Interactive prototyping in the early stages of the design process

User Interface Design seminar

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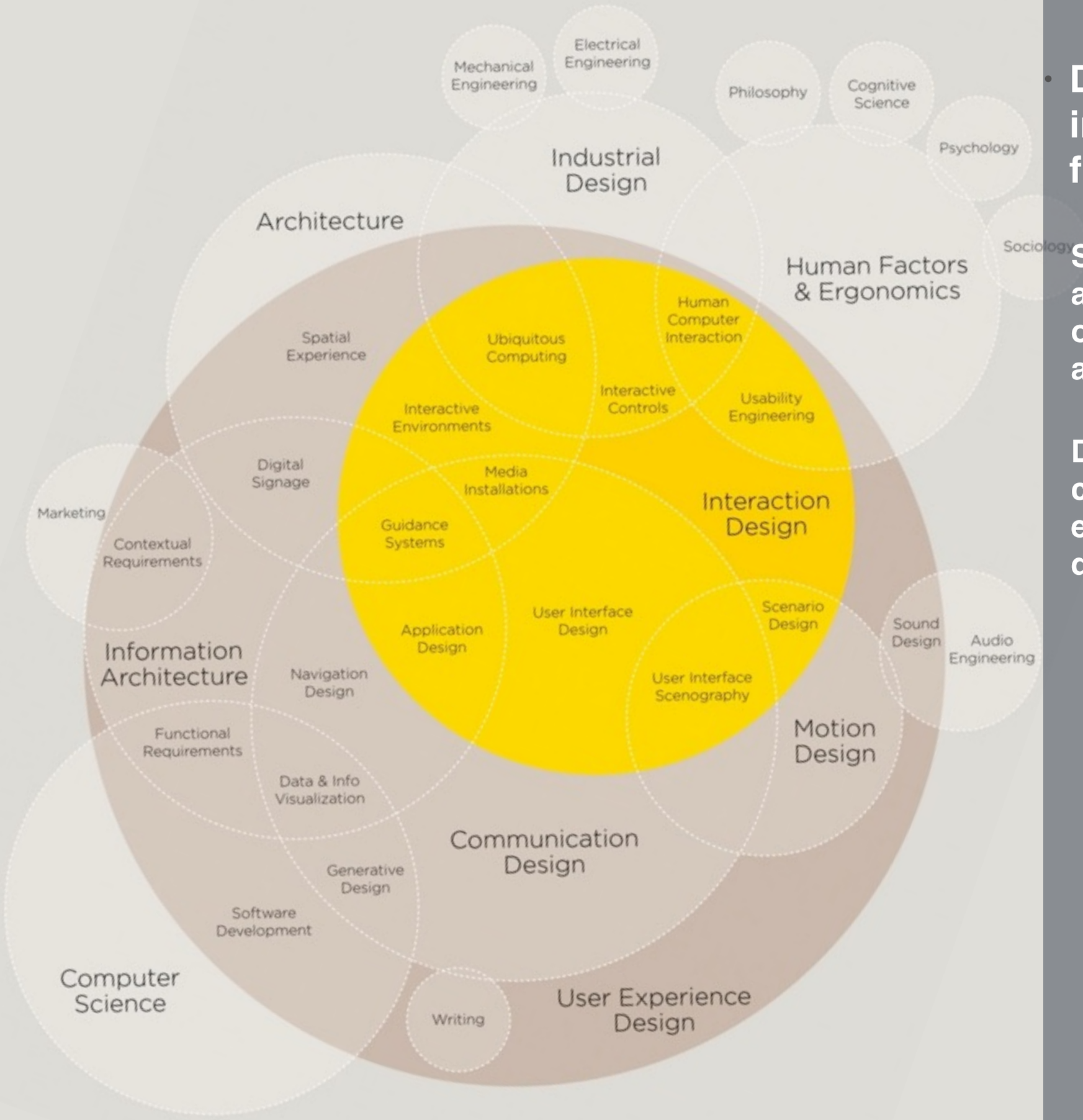
software engineering, computer graphics, computer networks

