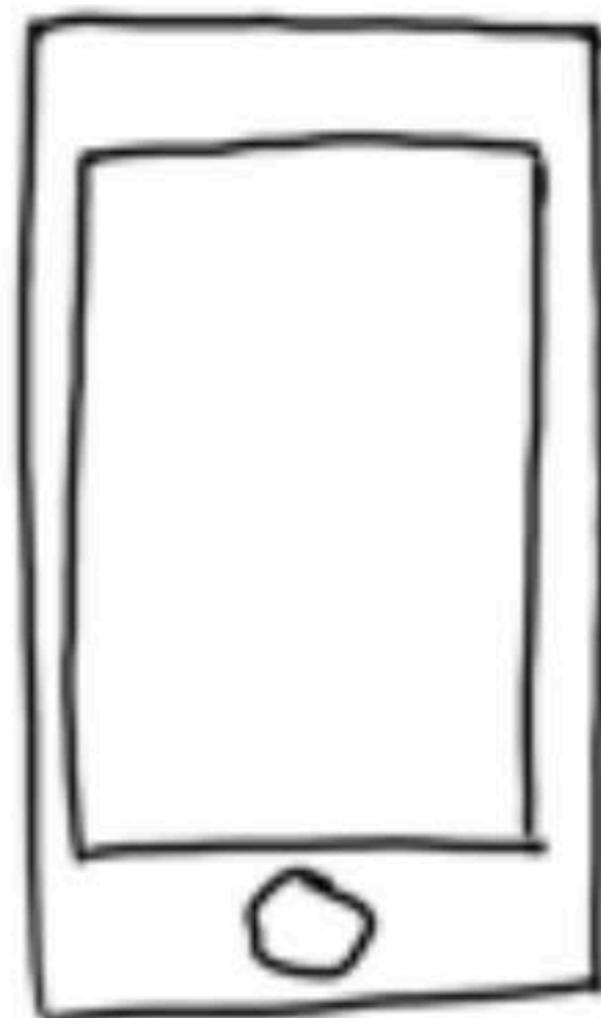
**Sketching Tip 2:  
Keep your mistakes,  
just keep going**



# Sketching Tip 3: Imitate sketching styles you like



Sketching Tip 4:  
**Sketch with fast and long strokes**  
(needs some practice)



Sketching Tip 5:  
Sketch ***analog*** (pen and paper)  
**before *digital*** (tablet)

**Sketching Tip 6:**  
Sketch in 2D –  
three dimensions are not  
necessary (most of the time)

# Sketching Tip 7:

## Reduce to Essentials

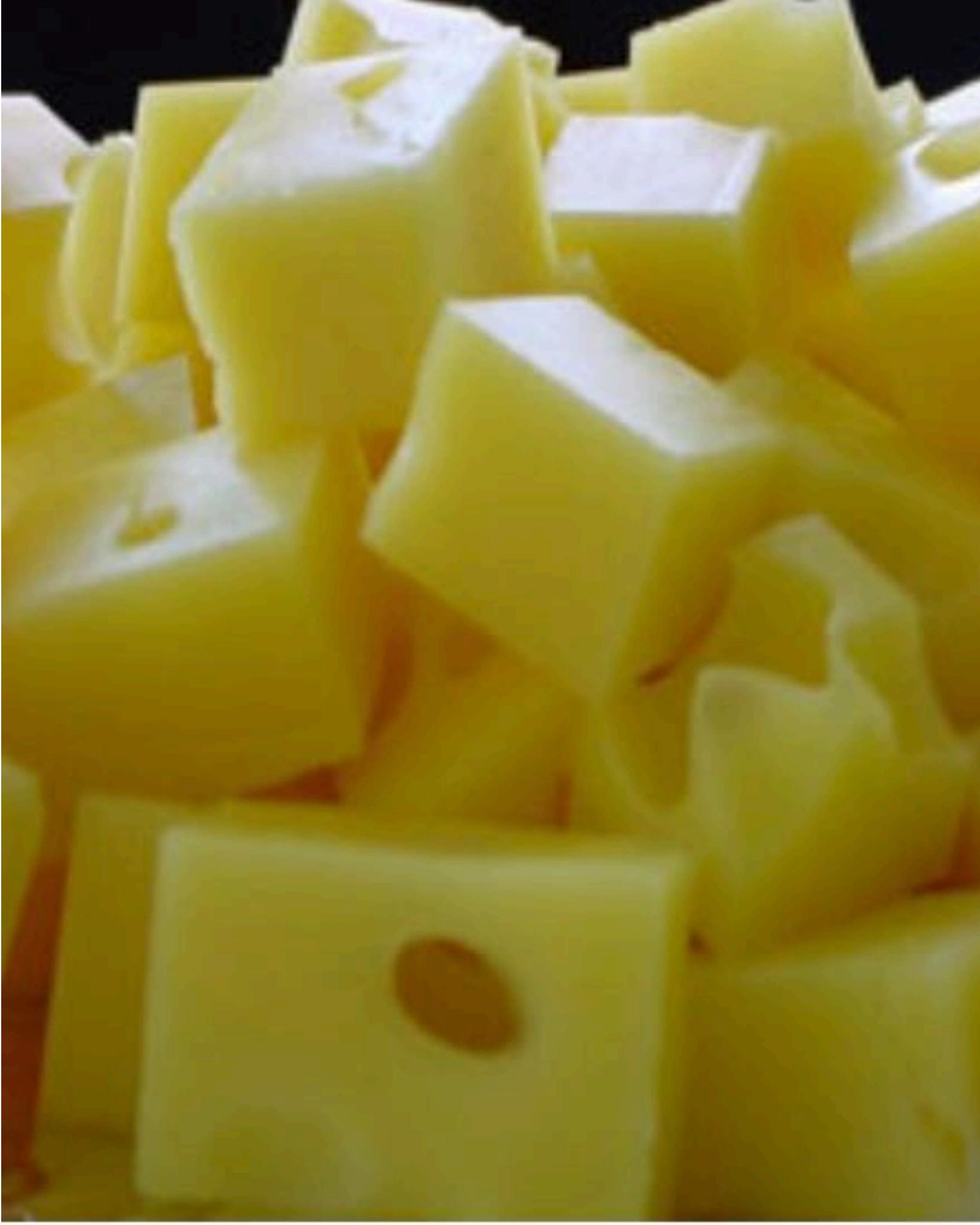


vs.



Minimal detail and  
distinct gesture





**"If you want to get the most out of a sketch, you **need** to leave **big** enough holes.**

**There has to be enough room for the **imagination**.**"

Bill Buxton

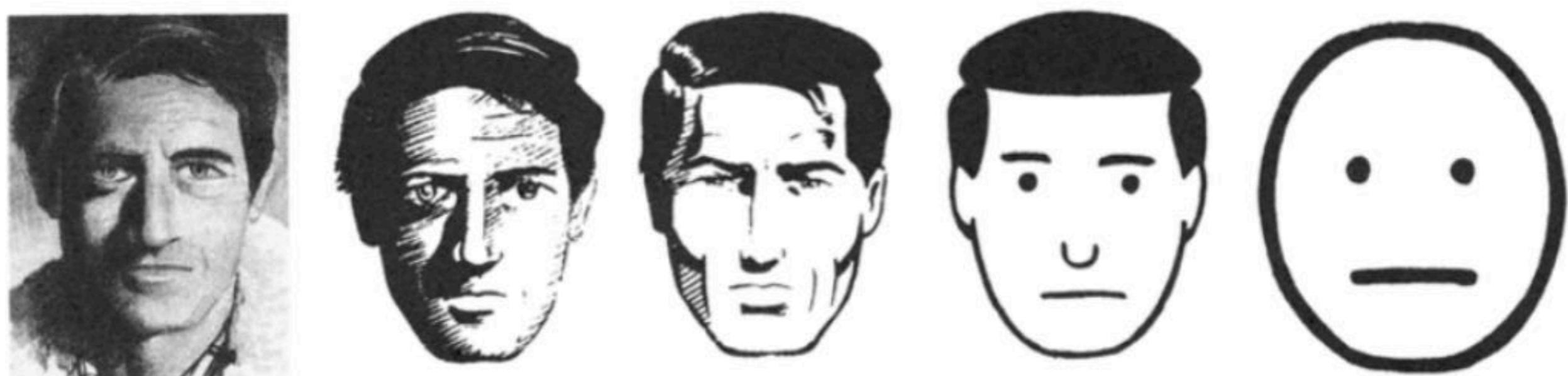


# Drawing People

就從火柴人開始吧



REALISTIC -----> ABSTRACT

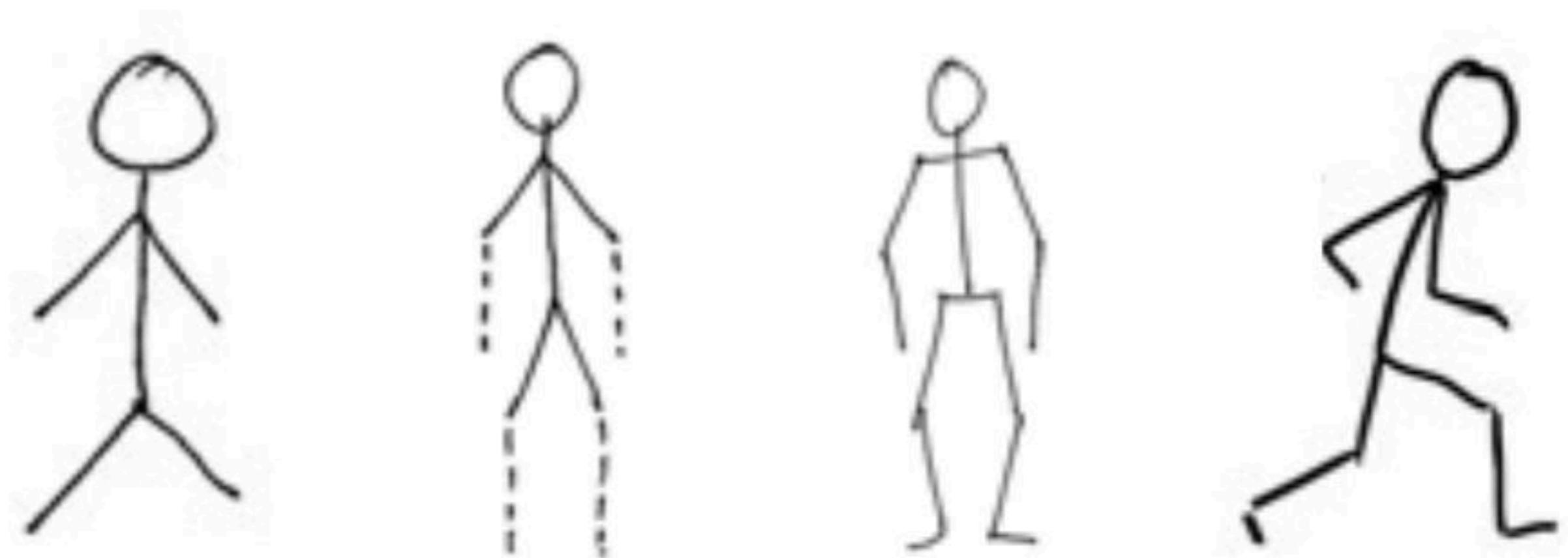


PORTRAIT -----> IDEA

某個人

(幾乎)所有人

# Drawing stick figures



# Drawing stick figures



# Expressions



# Expressions







# *Hands-on Sketching: Drawing people*

## Sketch 10 different stick figures:



Share ideas about what to draw with your neighbor.

For example, draw a person pointing, running, picking up an object, dancing, playing golf, ... **BE CREATIVE**