interactive media art

interaction design

Source: Concept Interaction style Toolkit - Interactive Technology Design

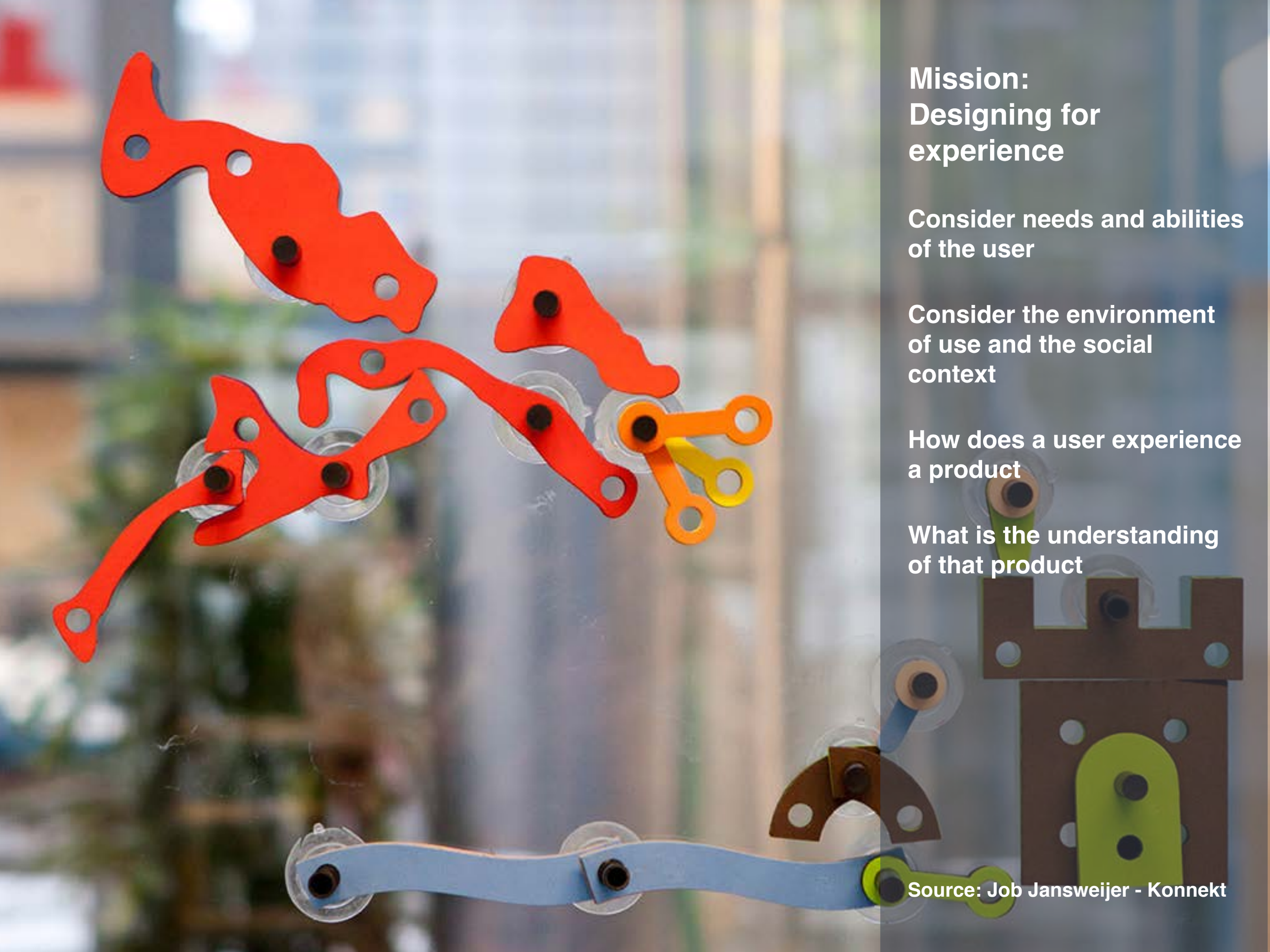


- **Design integrates knowledge from many disciplines**

Software engineers think: abstraction, maintenance, optimisation, efficiency, adaptability, code is poetry

Designers think: concrete, one-off, towards experience, quick to evaluate

- **Source: www.envis-precisely.com**



Mission: Designing for experience

Consider needs and abilities of the user

Consider the environment of use and the social context

How does a user experience a product

What is the understanding of that product

Source: Job Jansweijer - Konnekt

Products with embedded technology

Sensors

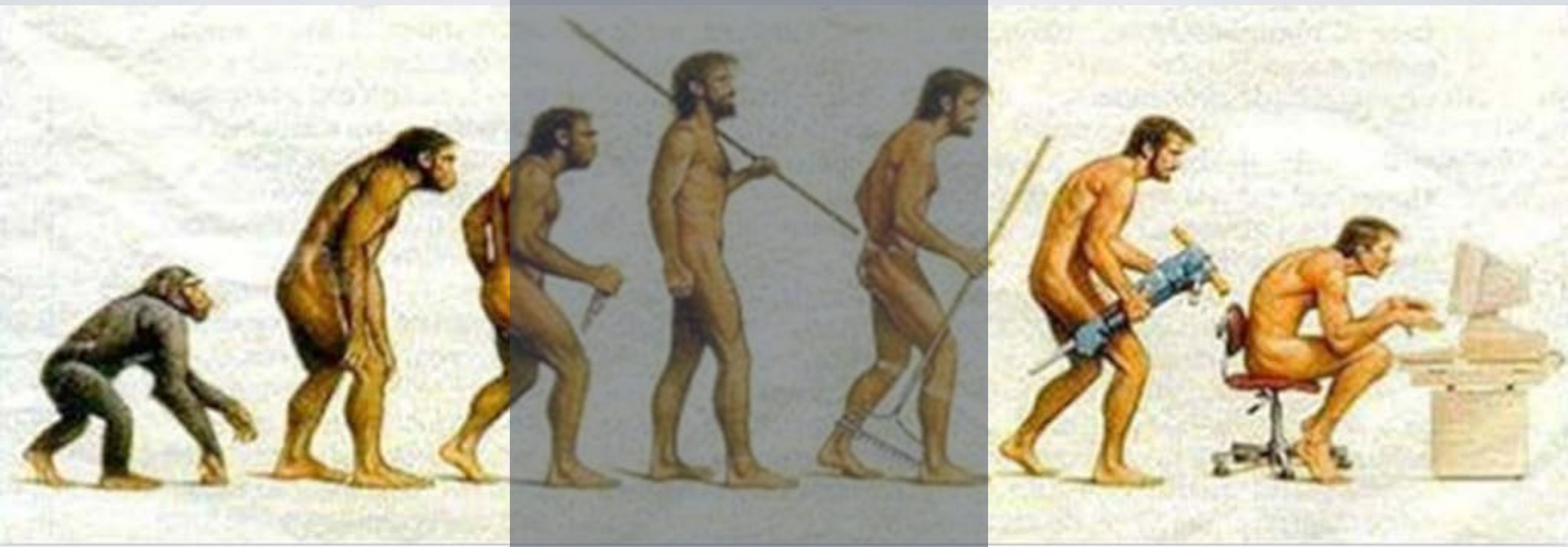
Actuators

Microcontrollers