# Star People



# Star People

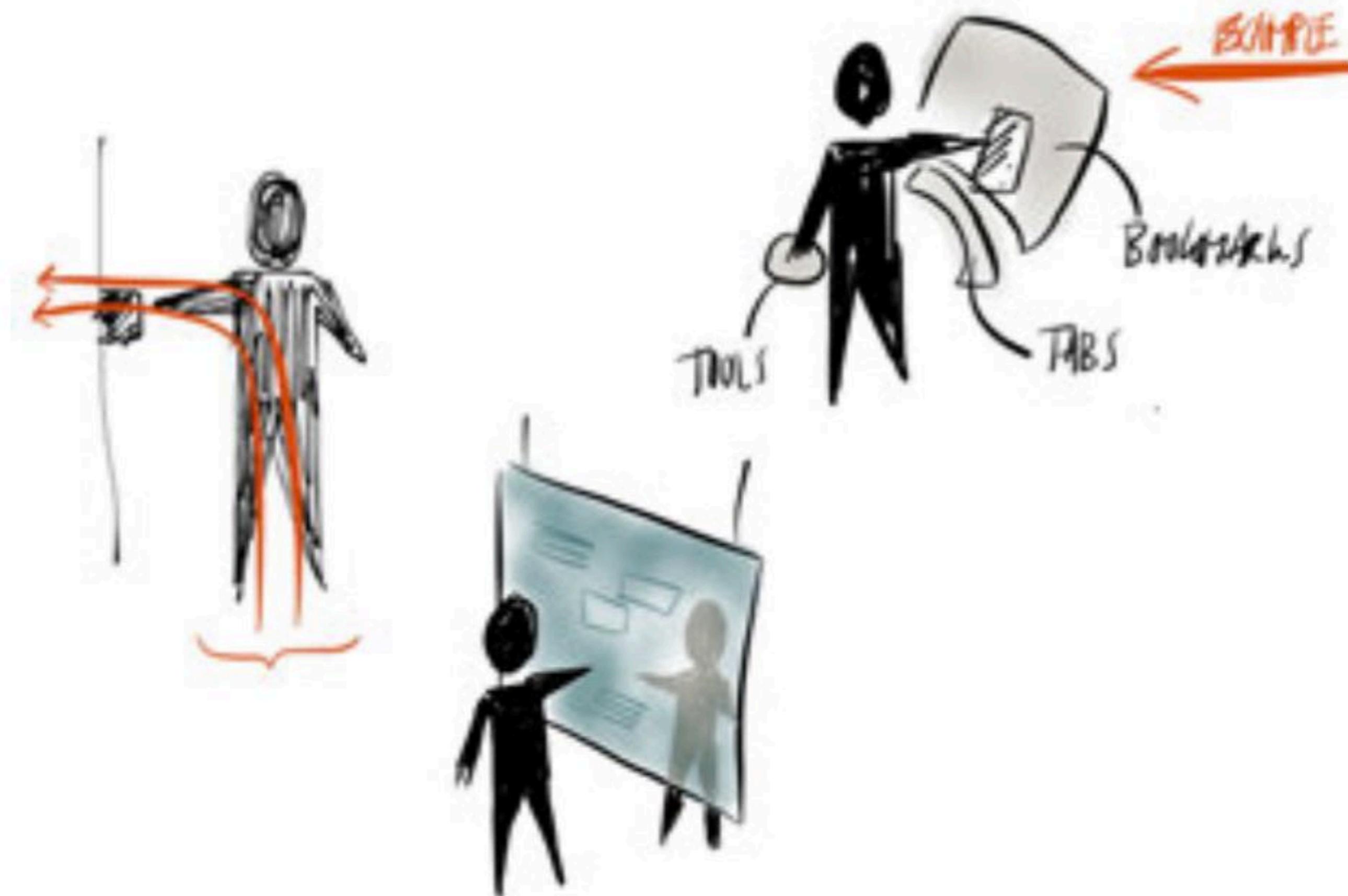




# star people





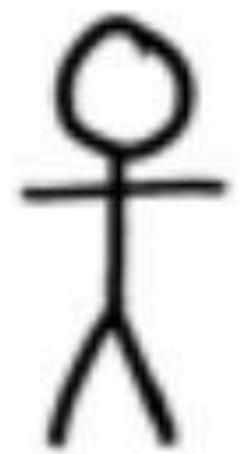


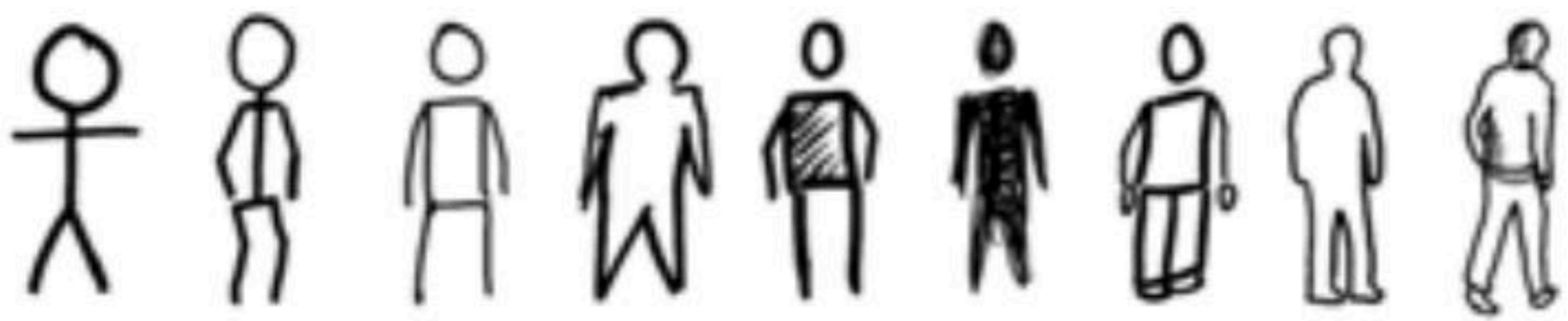


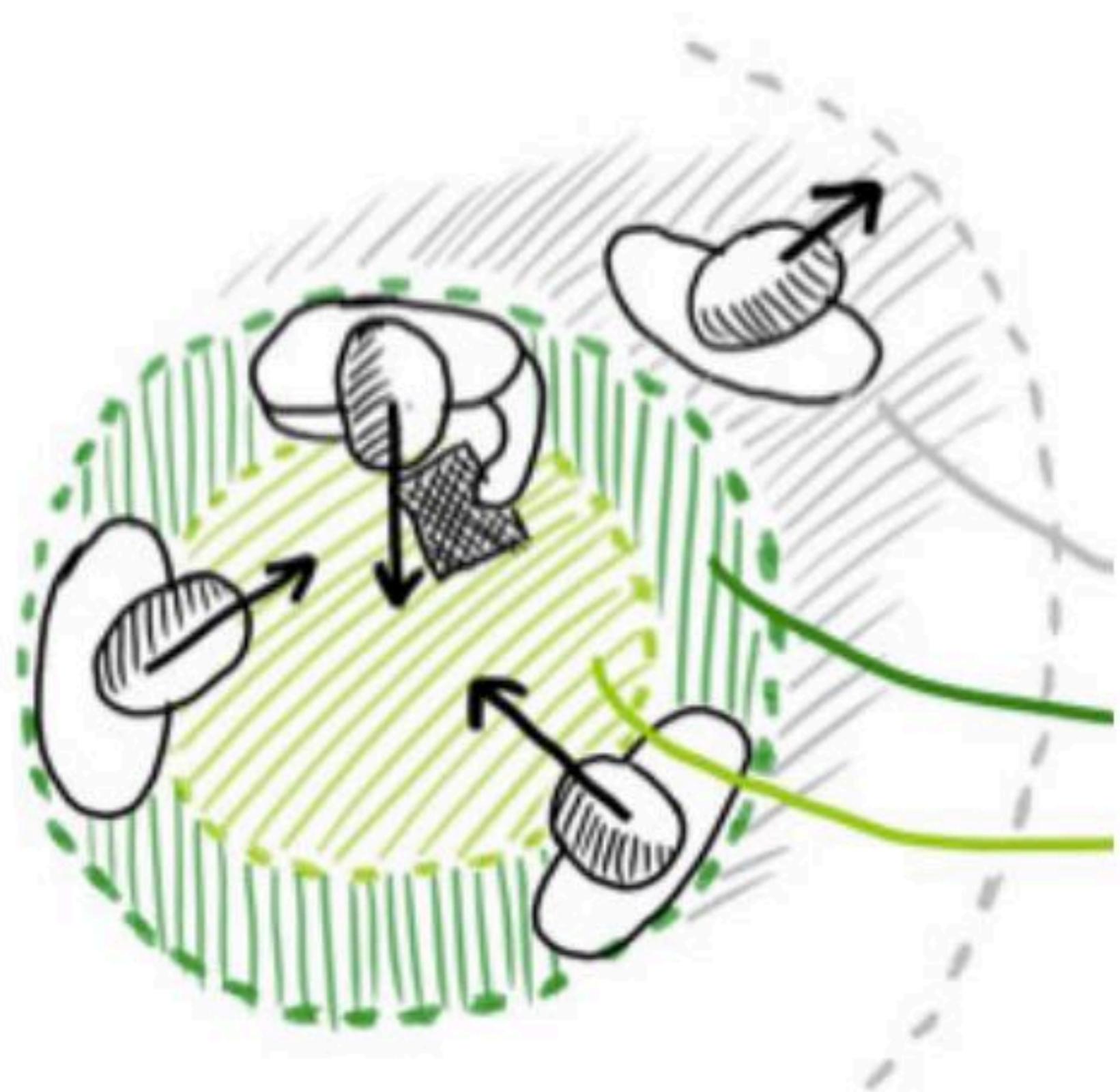


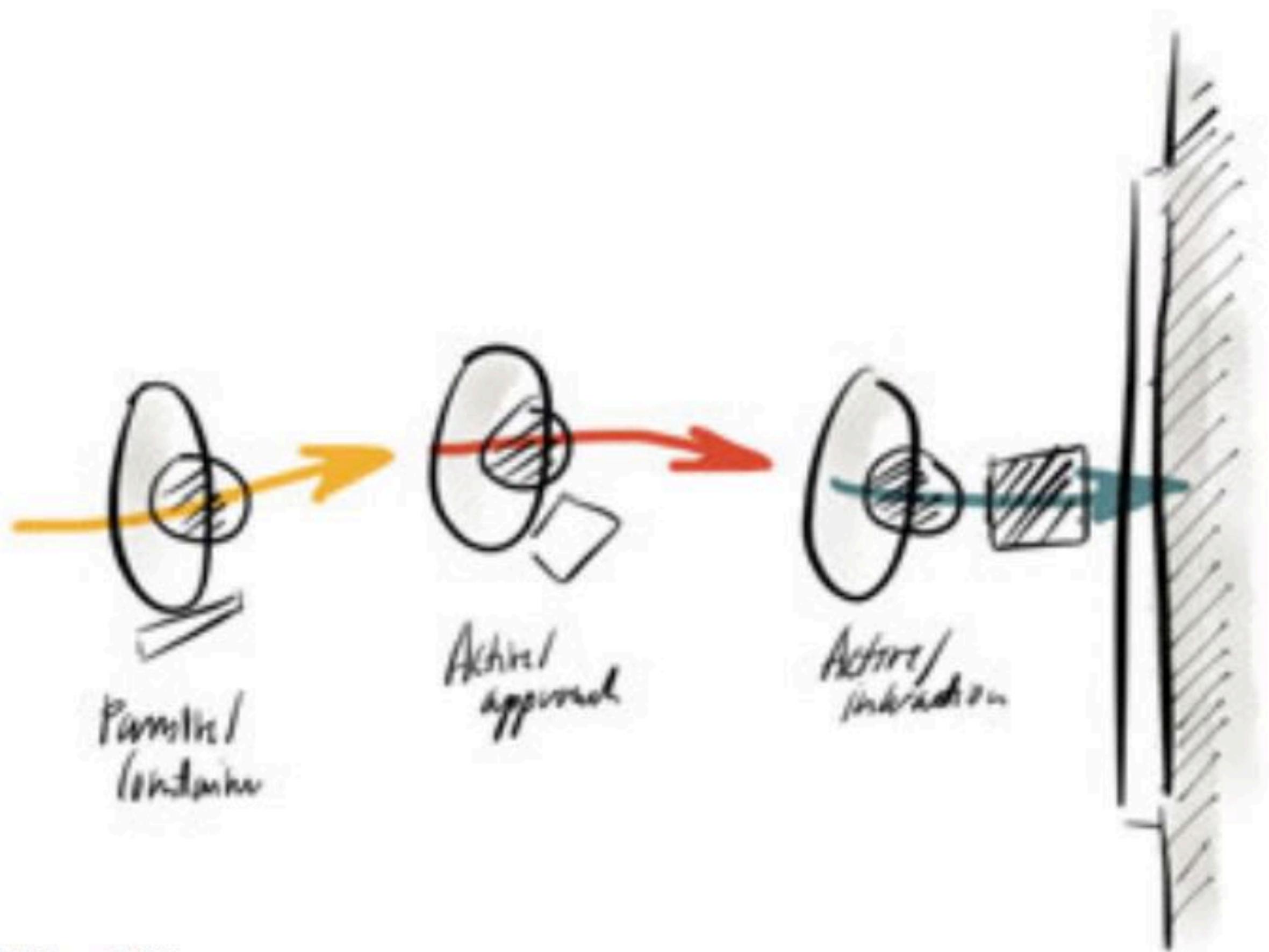
## Sketch 10 star people:

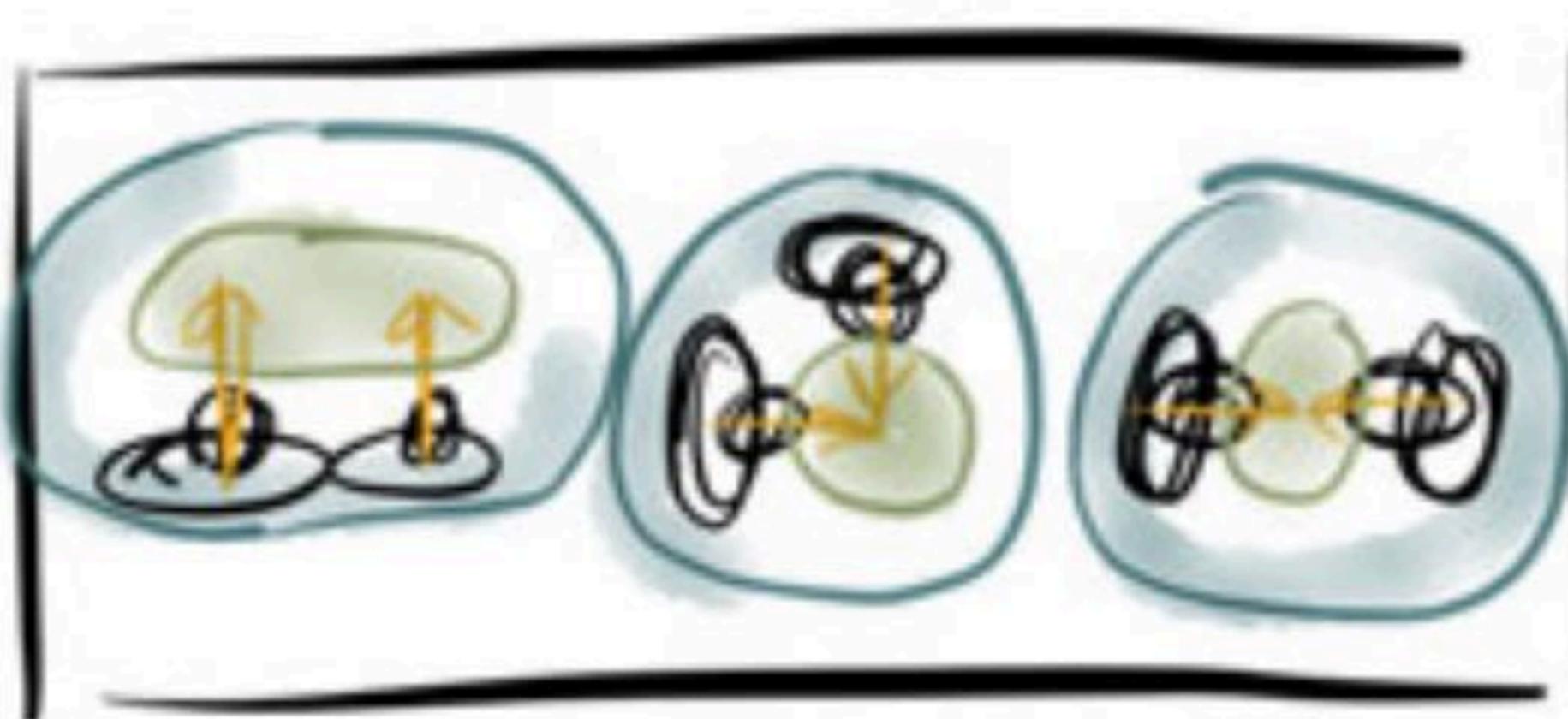
Different positions,  
actions, movements,  
size, ...