Source: Concept Liv - www.interactive-environments.nl

Evolution of man

From ape to knowledge worker



Homo WIMPi

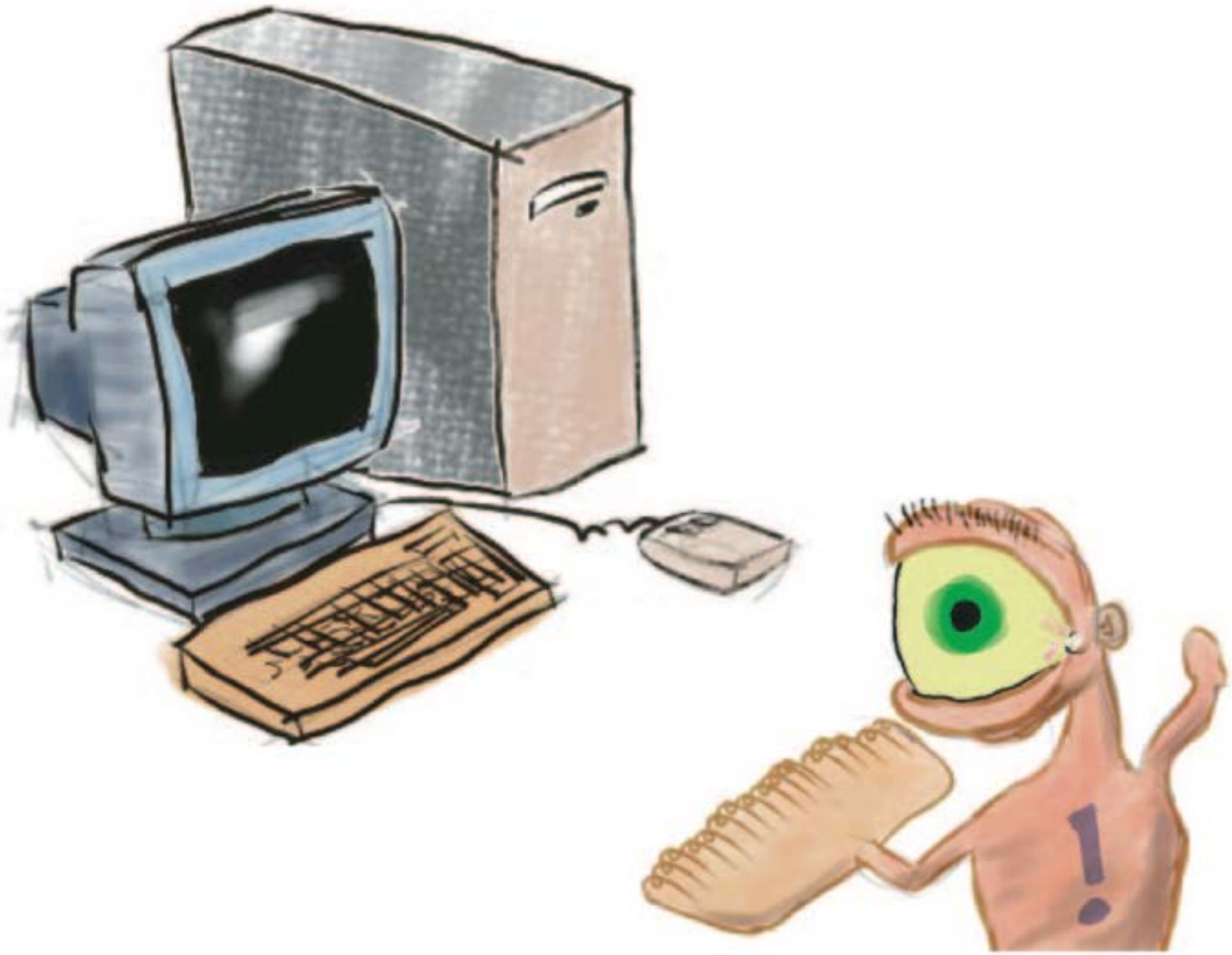
Windows

Interface

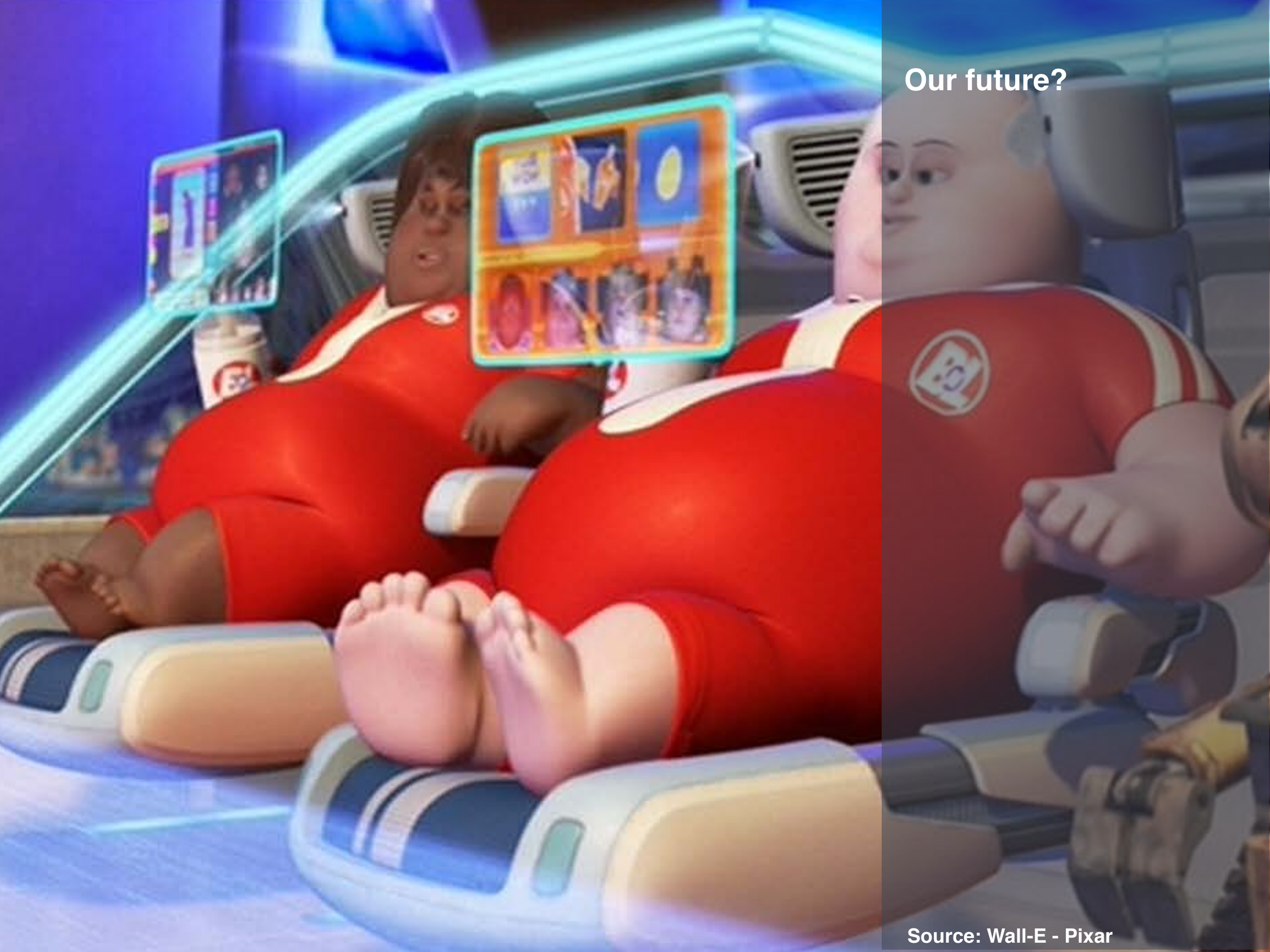
Mouse

Pointer

interaction



Source: Bill Buxton (1986)


Our future?
Source: Wall-E - Pixar

Imagine the knowledge worker of the future as the artisan of today

Bodily skills of man are central to interaction

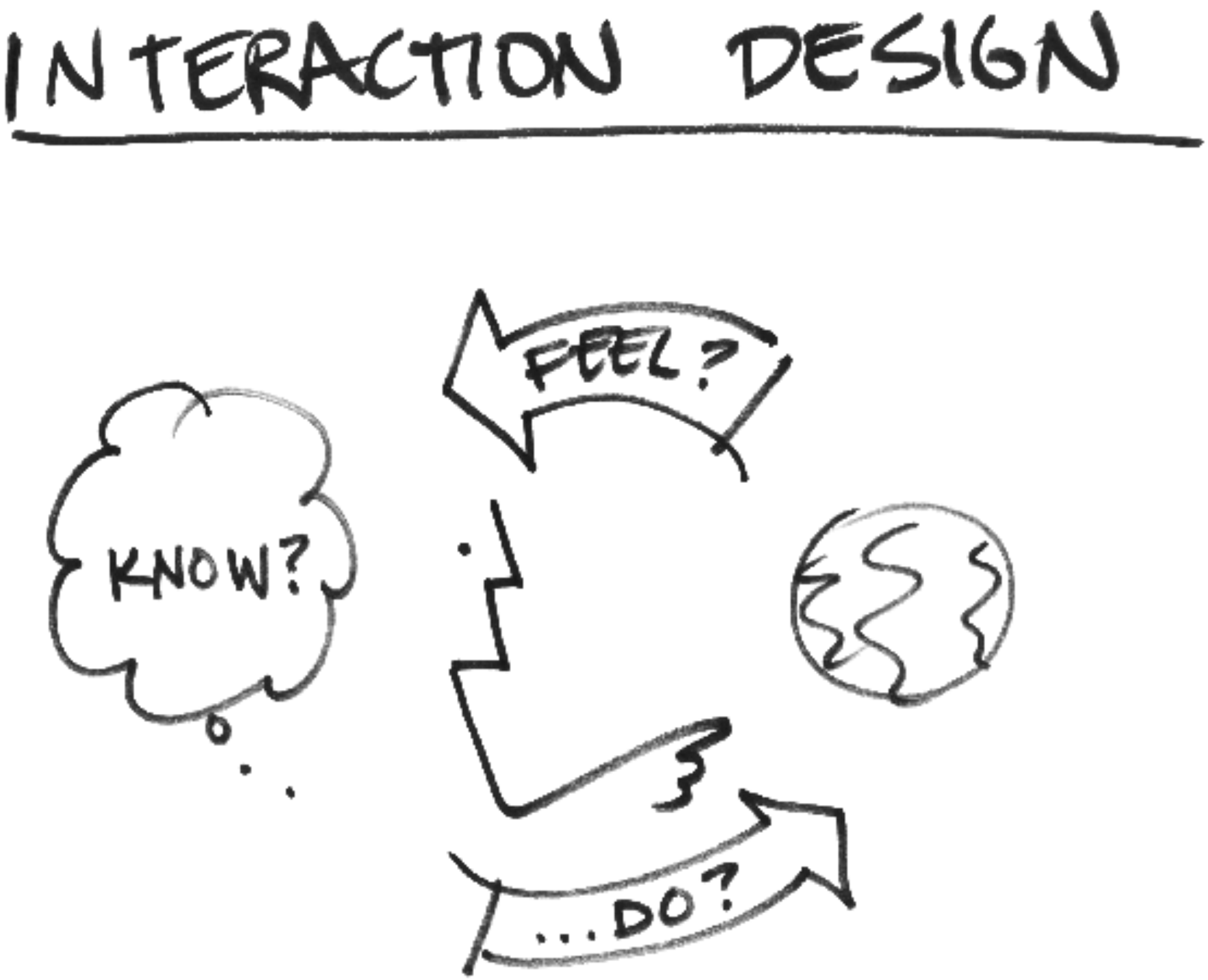
Involves multiple modes of understanding:

Visual, Aural, Tactile, Kinaesthetic,Spatial

Bret Victor - UIST 2014:
On Humane Representation of Thought

How to design for interaction

Source: Concept Traho - Interactive Technology Design



Ingredients of interaction design

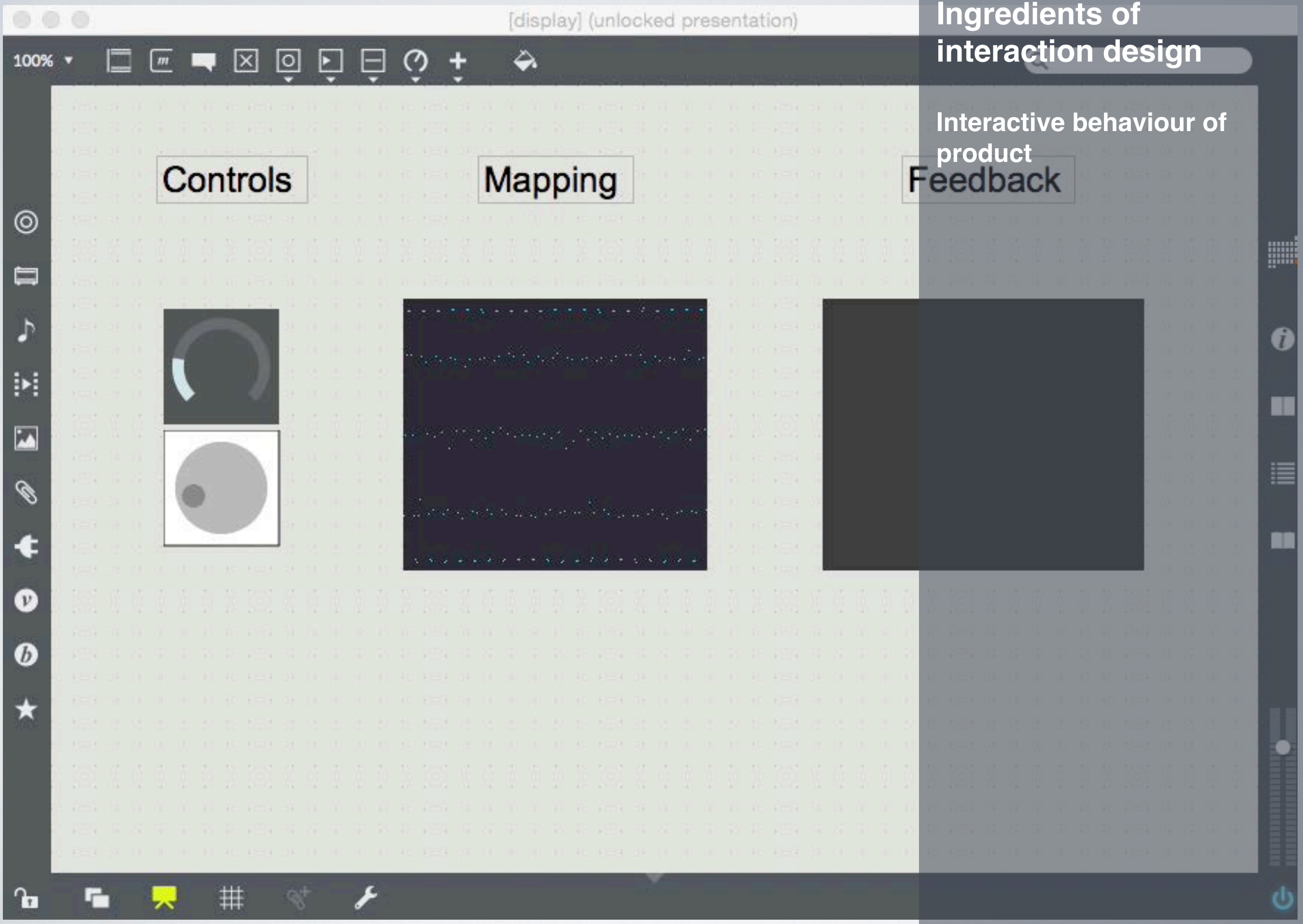
What does the user

know

do

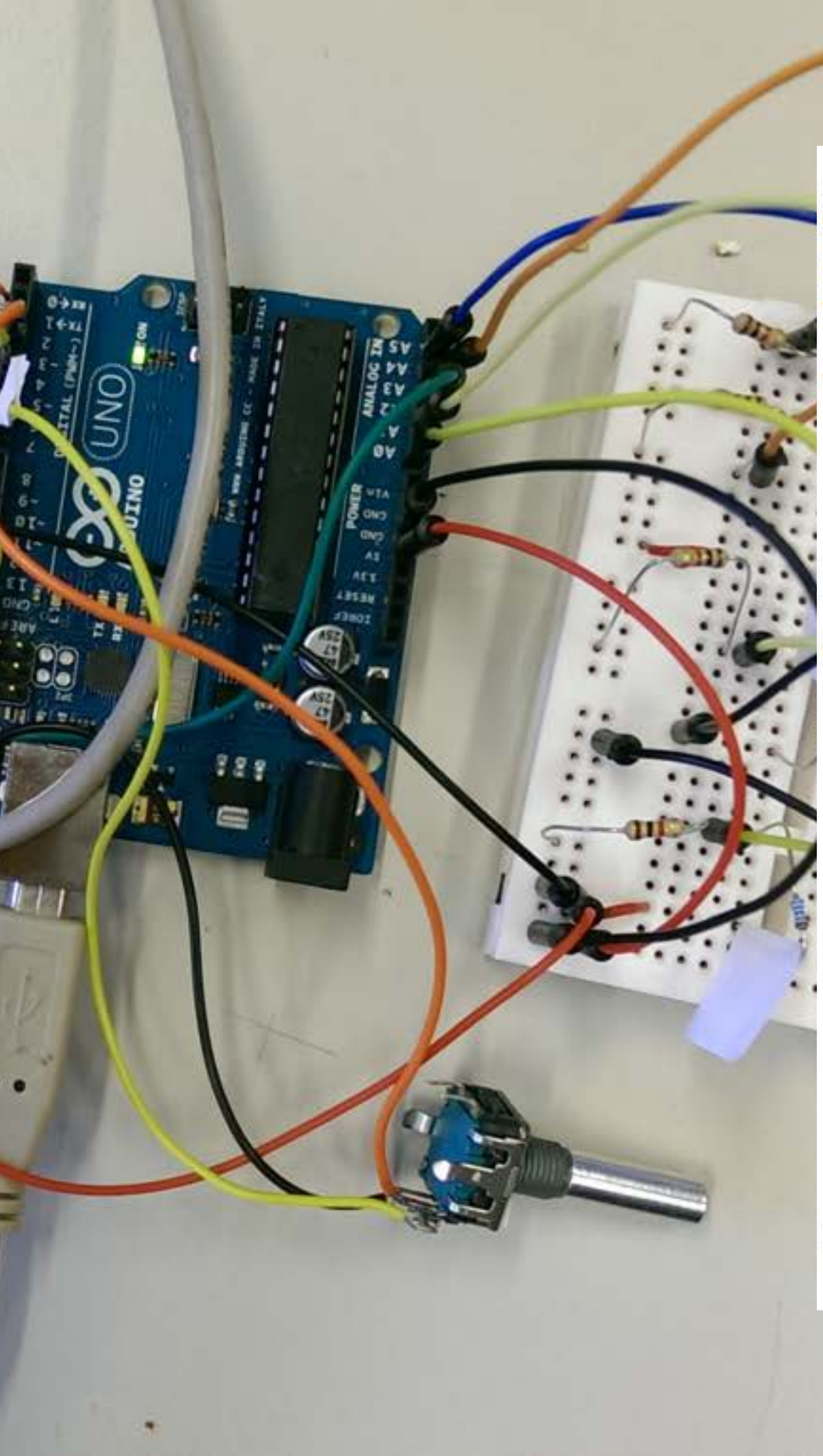
feel

Source: Bill Verplank (2001)



Ingredients of interaction design

Interactive behaviour of product



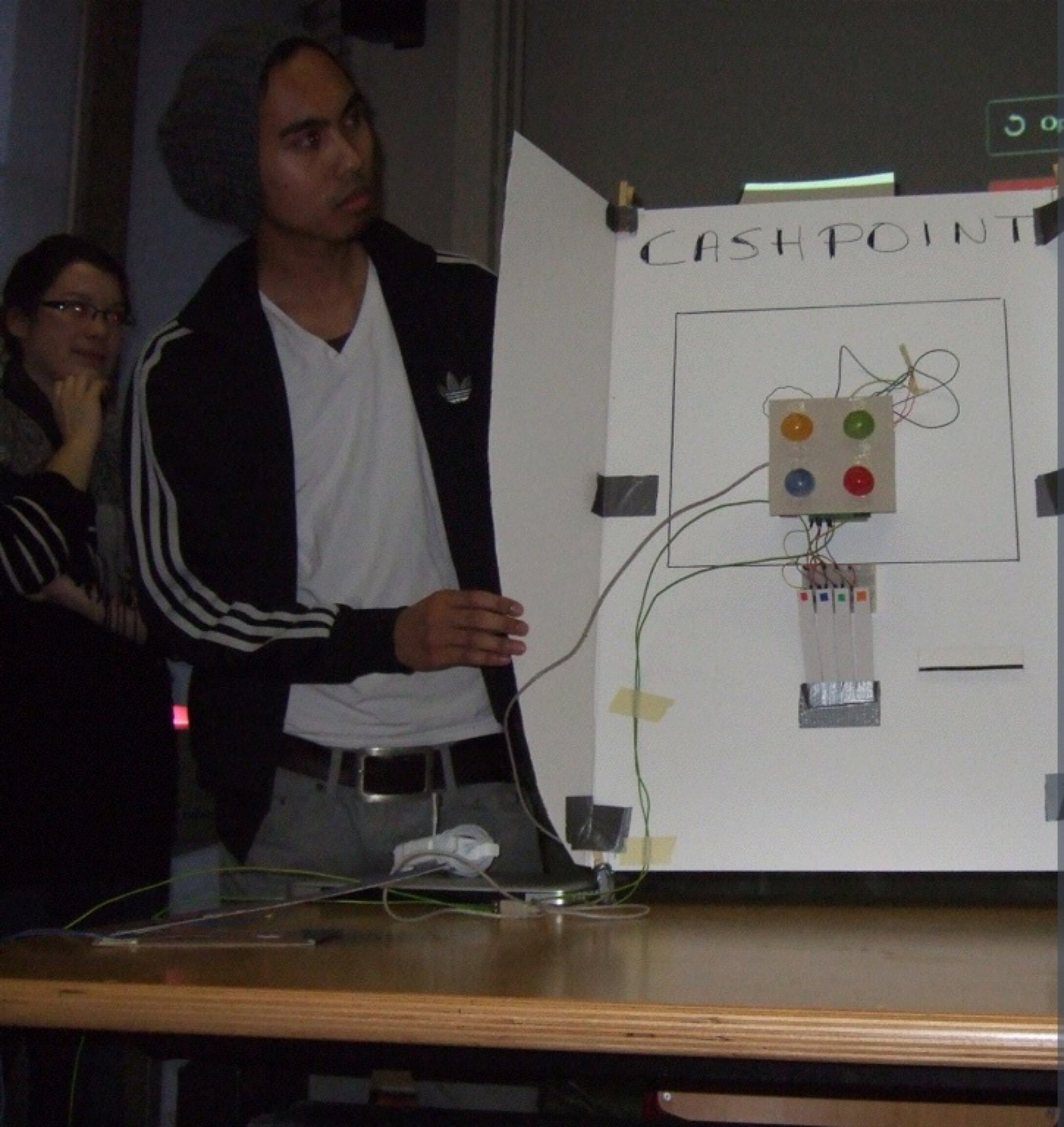
Ingredients of interaction design

electronics and programming

```
// These constants won't change:
const int analogPin = A0;    // pin that the sensor is attached to
const int ledPin = 3;       // pin that the LED is attached to
const int threshold = 400;   // an arbitrary threshold level that's

void setup() {
  // initialize the LED pin as an output:
  pinMode(ledPin, OUTPUT);
  // initialize serial communications:
  Serial.begin(9600);
}

void loop() {
  // read the value of the potentiometer:
  int analogValue = analogRead(analogPin);

  // if the analog value is high enough, turn on the LED:
  if (analogValue > threshold) {
    digitalWrite(ledPin, HIGH);
  }
  else {
    digitalWrite(ledPin, LOW);
  }

  // print the analog value:
  Serial.println(analogValue);
  delay(1);        // delay in between reads for stability
}
```