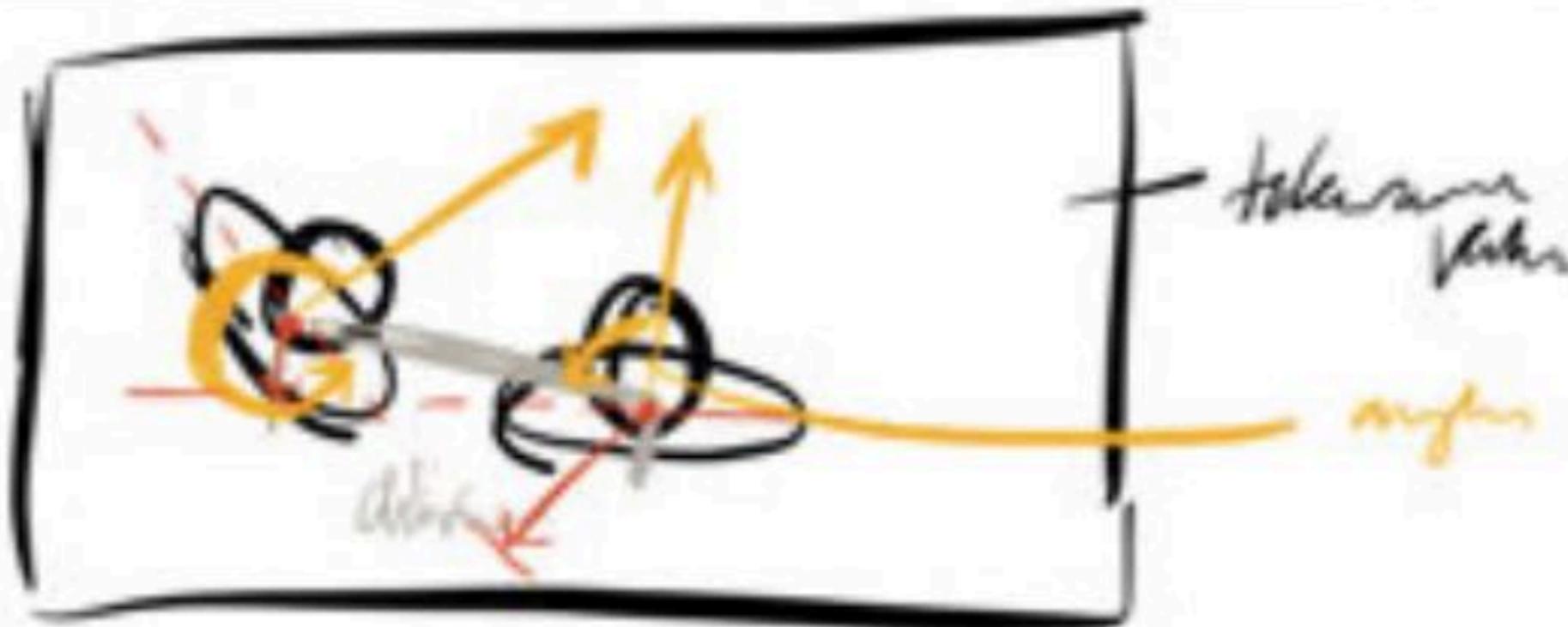






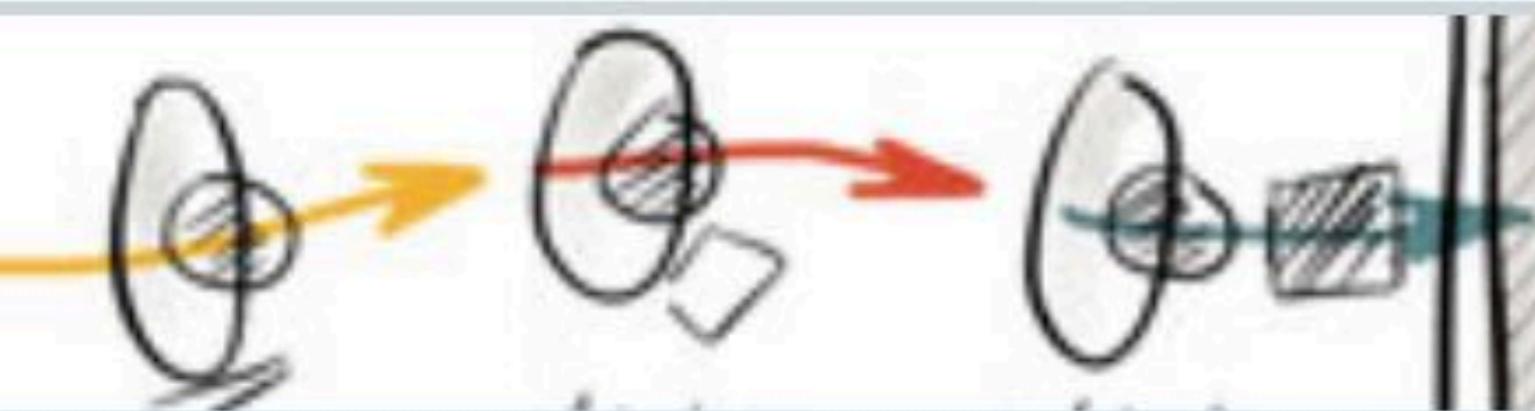


Could be  
P<sub>2</sub> Agote 2  
(small!!)  
distorted  
formation



# Activity: Sketching people

Try out three more techniques for drawing people

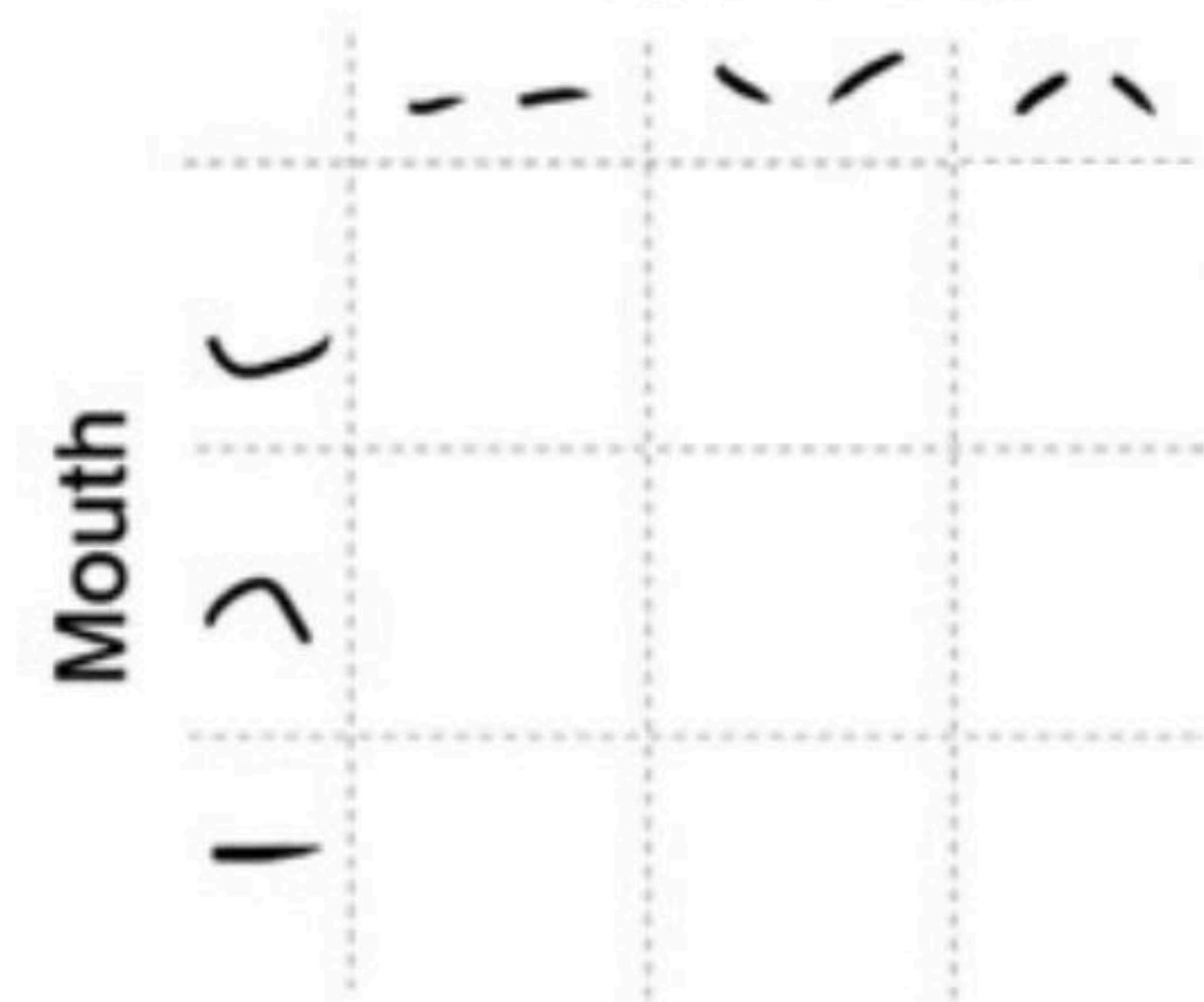




University College London  
Interaction Centre

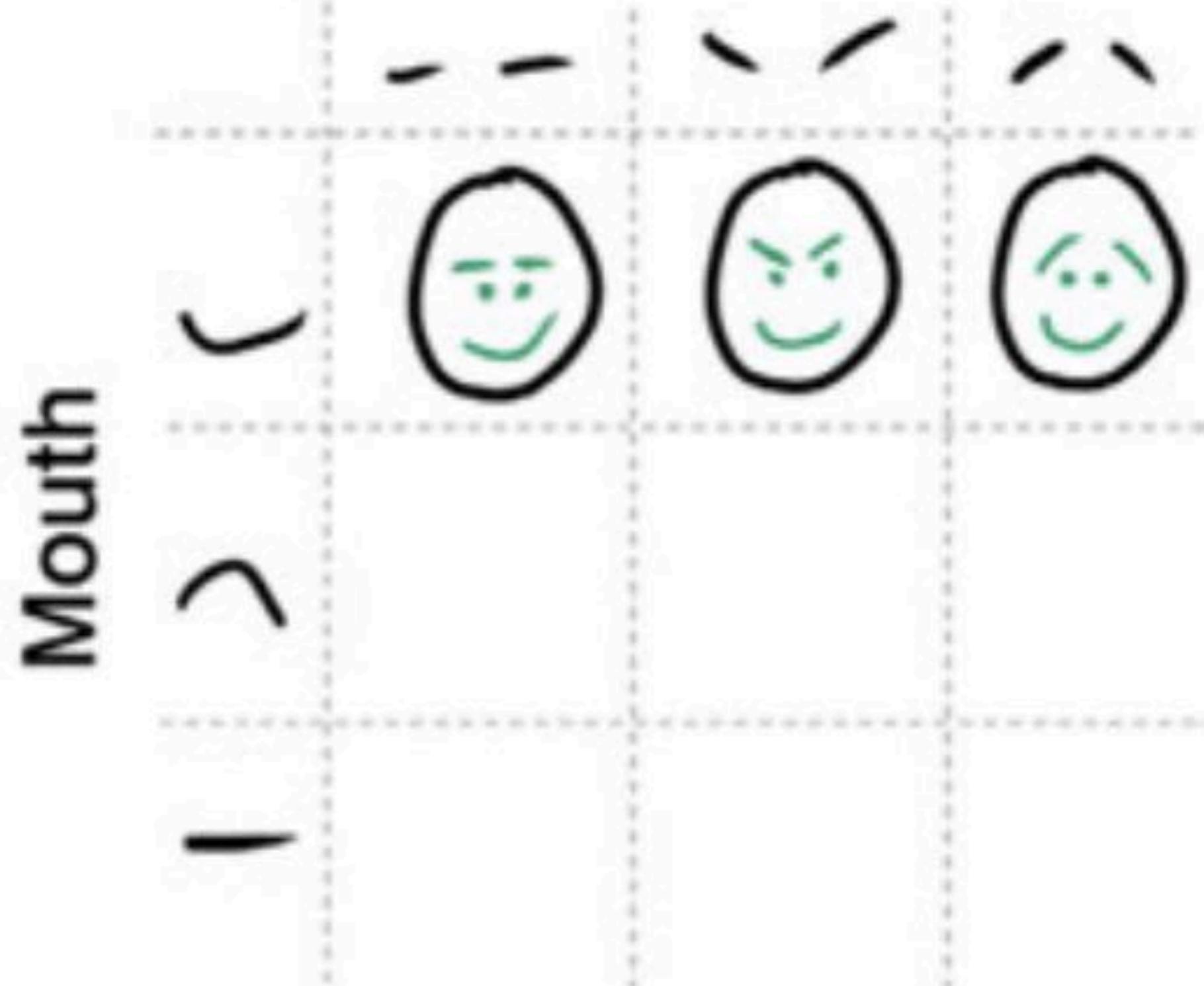
# Sketching Faces and Emotions

# Eyebrows

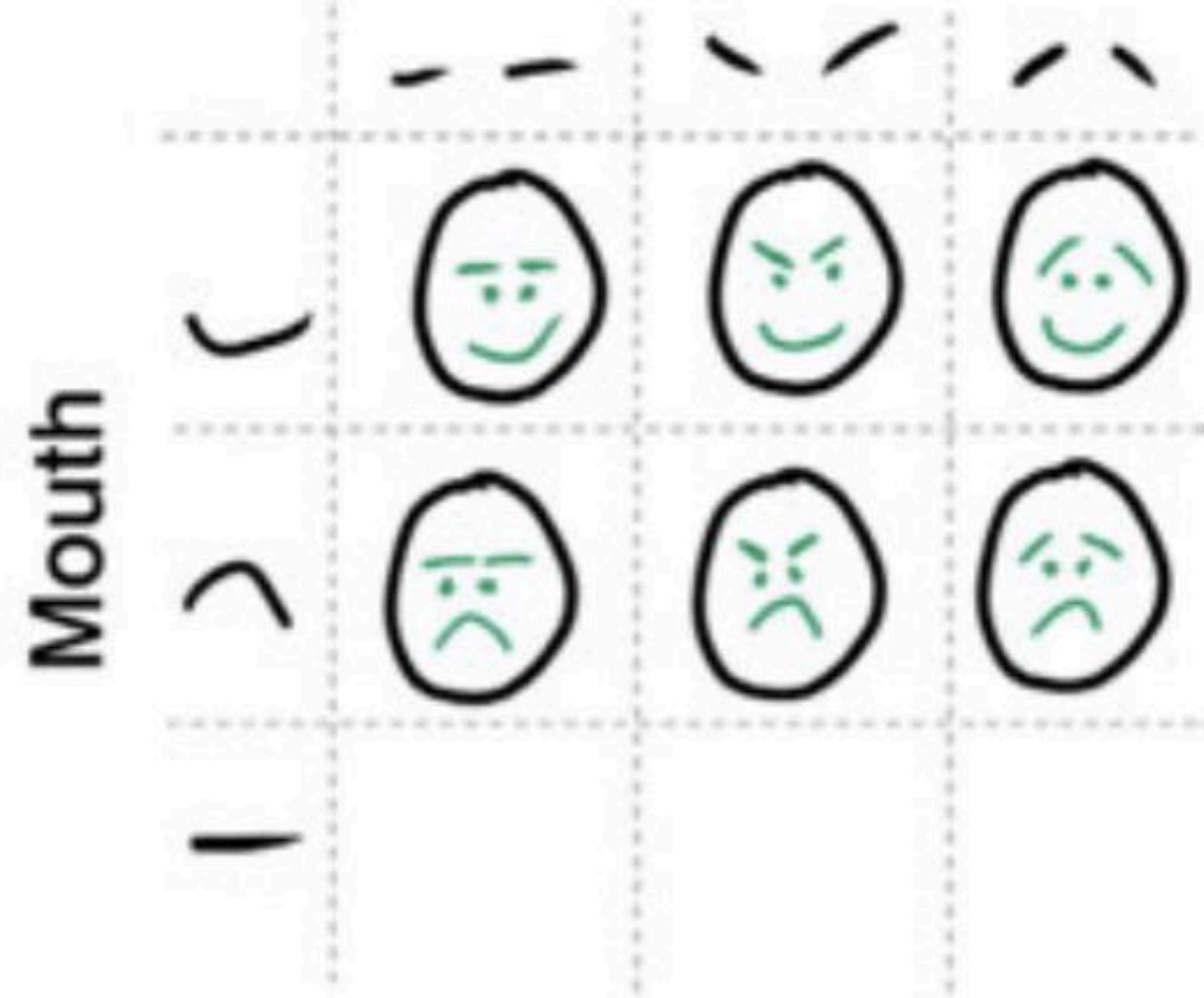


Mouth

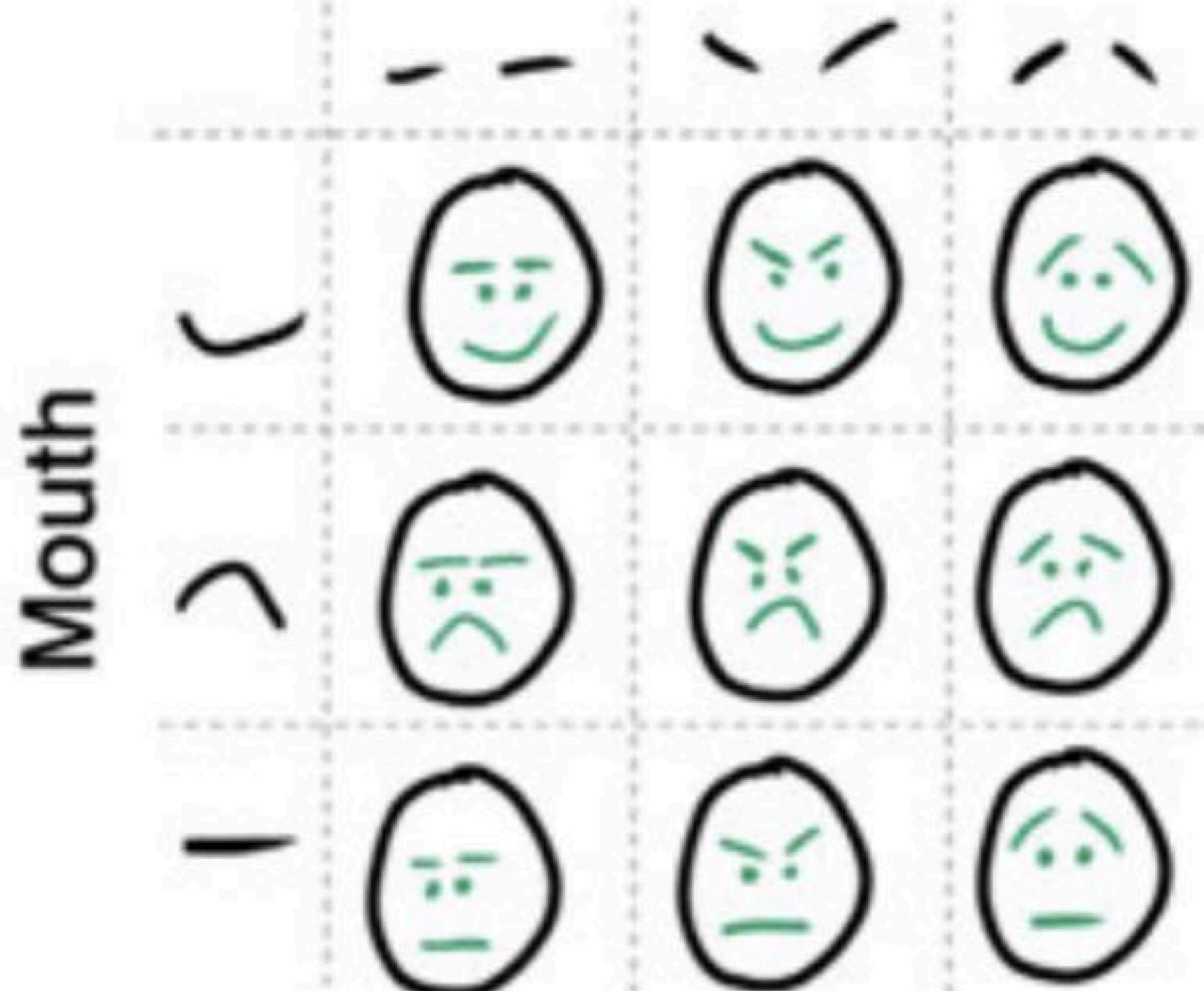
# Eyebrows



# Eyebrows



# Eyebrows

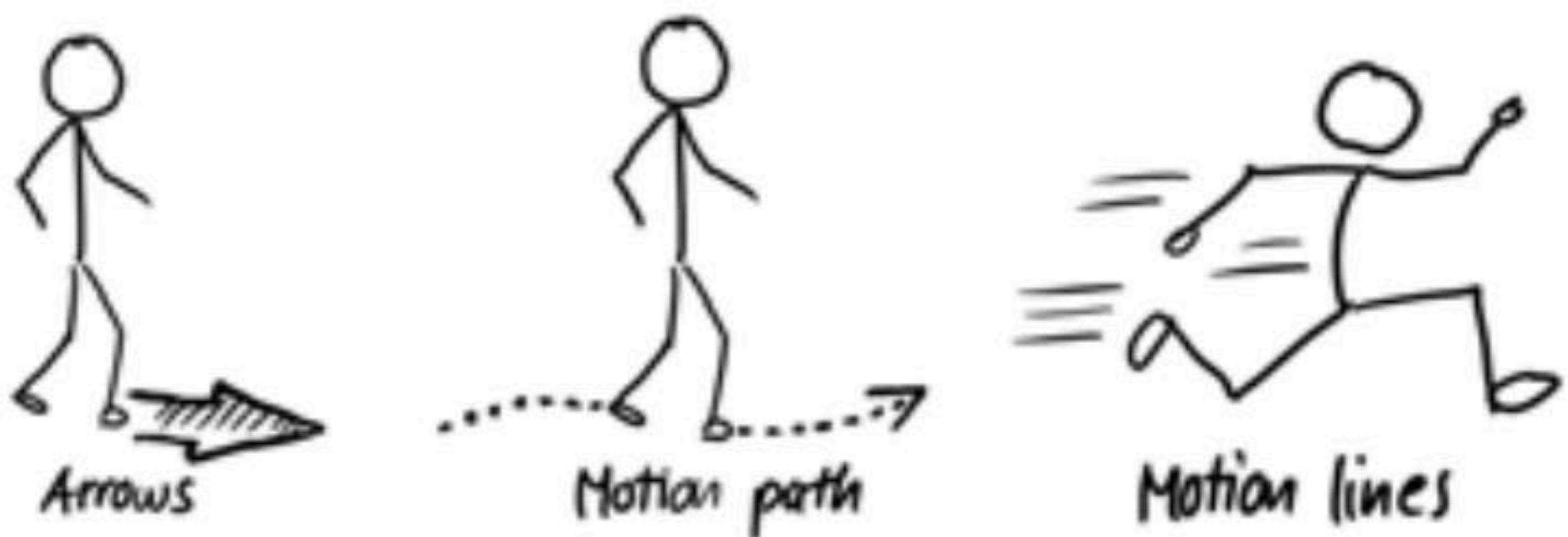


Mouth





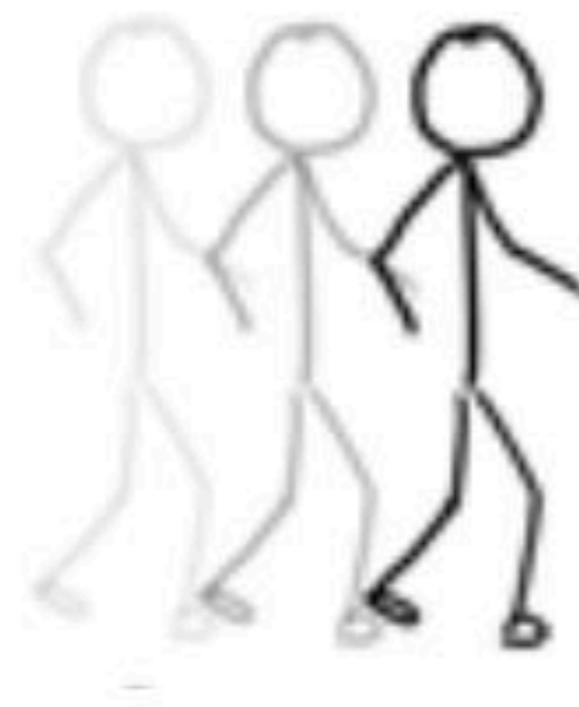
## Sketching motion (1)



## Sketching motion (2)



Wiggle lines



Ghosting



# ***Hands-on Sketching:***

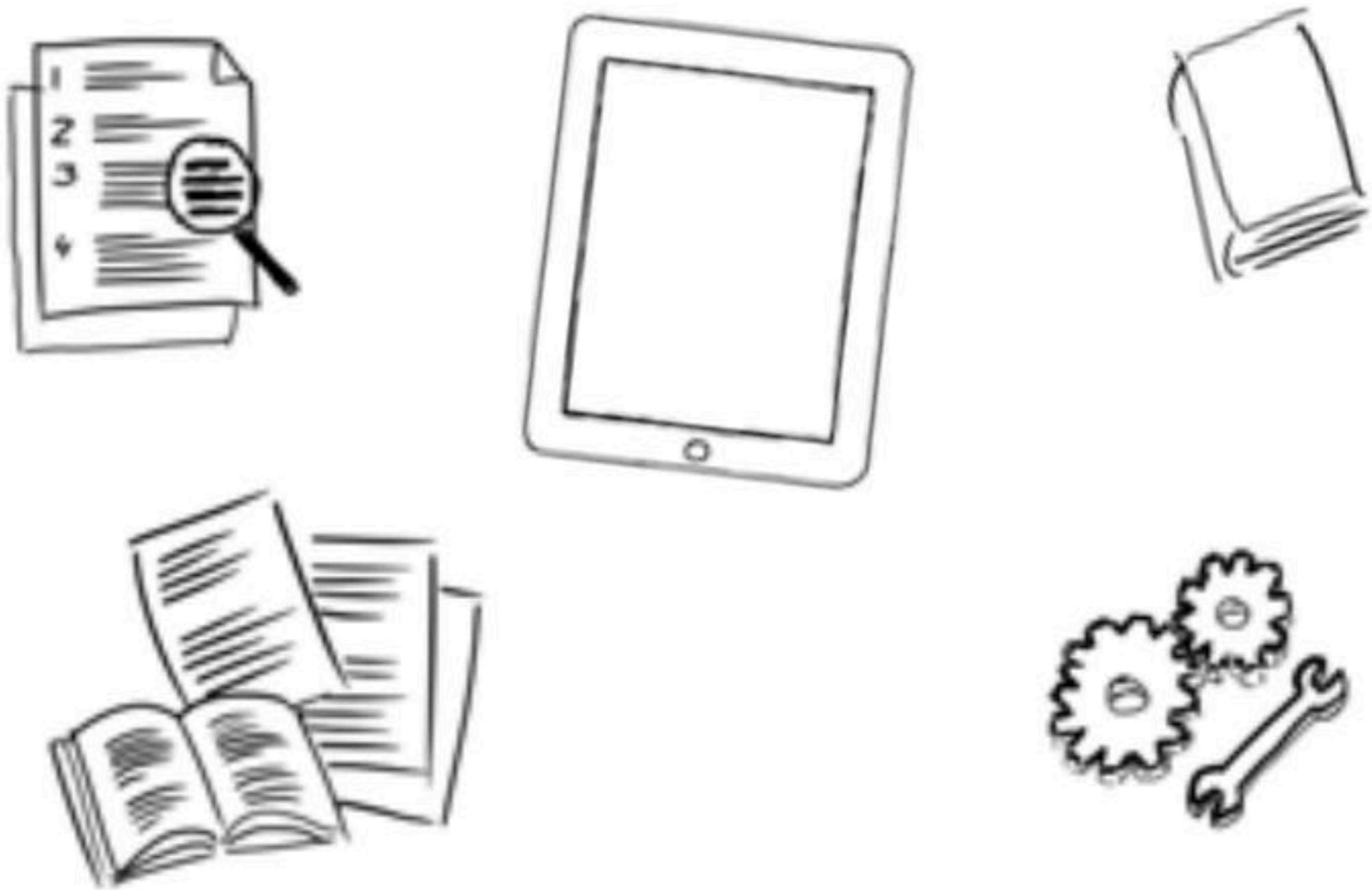
## *Drawing people and actions*

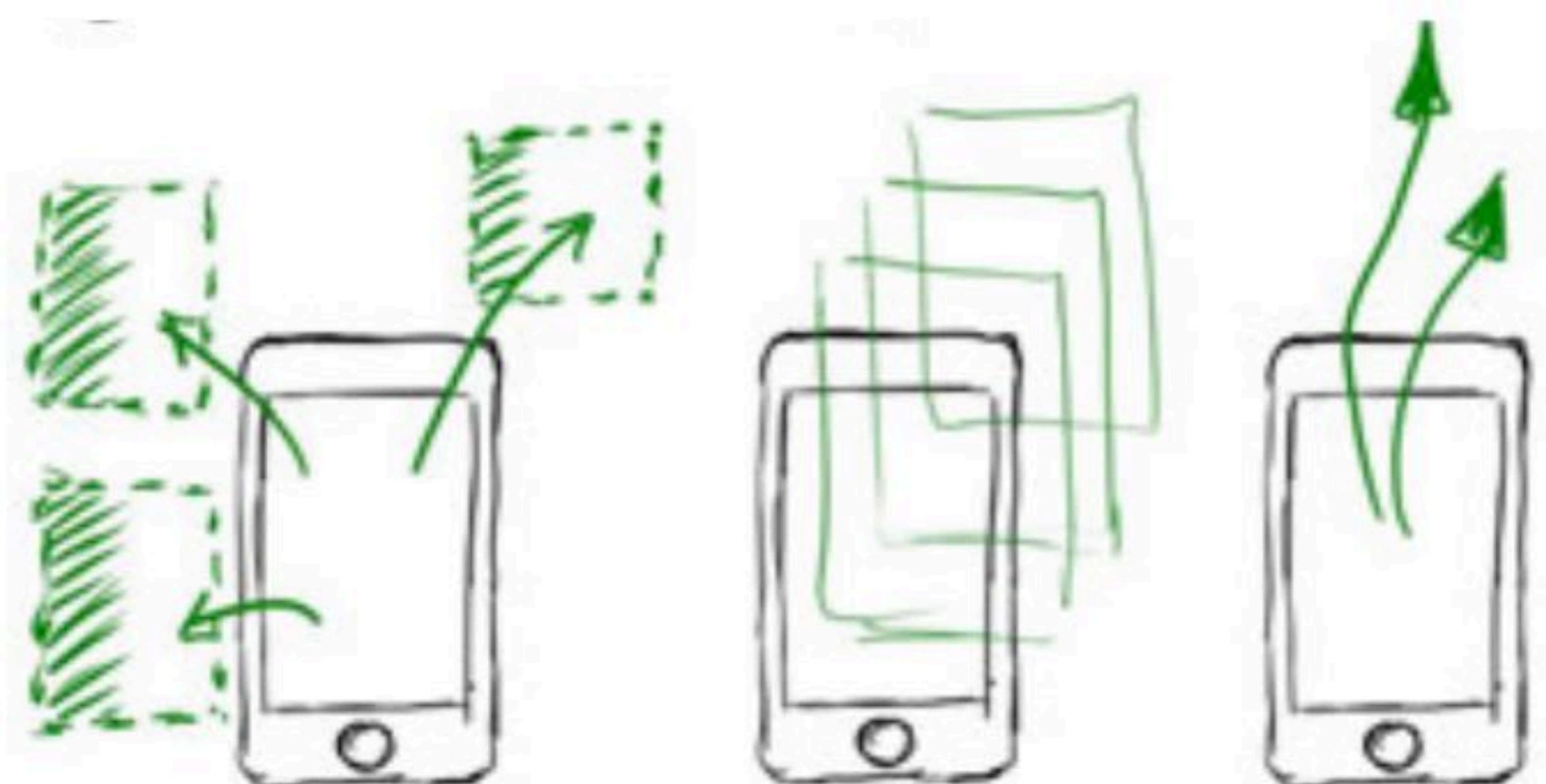
- **Sketch 2 situations involving 2 (or more) people activities** (use stick figures or star people, emotions, objects, actions). (hint: sports)
- **Pair Activity:** you tell your neighbor what situations to draw, then switch, then switch...

# Sketching Devices and Objects







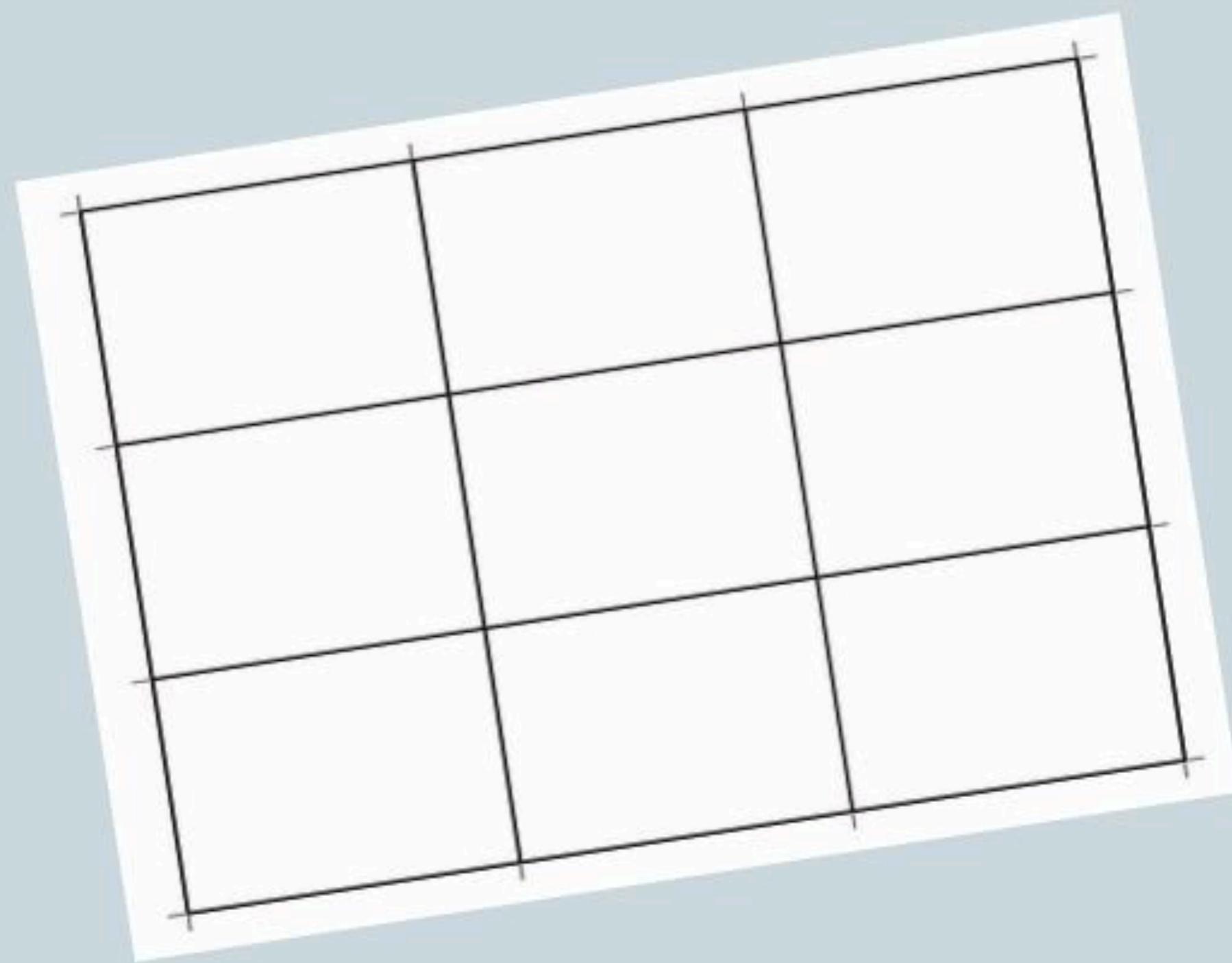






***Hands-on Sketching:***  
*Sketching Vocabulary – draw  
the following, 10s each*

**First, divide paper into 9 rectangles...**



**Now we fill the page**

VR Headset

VR Headset

Push

VR Headset	Push	Flying

VR Headset	Push	Flying
Earthquake		

VR Headset	Push	Flying
Earthquake	Exciting	

VR Headset	Push	Flying
Earthquake	Exciting	Collaboration

VR Headset	Push	Flying
Earthquake	Exciting	Collaboration
VR Glove with a special function		

VR Headset	Push	Flying
Earthquake	Exciting	Collaboration
VR Glove with a special function	Hot Weather	

VR Headset	Push	Flying
Earthquake	Exciting	Collaboration
VR Glove with a special function	Hot Weather	Reality

# ***Activity (15 minutes):***

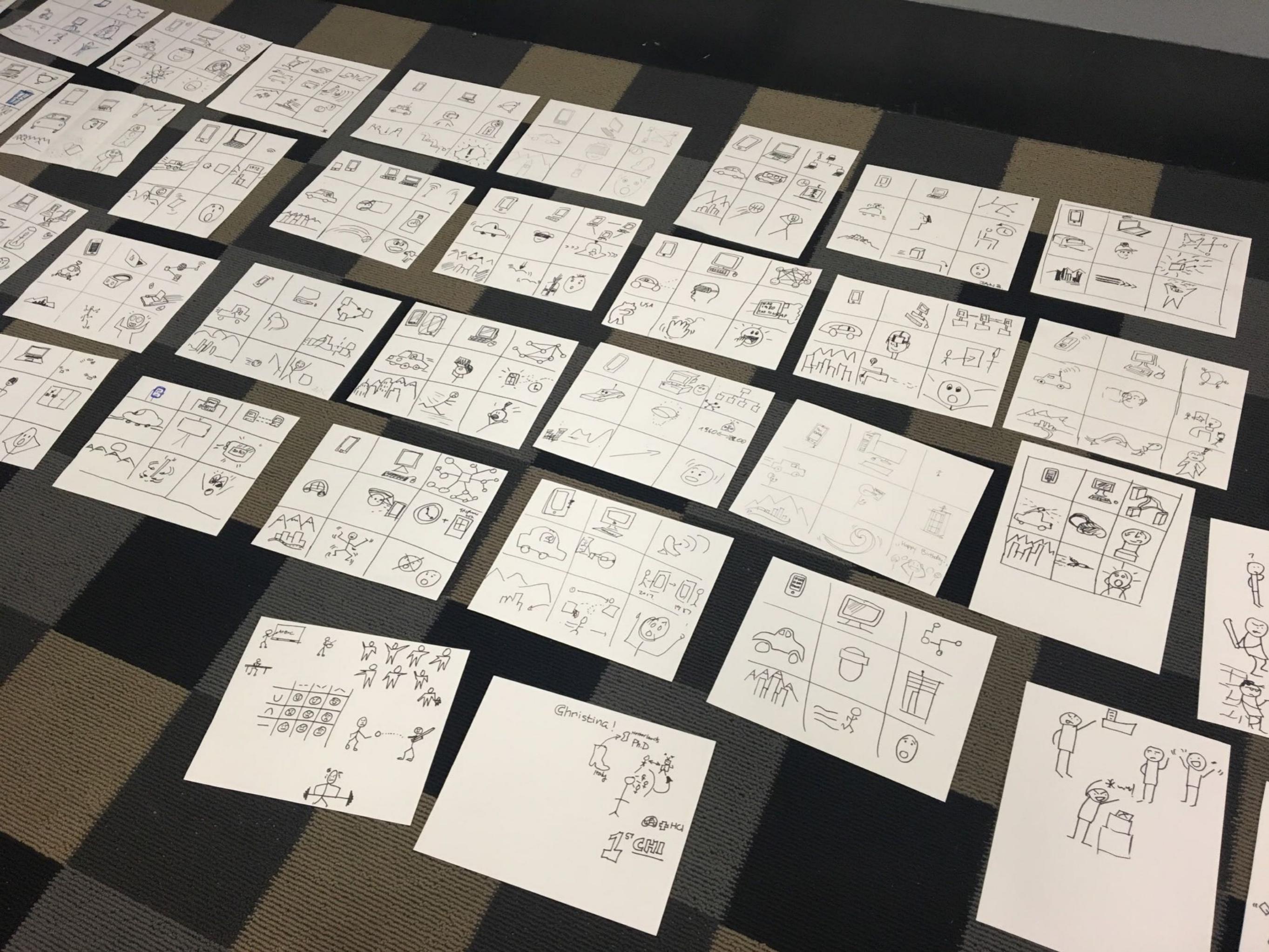
**post up your sketches**

**what worked well?**

**what didn't work well?**

**what things were important to  
communicate the idea?**

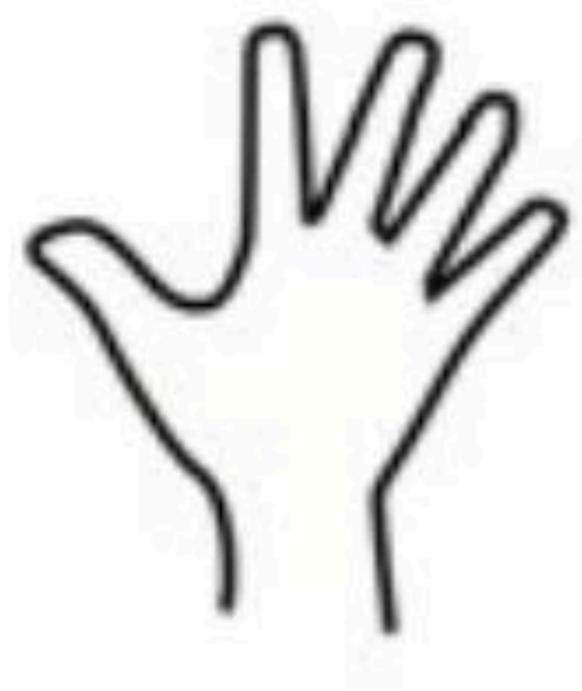
**what wasn't important to communicate the idea?**

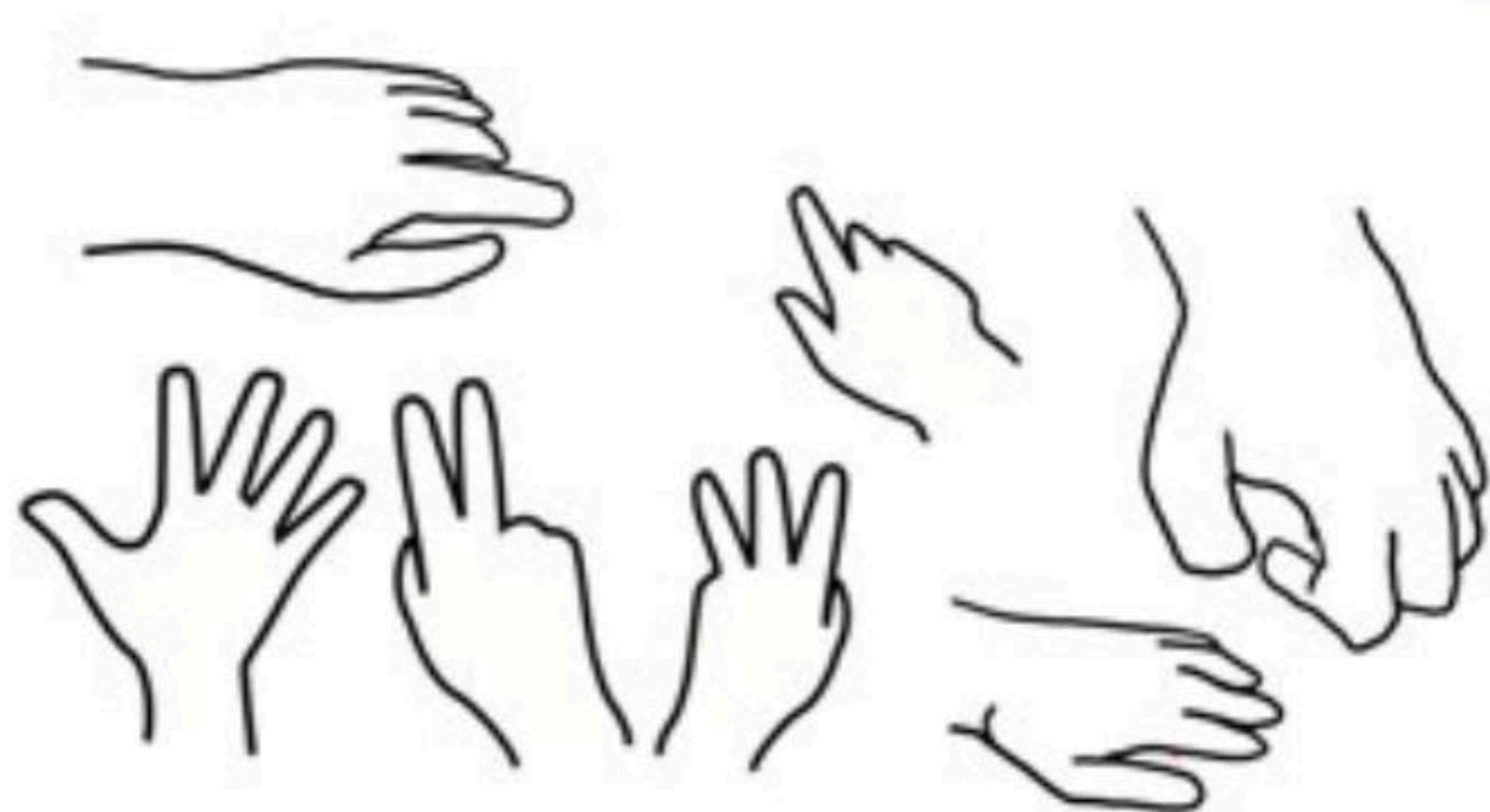




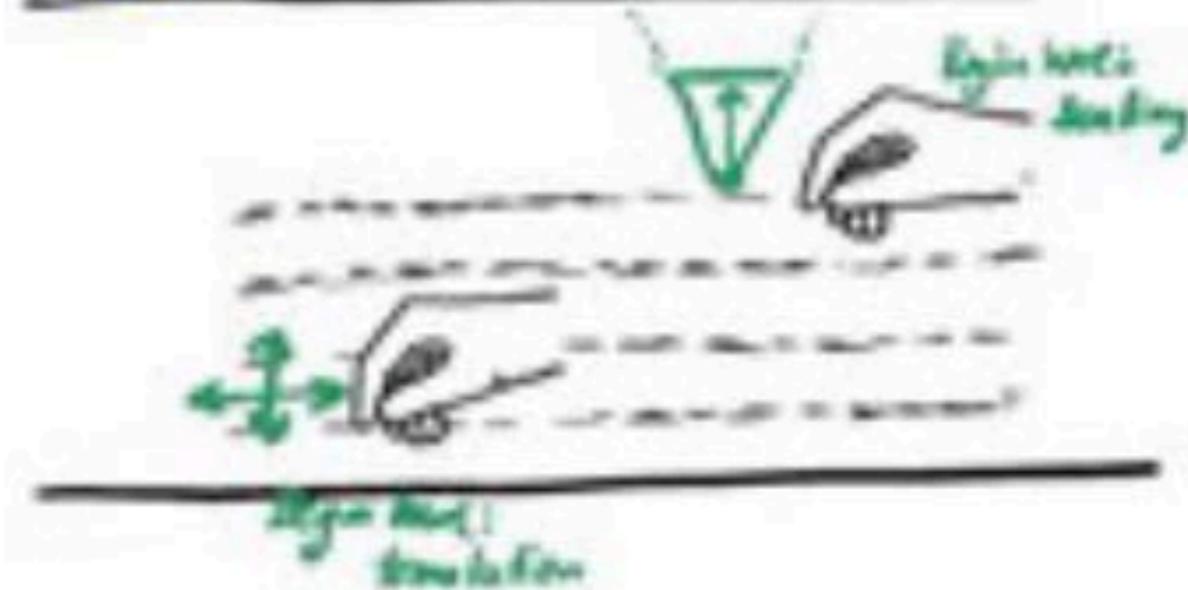
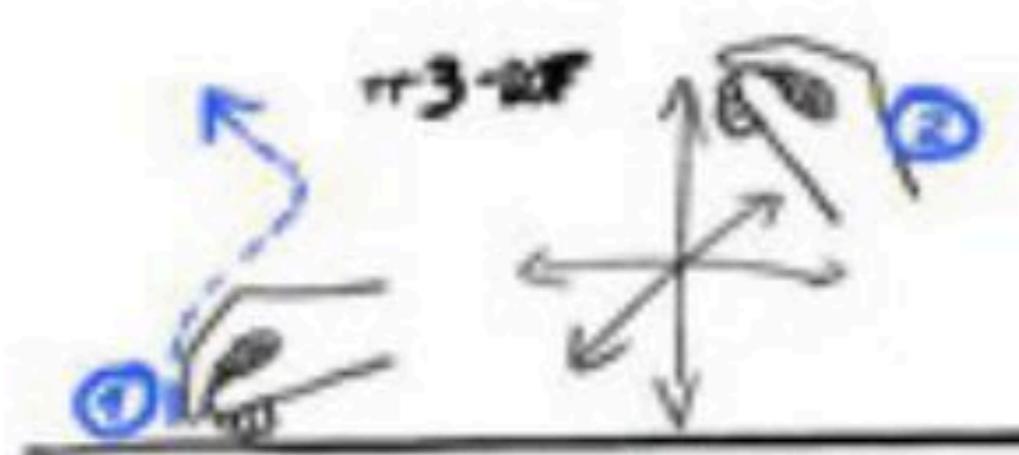
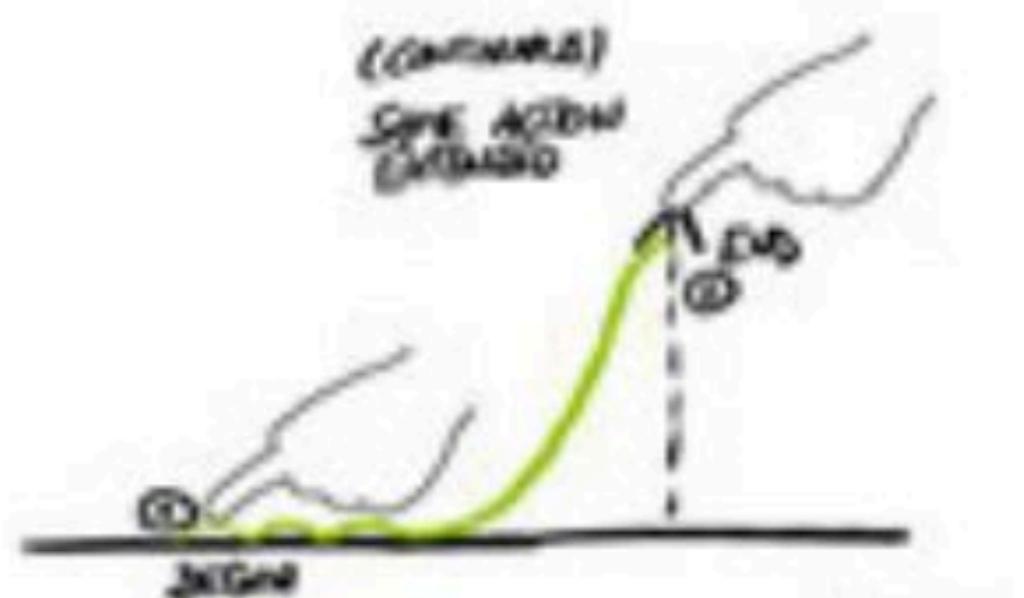
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# Sketching Hands and Gestures