Ingredients of interaction design

Multi disciplinary design teams



Ingredients of interaction design

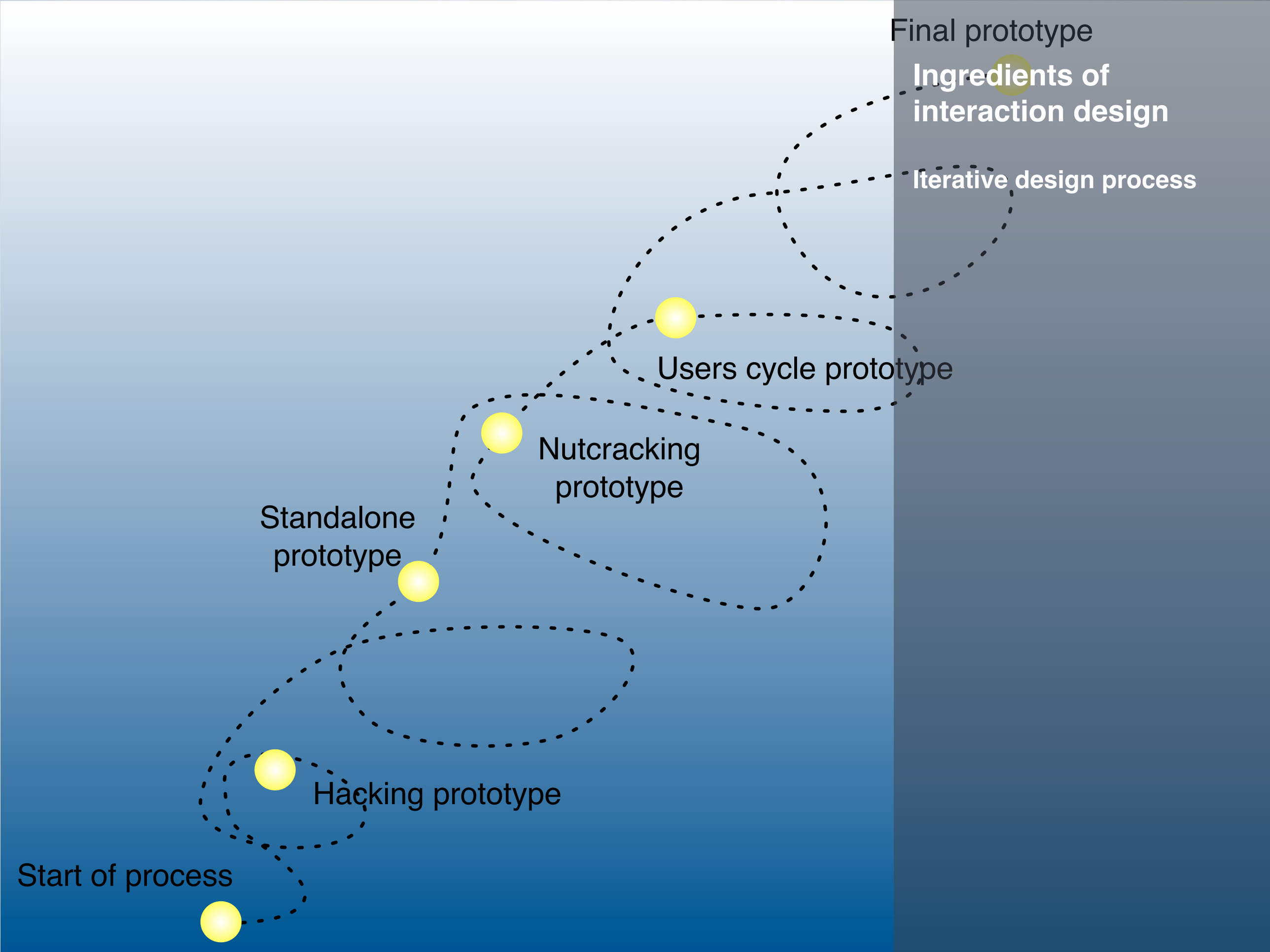
Prototypes

Making-first as a strategy

Thinking, talking, inspiration

Faking, Wizard of OZ

Sketchy first, progressive refinement

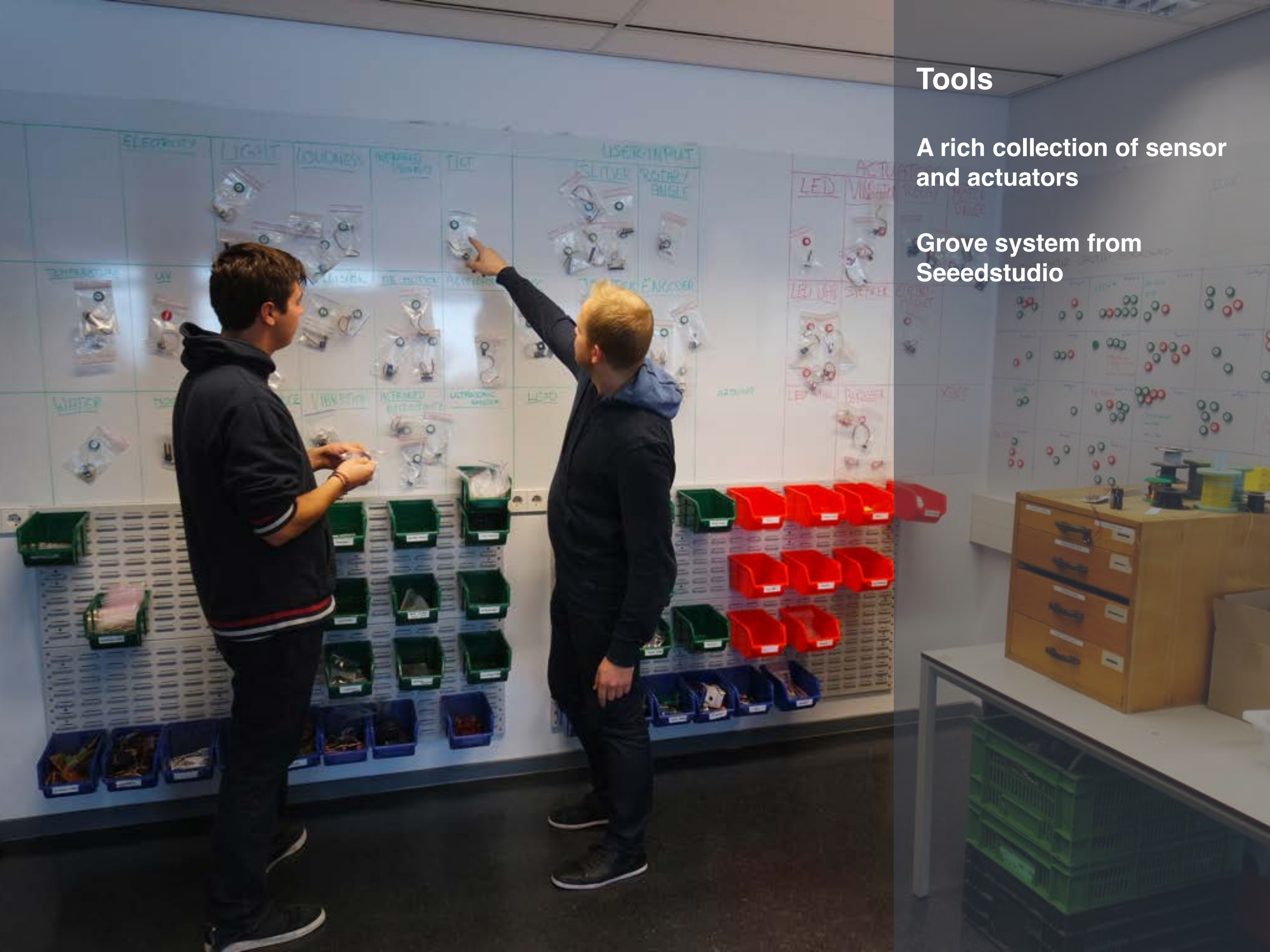

Final prototype
Ingredients of interaction design