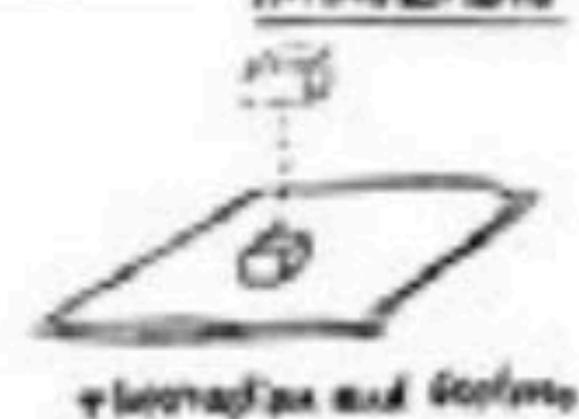


### CONTINUOUS INTERACTION STAGE

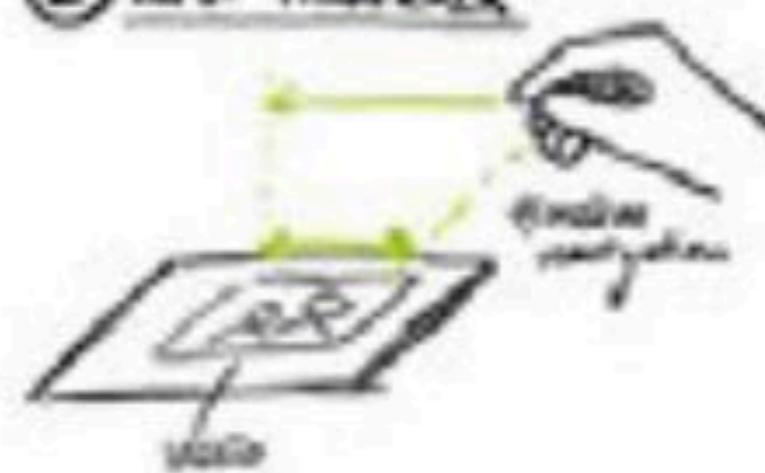


## STUDIES ABOVE SURFACES

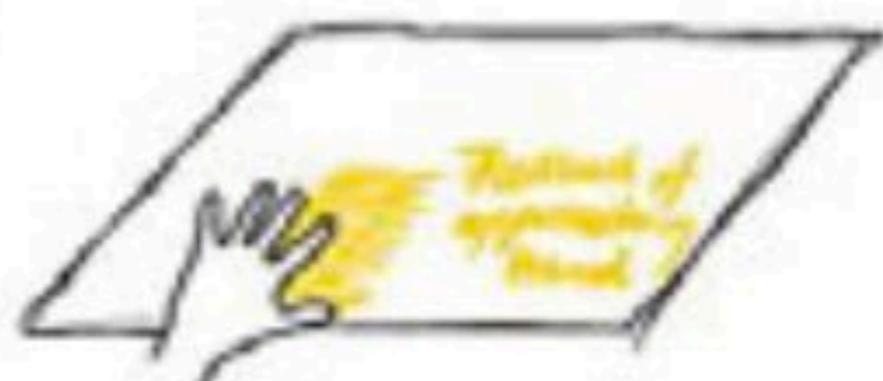
### ① 3D SIMULATION / INTERACTION



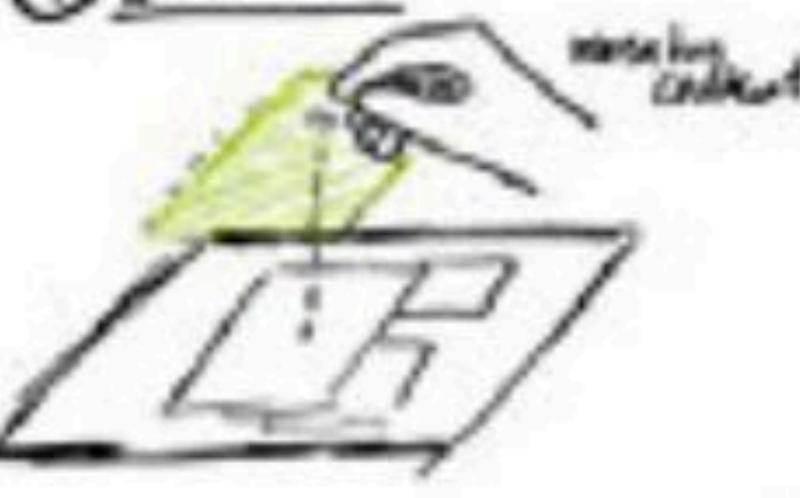
### ② INPUT PREVIEW



### ③ ANIMATION / PAINTING



### ④ 2.5D INPUT

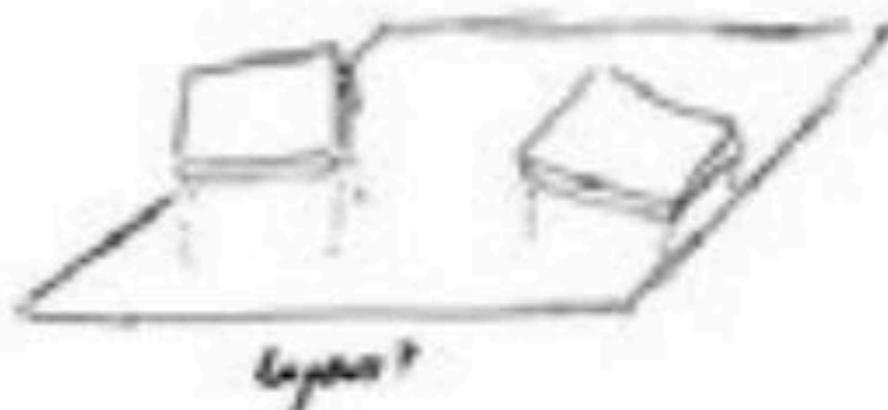


### ⑤ COMPLEX GESTURES

e.g. handover? hand off/pan/pick?



### ⑥ TOOL SPACE



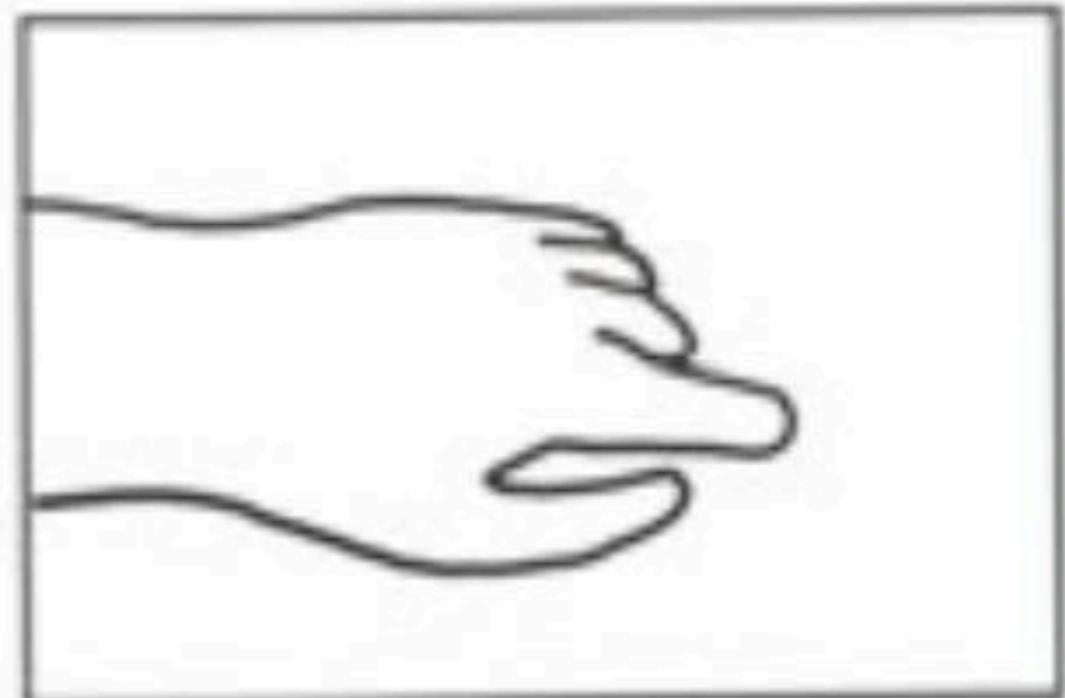
**But: “I really, really can’t  
draw hands...”**



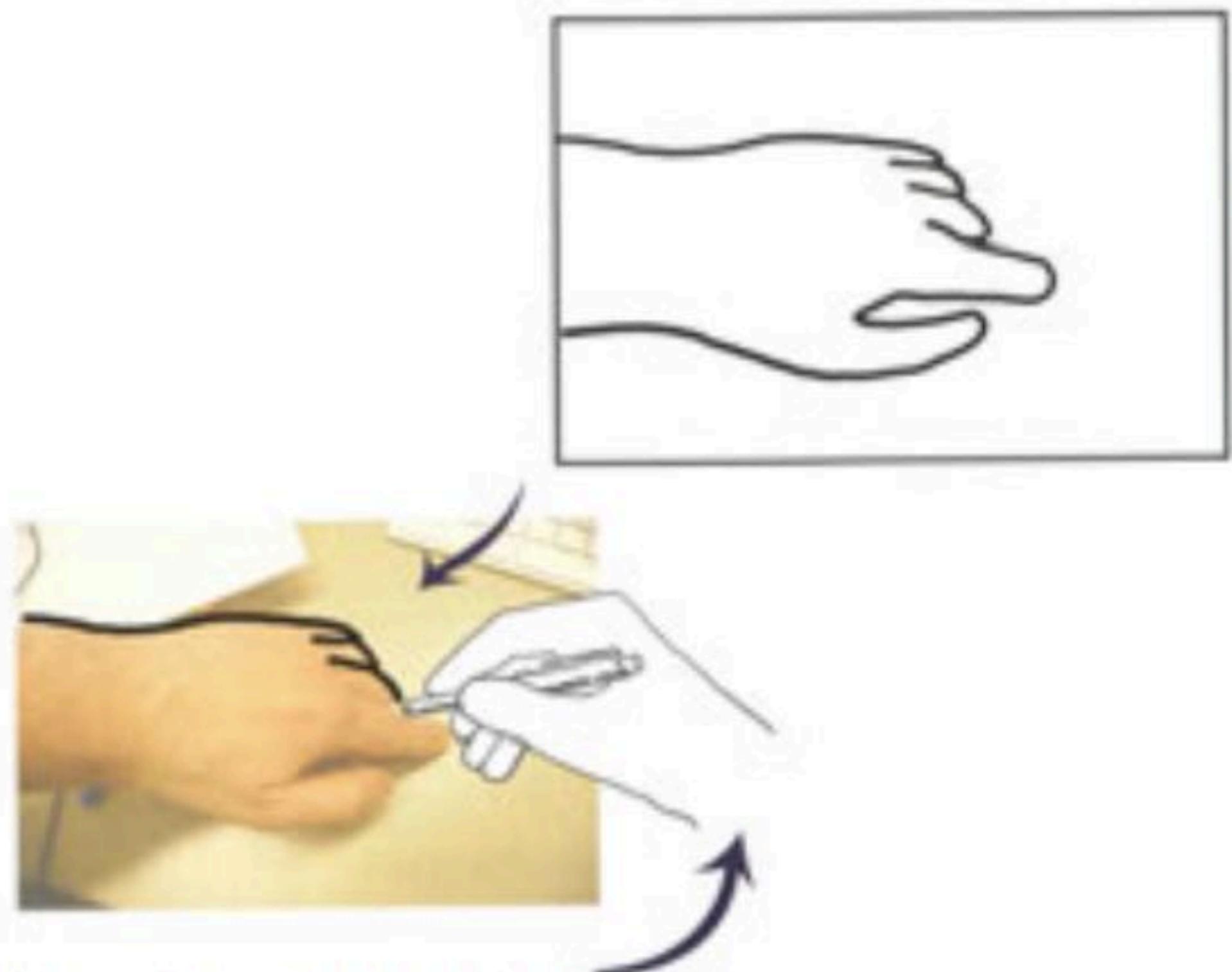
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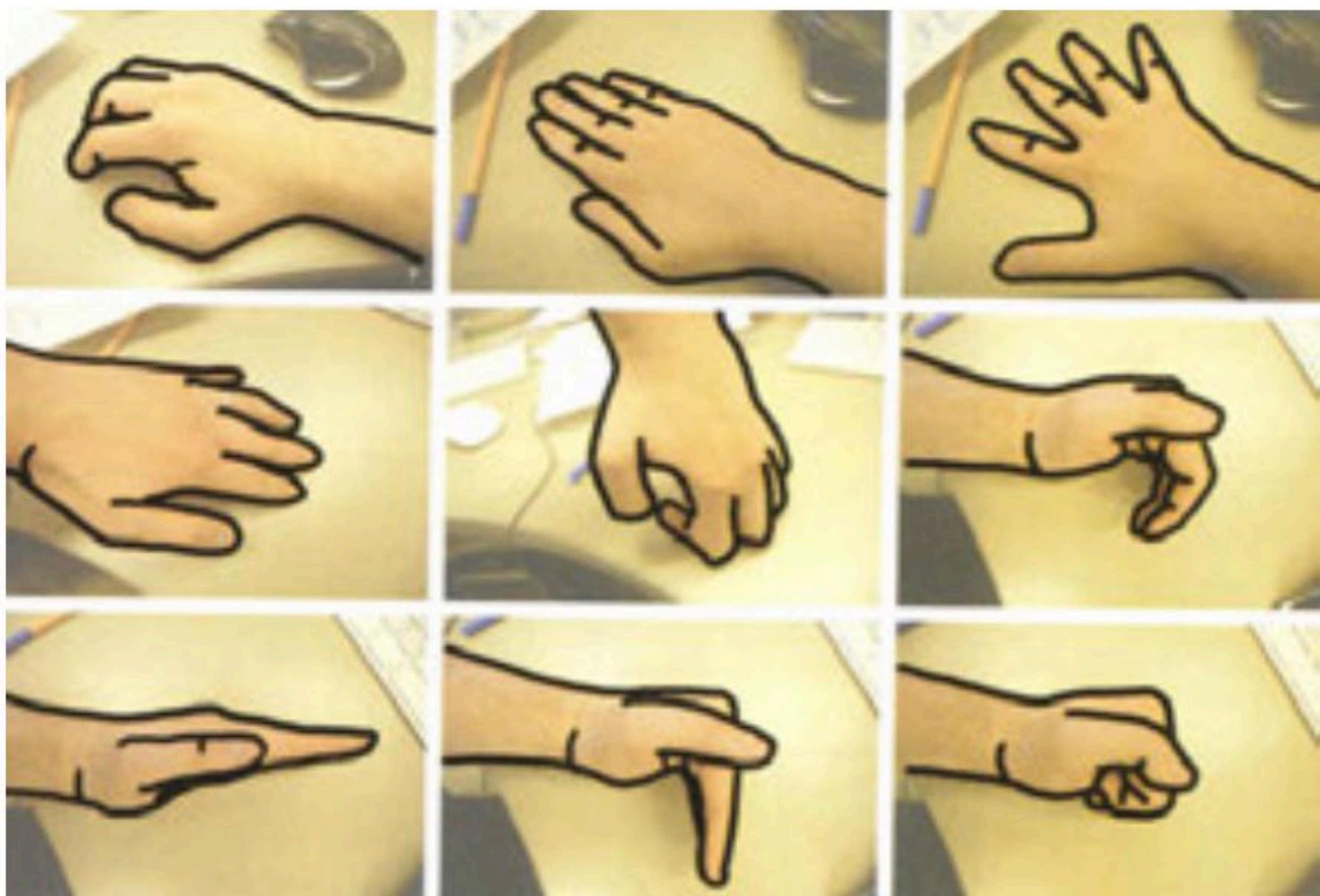
# Sketching Technique: **Photo Tracing**

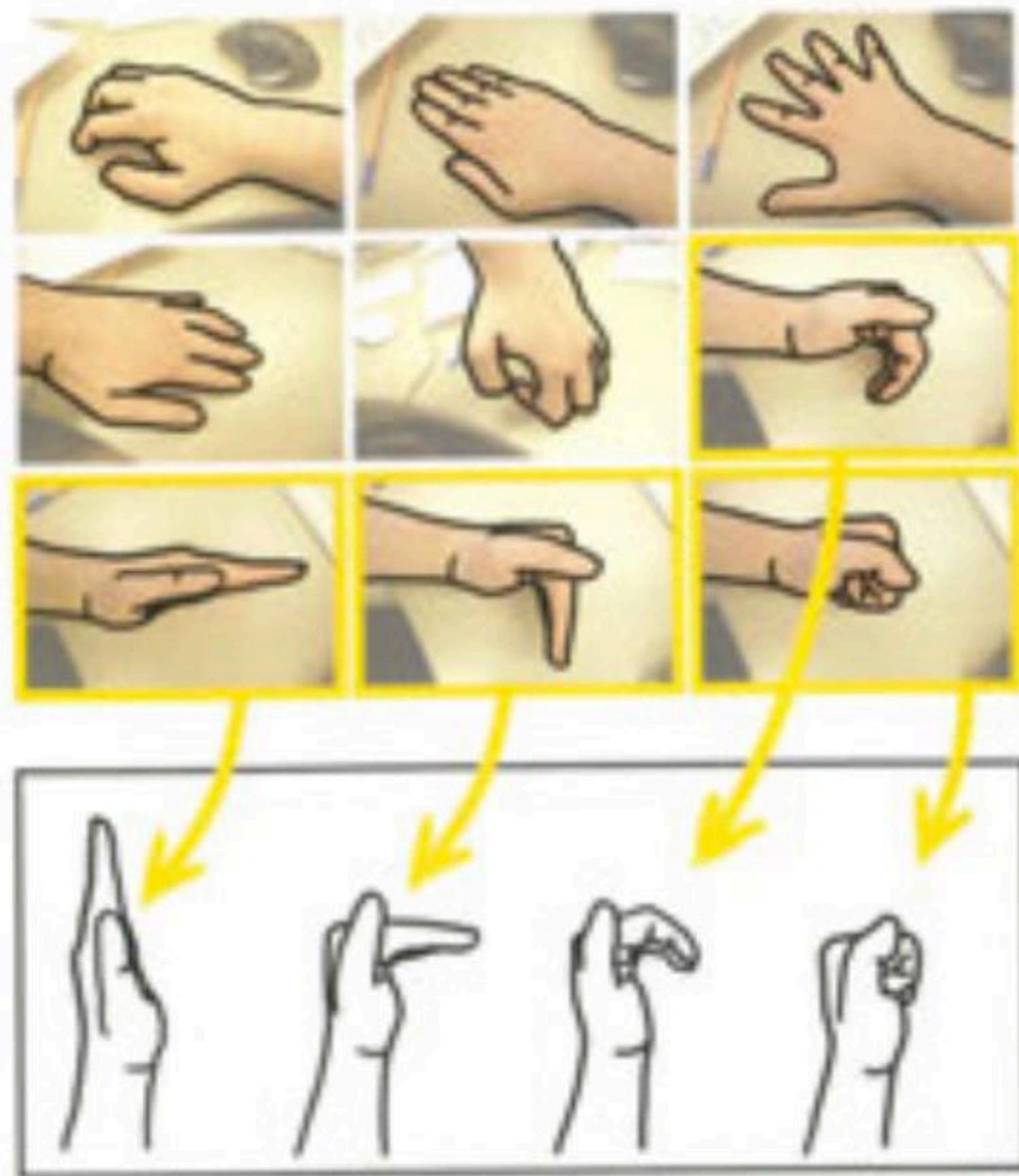
# Sketching Technique: Photo Tracing

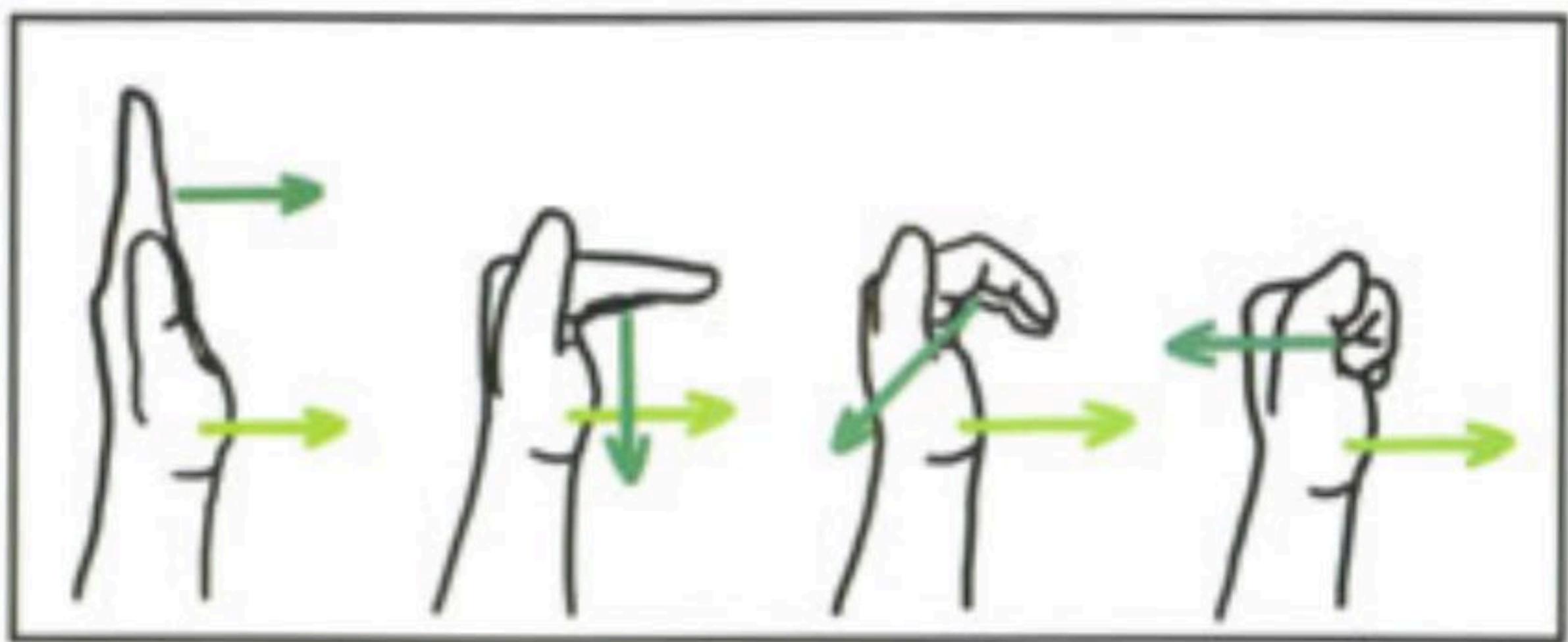


# Sketching Technique: Photo Tracing

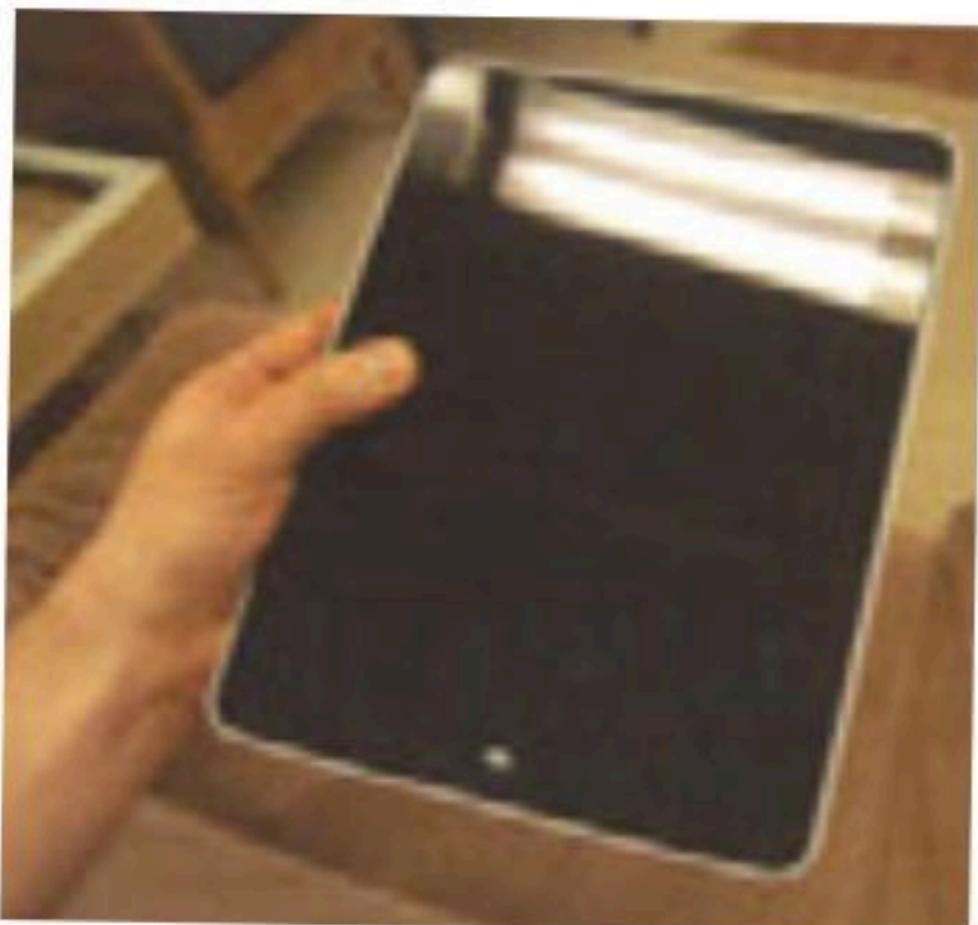




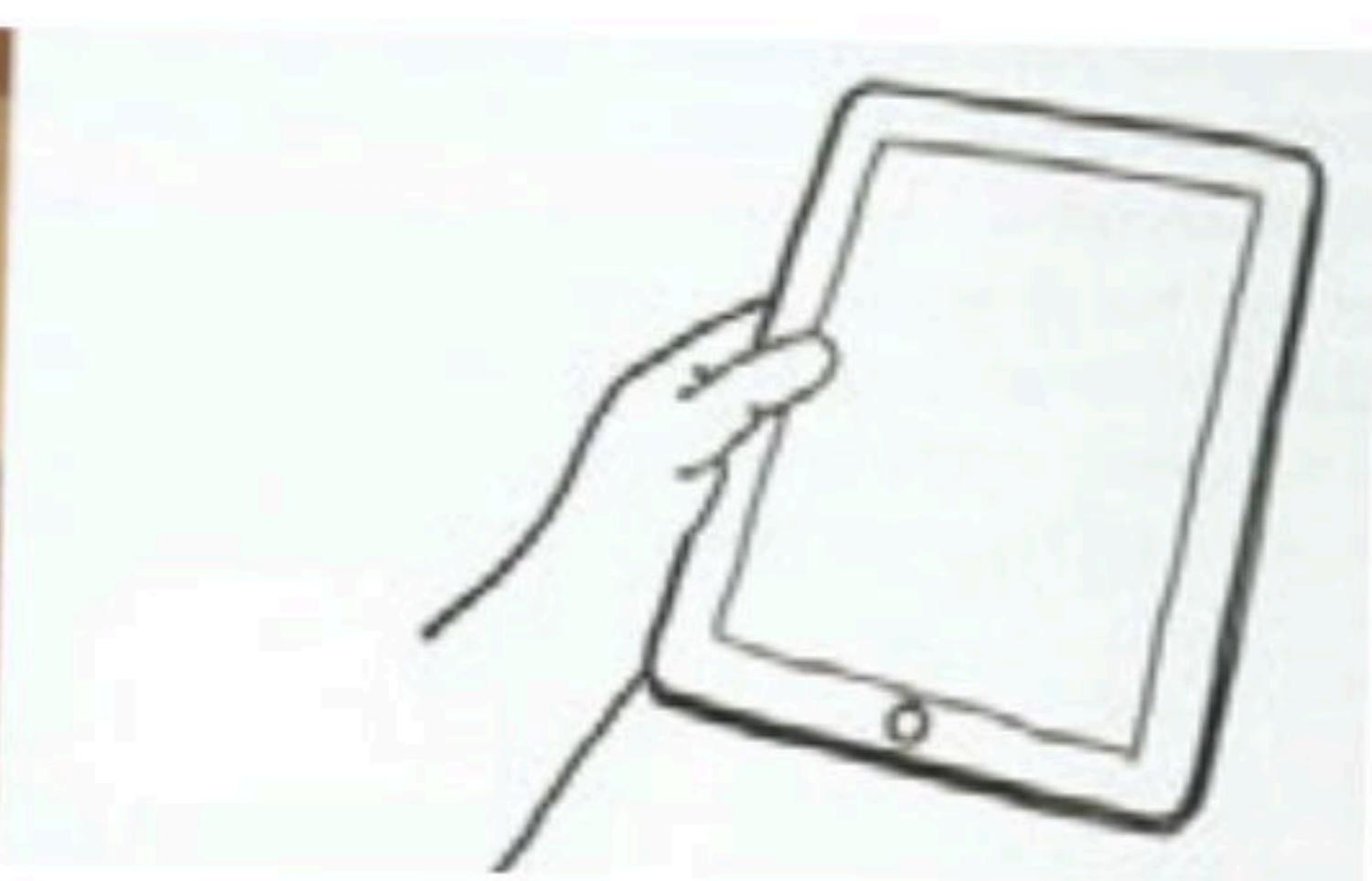
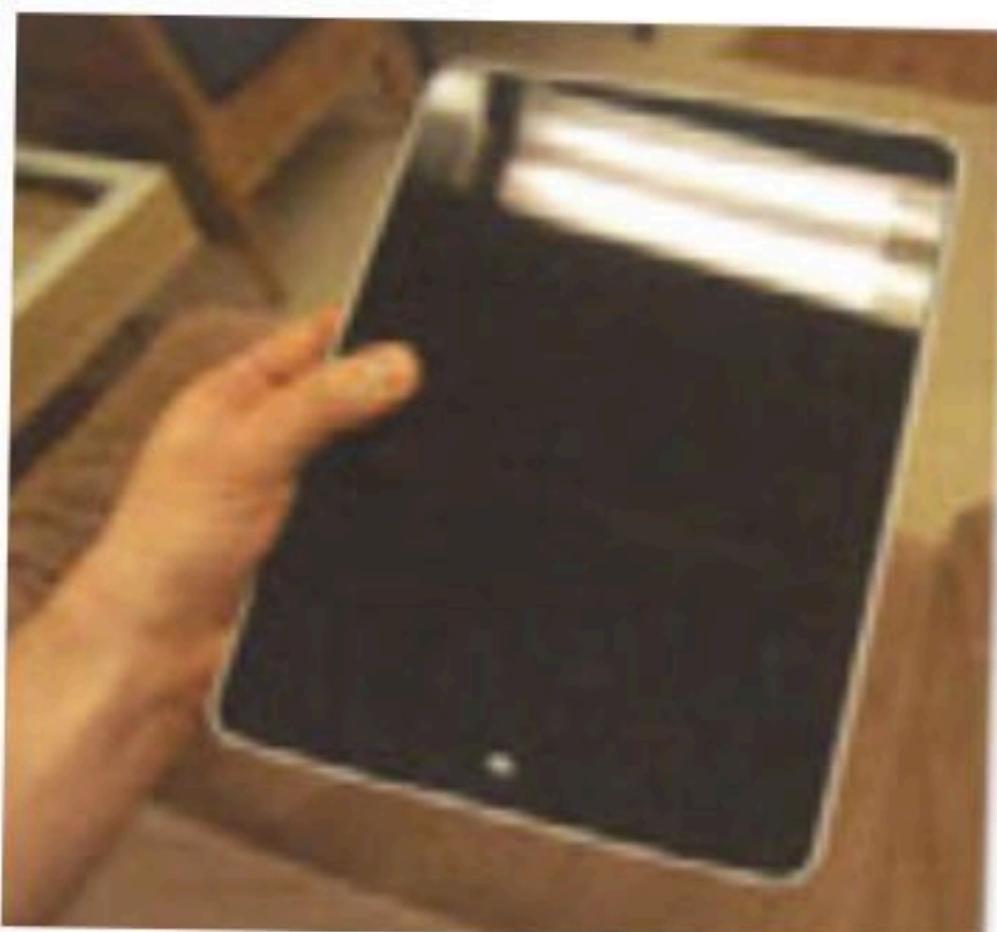




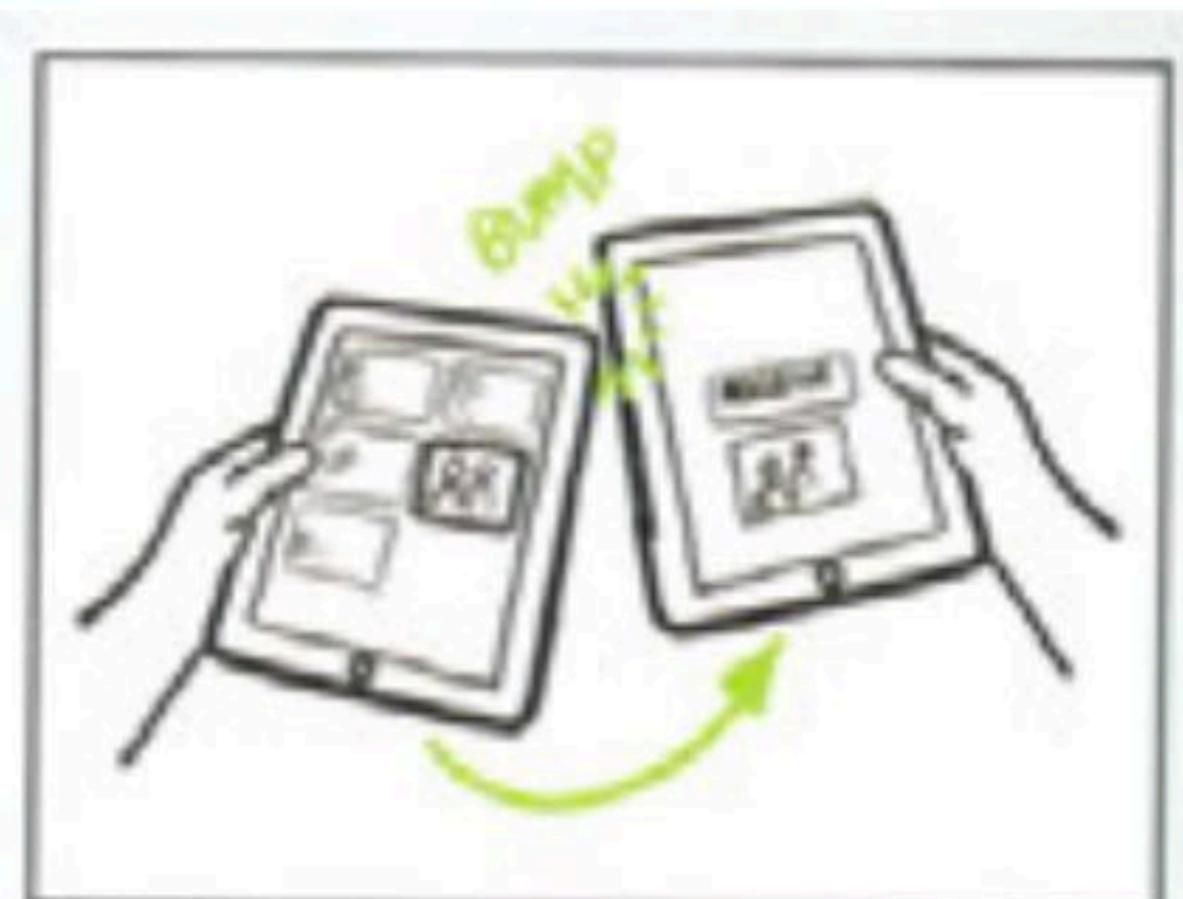
# Sketching Technique: Templates

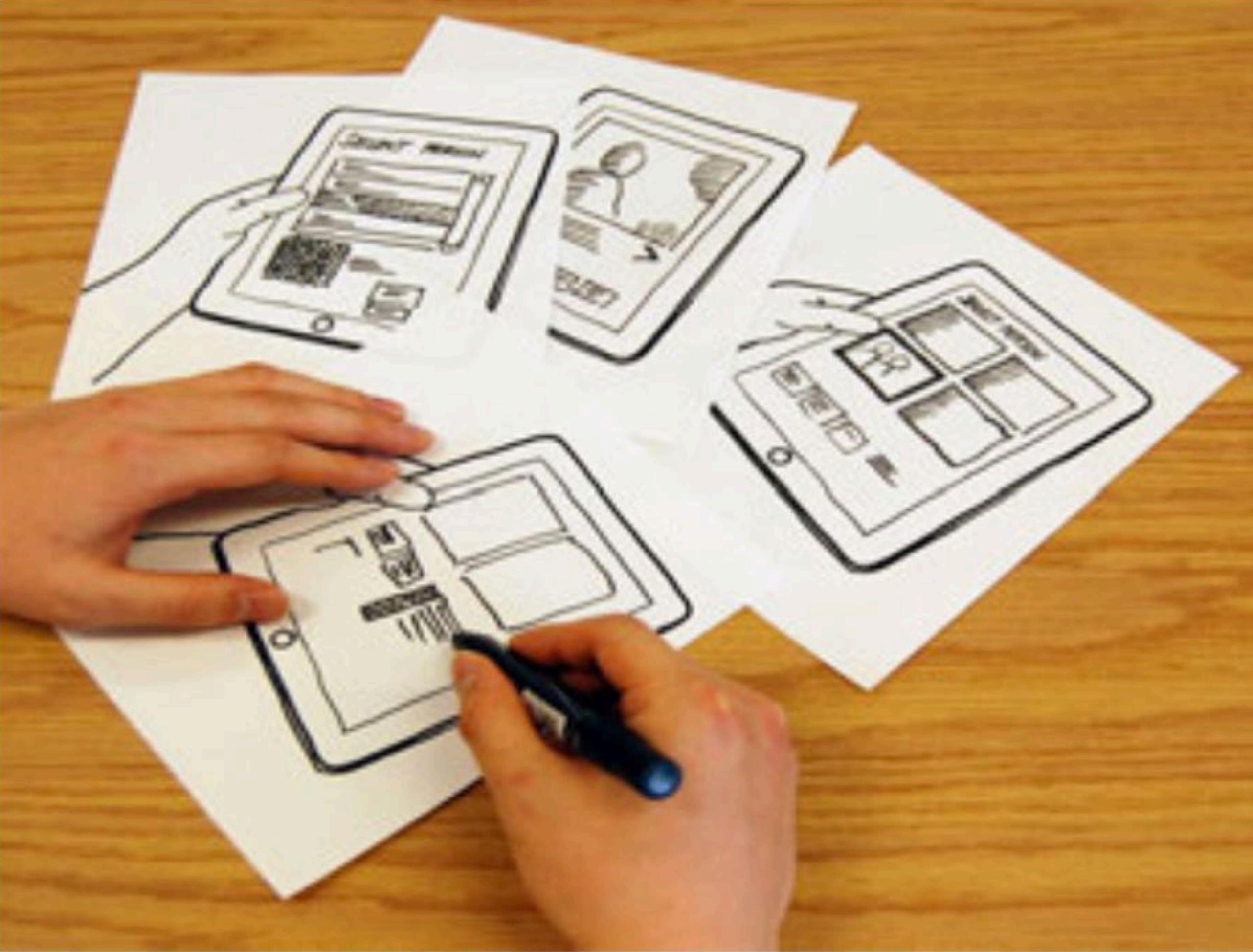


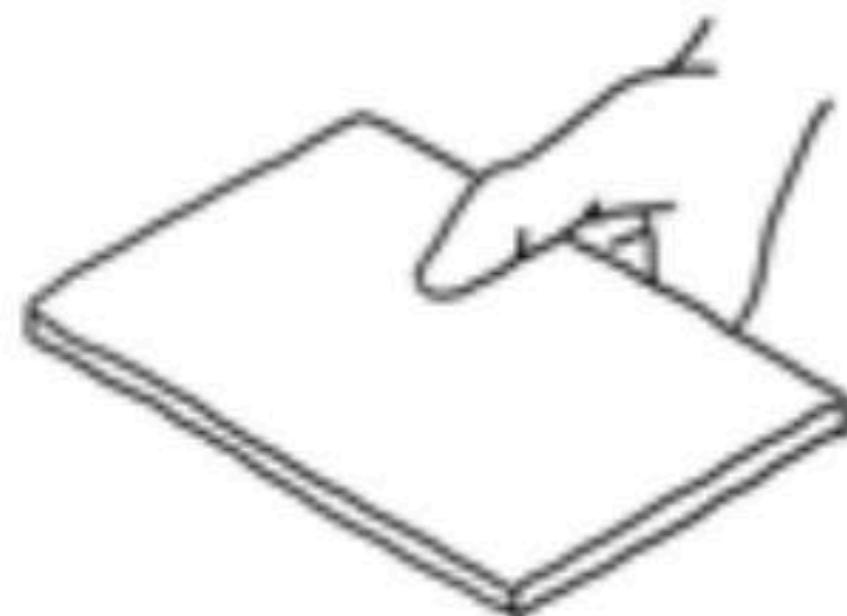
# Sketching Technique: Templates

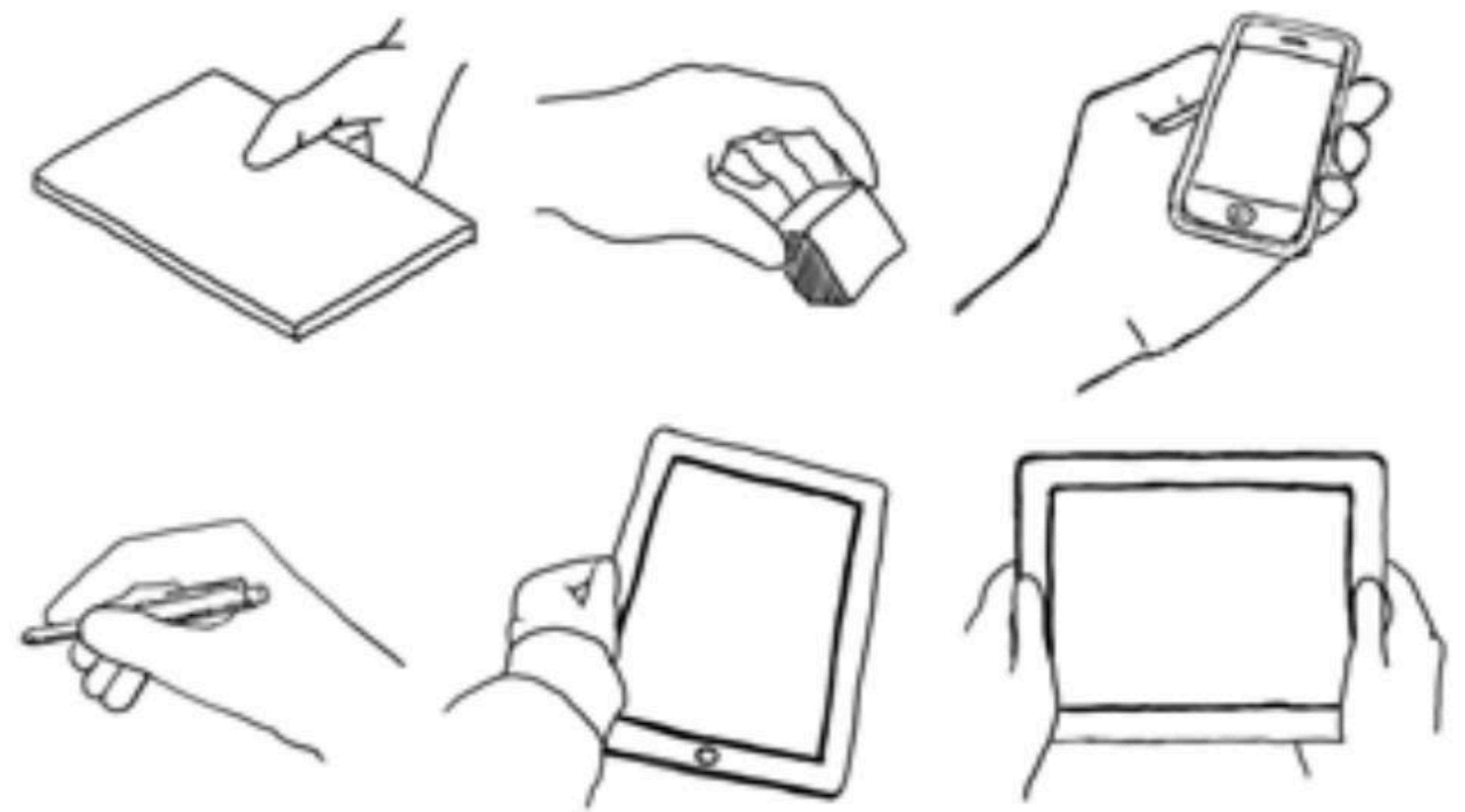


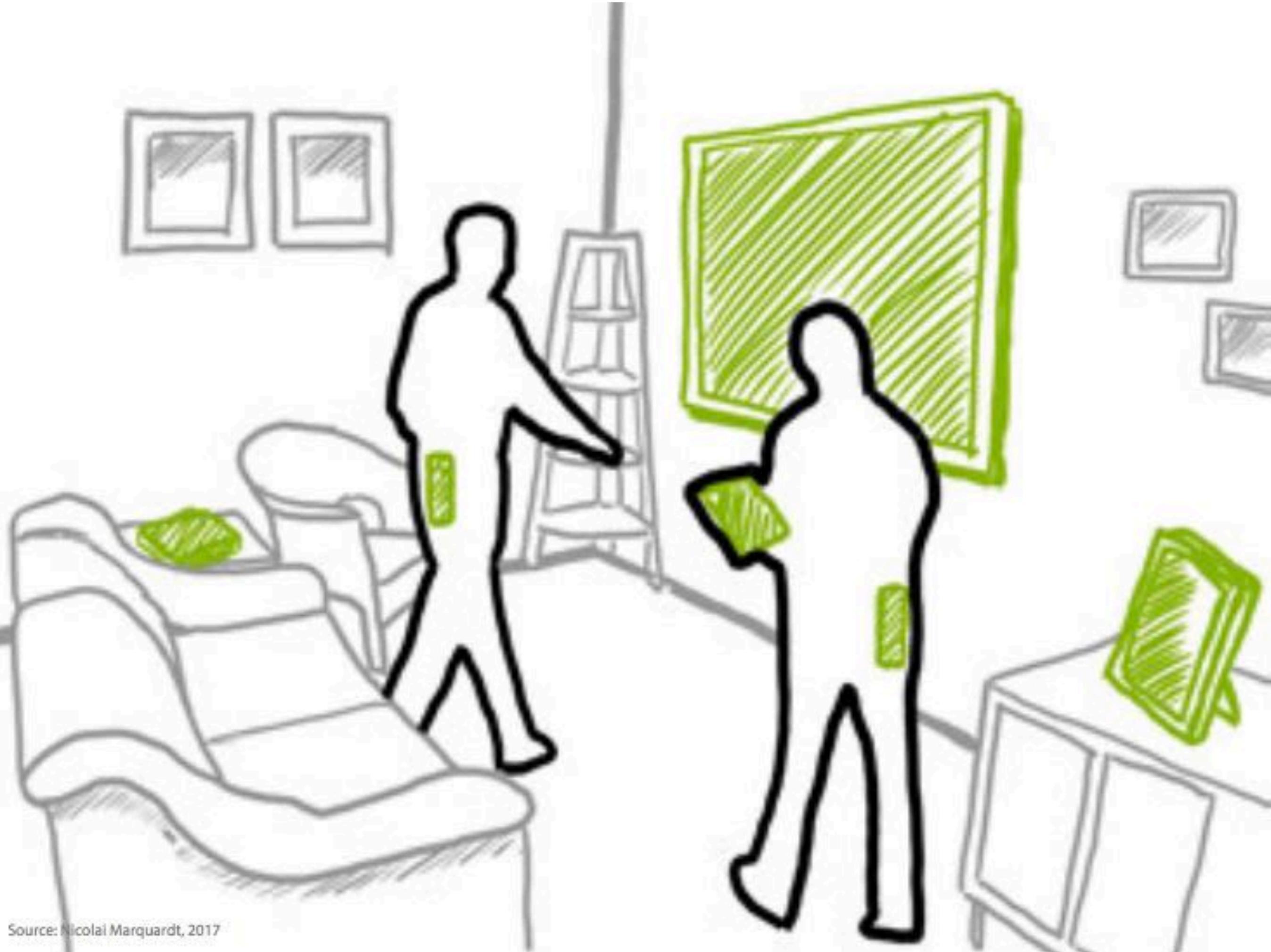
# Sketching Technique: Templates

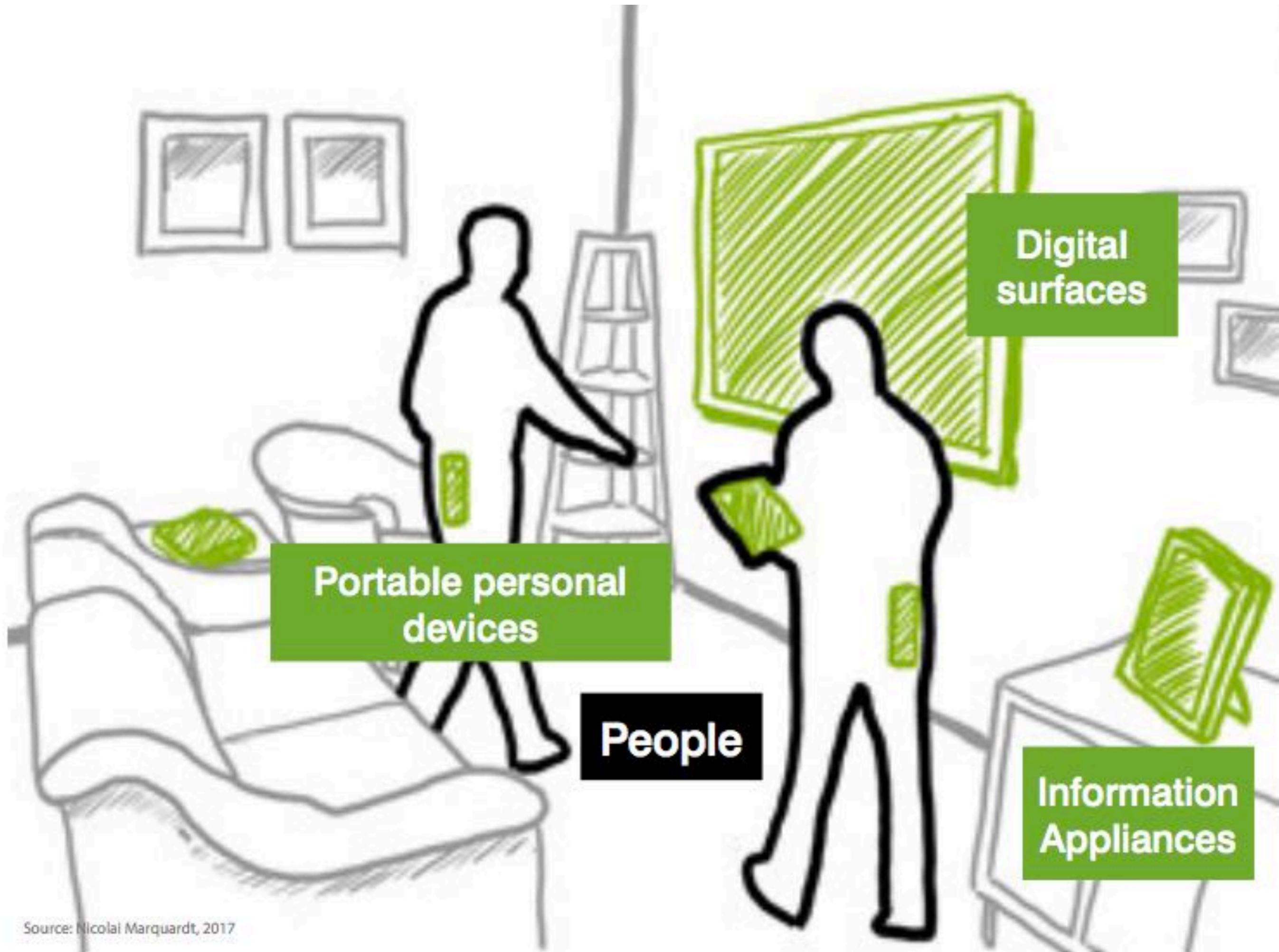






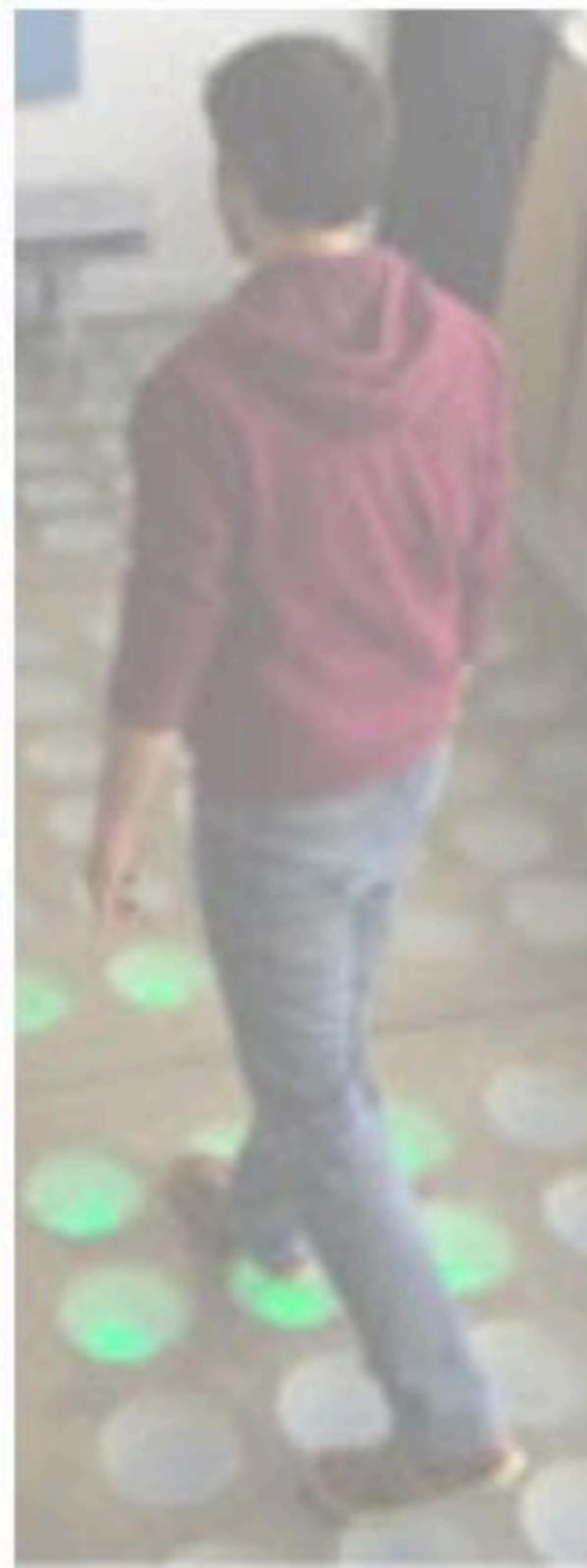




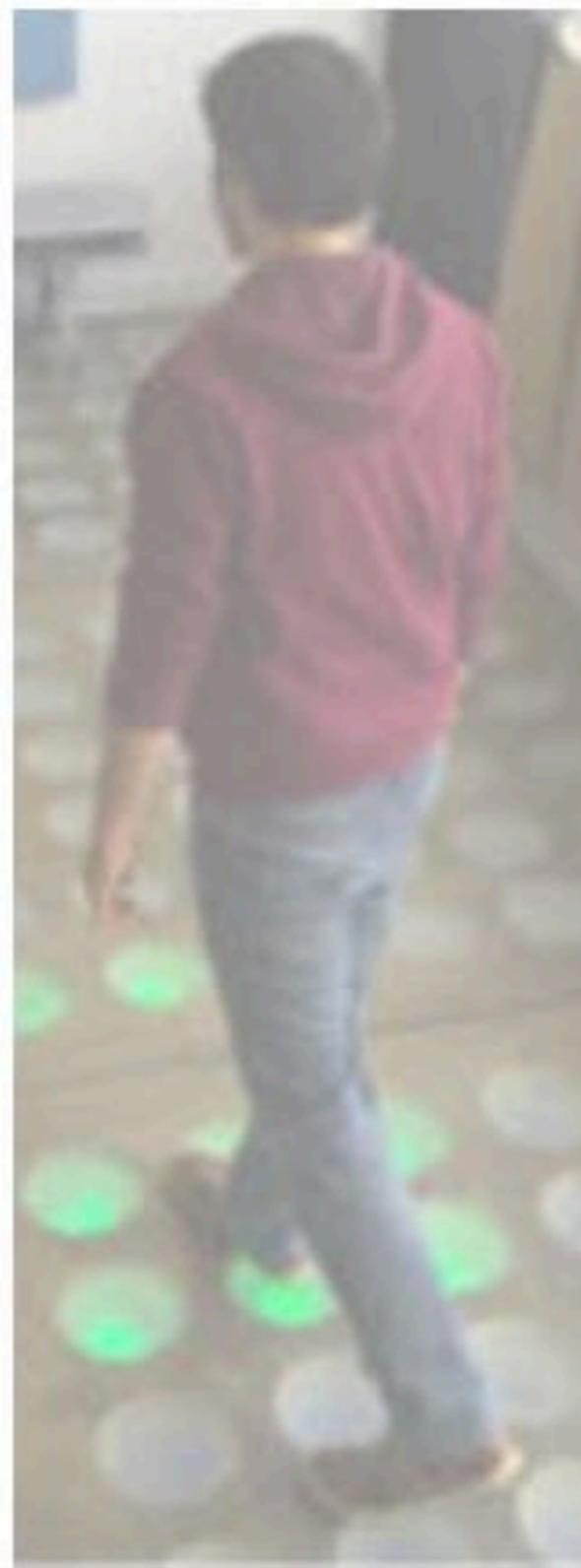


# Tricks for photo tracing

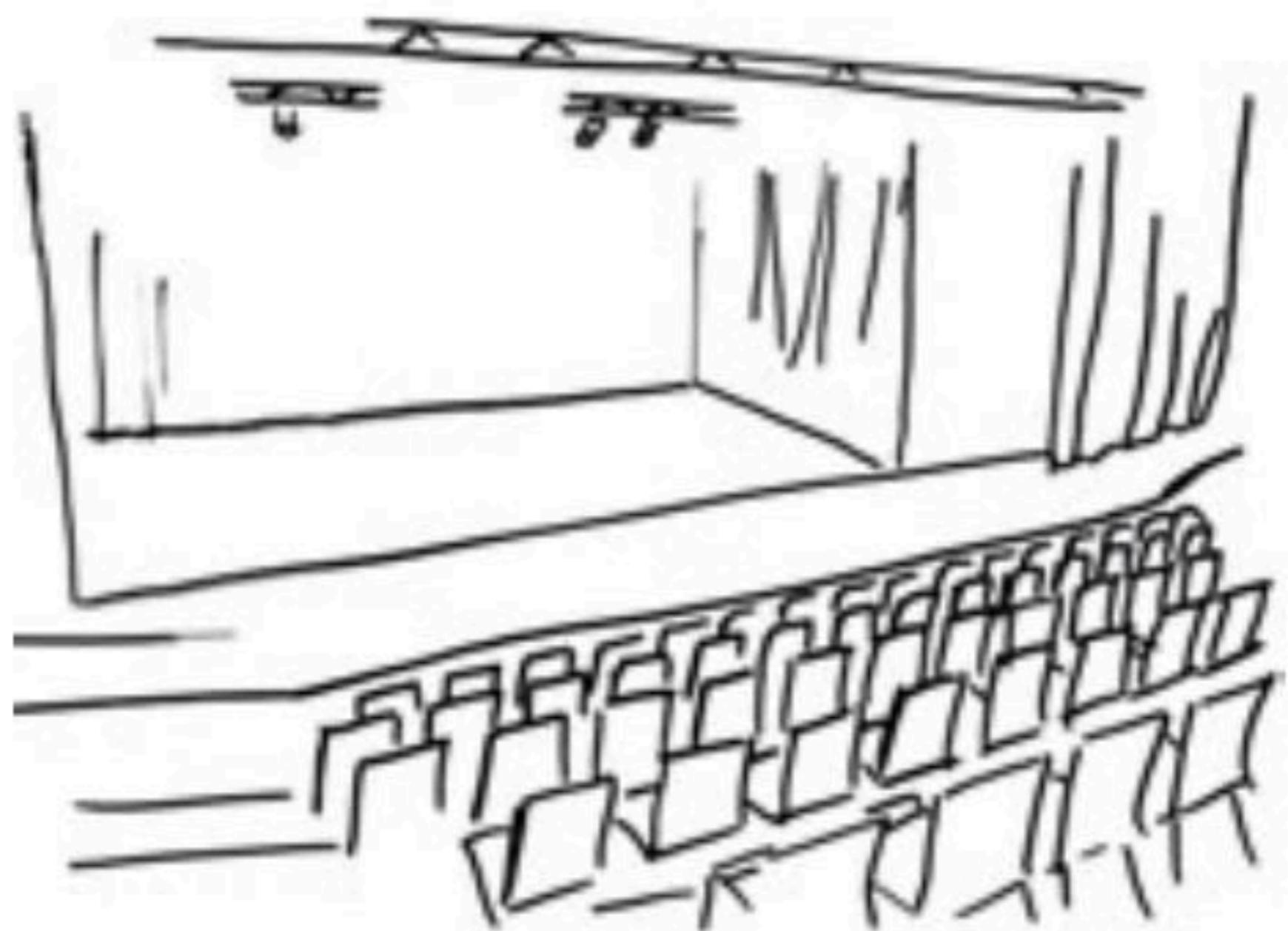
Tricks for photo tracing:  
**Begin with major  
outline, then add  
minimal details**



Tricks for photo tracing:  
**Begin with major  
outline, then add  
minimal details**



Tricks for photo tracing:  
**Leave space for later sketching**



Tricks for photo tracing:  
**Emphasize major elements through thicker lines**



# *Hands-on Sketching: Photo Tracing*

# Sketching Technique: More examples of templates and photo tracing

① DANCE - TO - MOVE

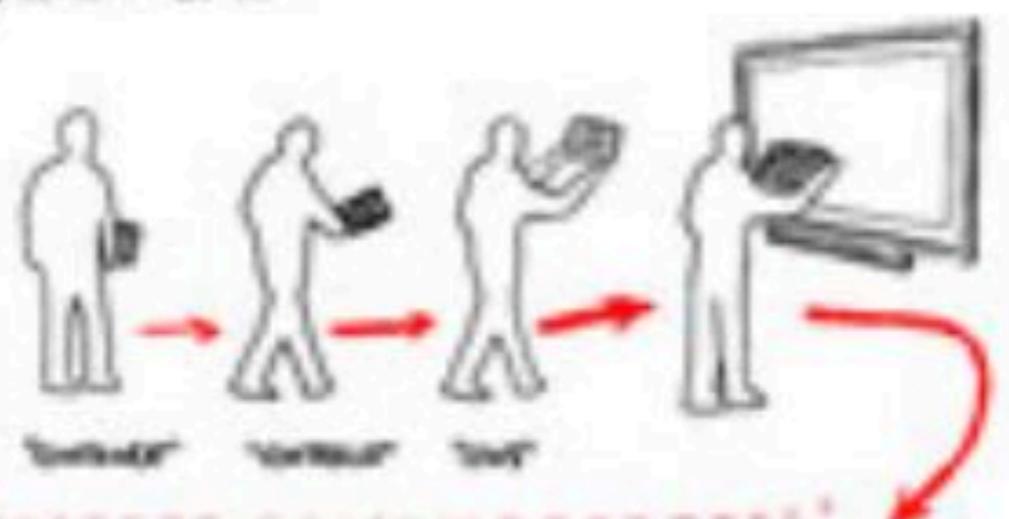
- move
- activity
- music
- movement



② DANCE - TO - MOVE (SILENT, MUSICAL, MOVE)



③ DANCE - TO - MOVE (MOVE)

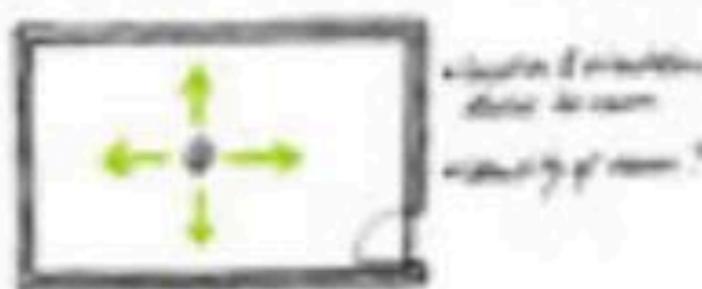


The sequence of movement can be described as a circle or a spiral. The movement is continuous and rhythmic.

④ DANCE - TO - MOVE (MOVE)



⑤ DANCE - TO - MOVE (MOVE) (ROTATION / SWING)



⑥ DANCE - MOVEMENTS

- move
- activity
- music
- physical action
- visual activation (green square)

① DANCE - IN - PAIR

- dancing  
- dancing in pairs



② DANCE - IN - PAIR WITH STATION, SWING, AND

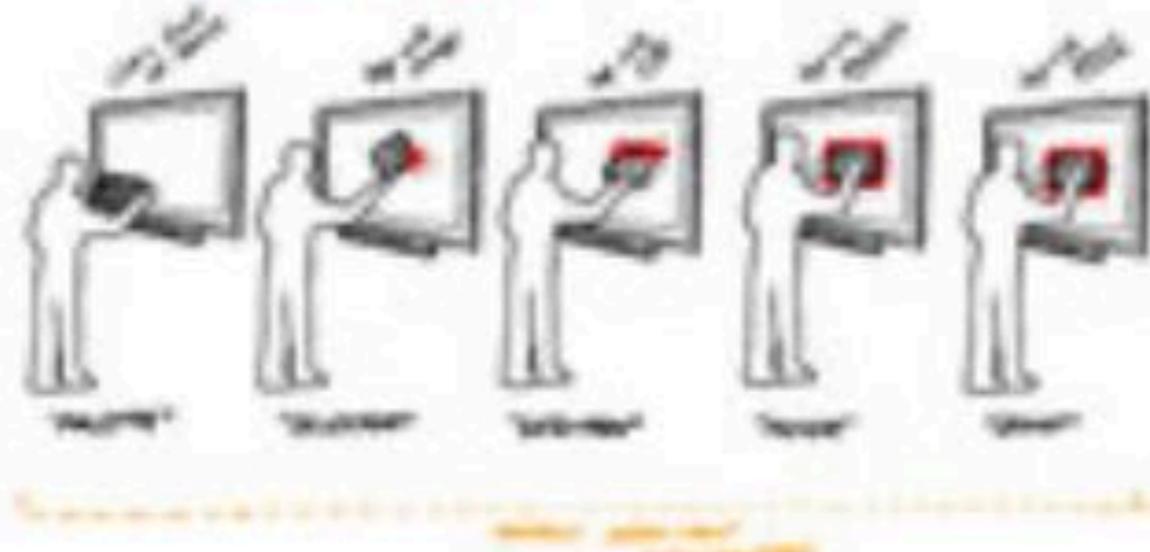


③ DANCE - IN - PAIR

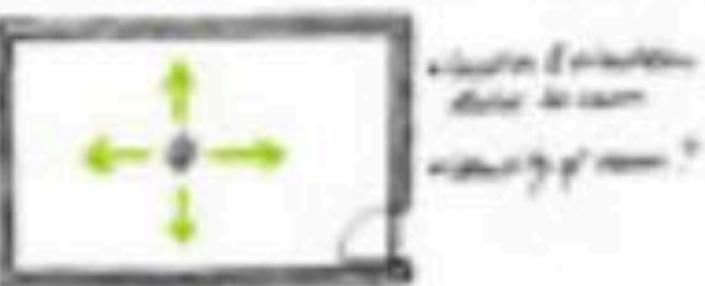
- dancing  
- dancing in pairs



④ DANCE - IN - PAIR WITH THE OBJECTS  
(color or colour in other?)

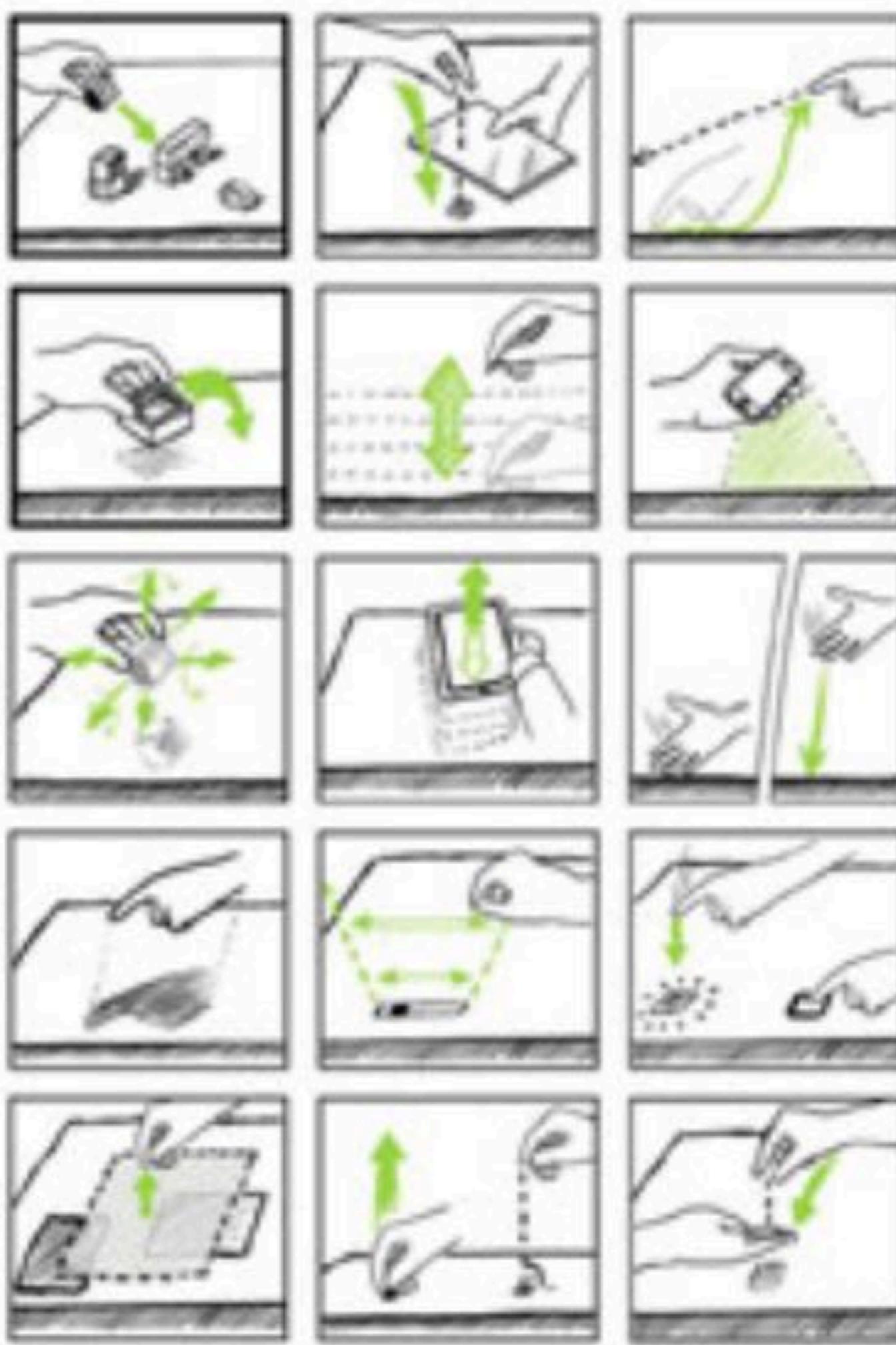


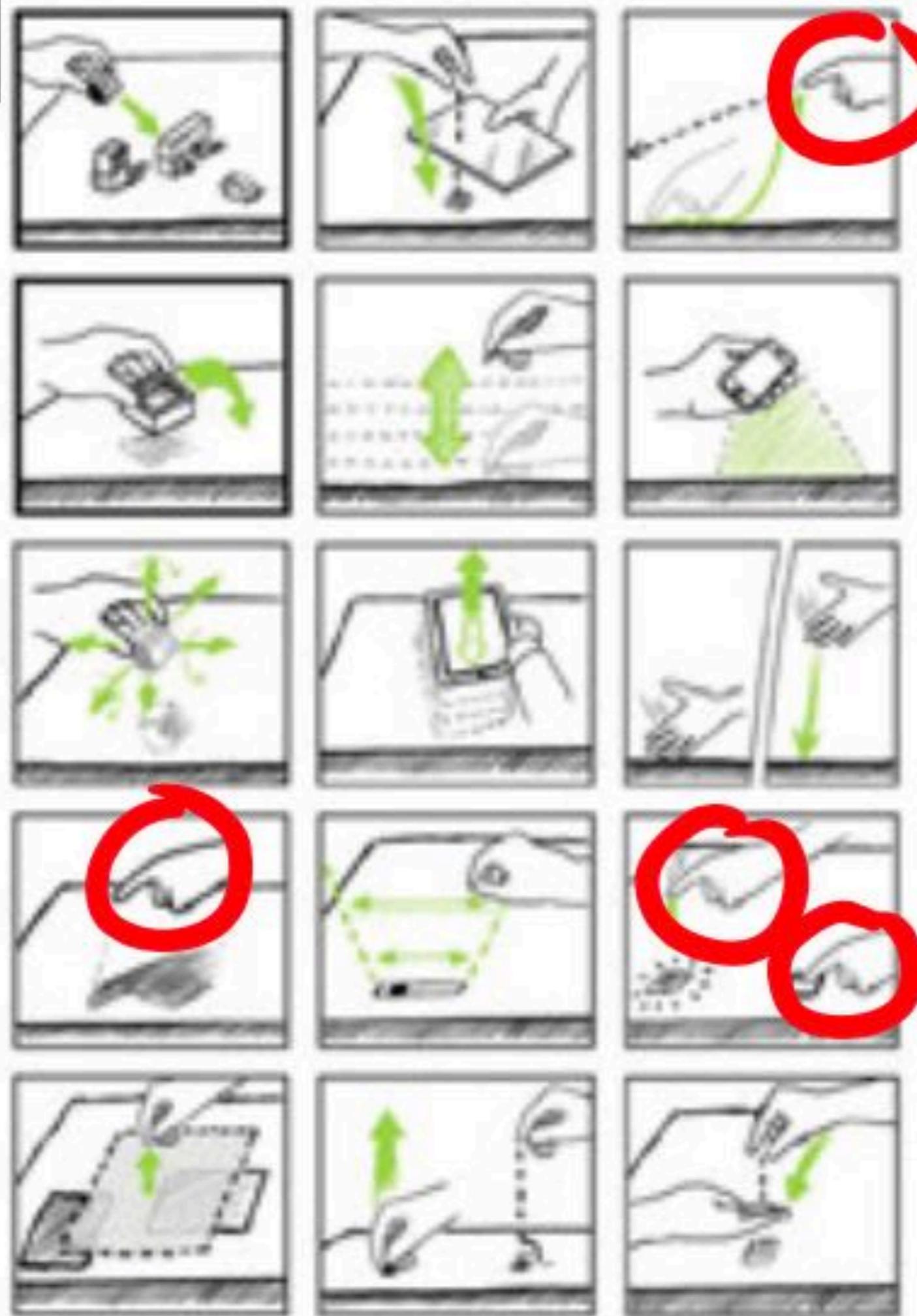
⑤ DANCE - IN - PAIR (PAIRS) / SWINGING

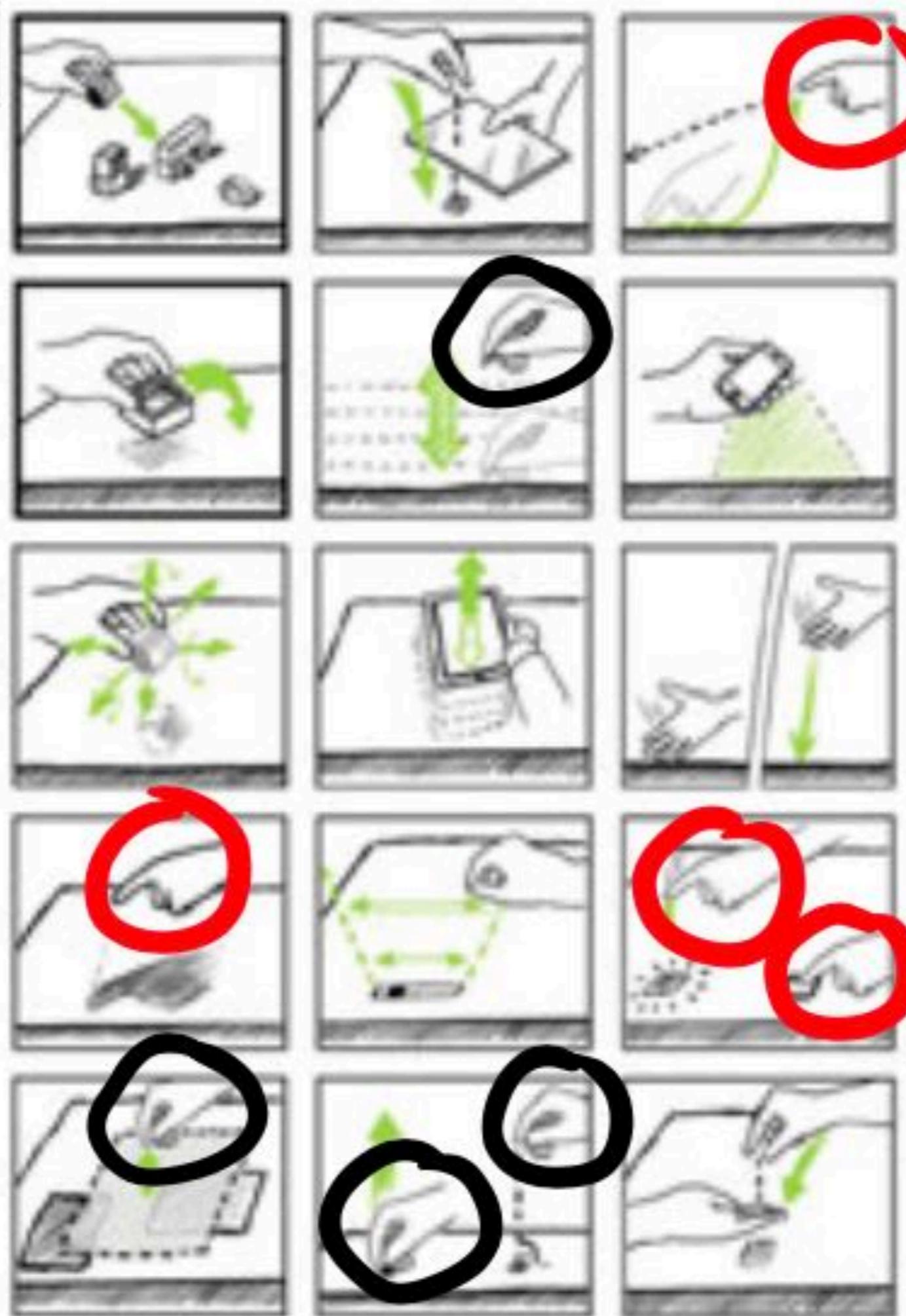


⑥ DANCE - MUSICAL

- dancing  
- dancing in pairs  
- dancing in groups  
- dancing in pairs  
- dancing in pairs  
- dancing in pairs











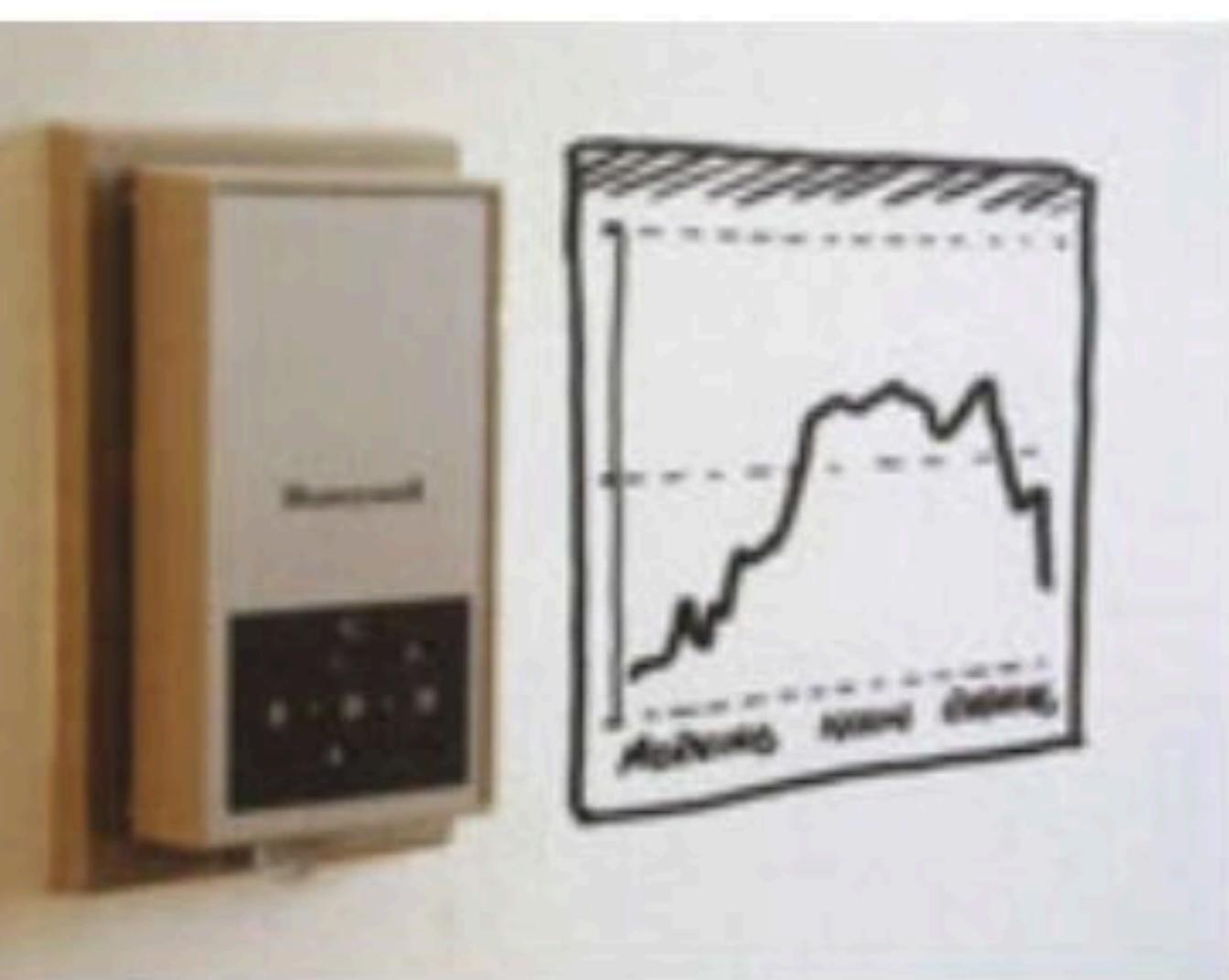
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# Sketching Technique: **Hybrid Sketches**





# Sketching Technique: Hybrid Sketches



# Sketching Technique: Hybrid Sketches