Iterative design process
Users cycle prototype
Nutcracking prototype
Standalone prototype
Hacking prototype
Start of process

How to support the design process for interaction design

Tools

Random stuff

Tinkering material



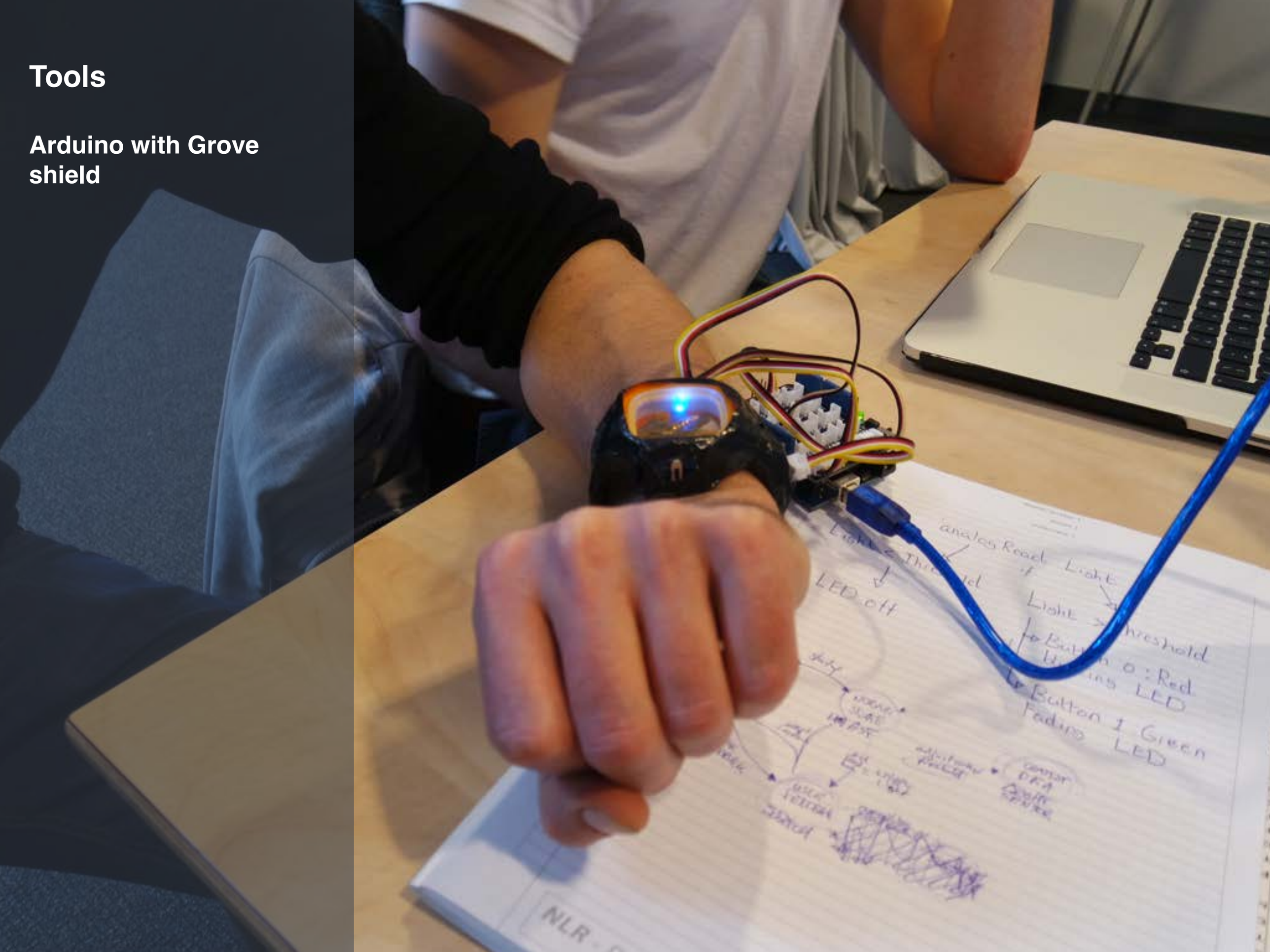
Tools

A rich collection of sensor and actuators

Grove system from Seeedstudio

Tools

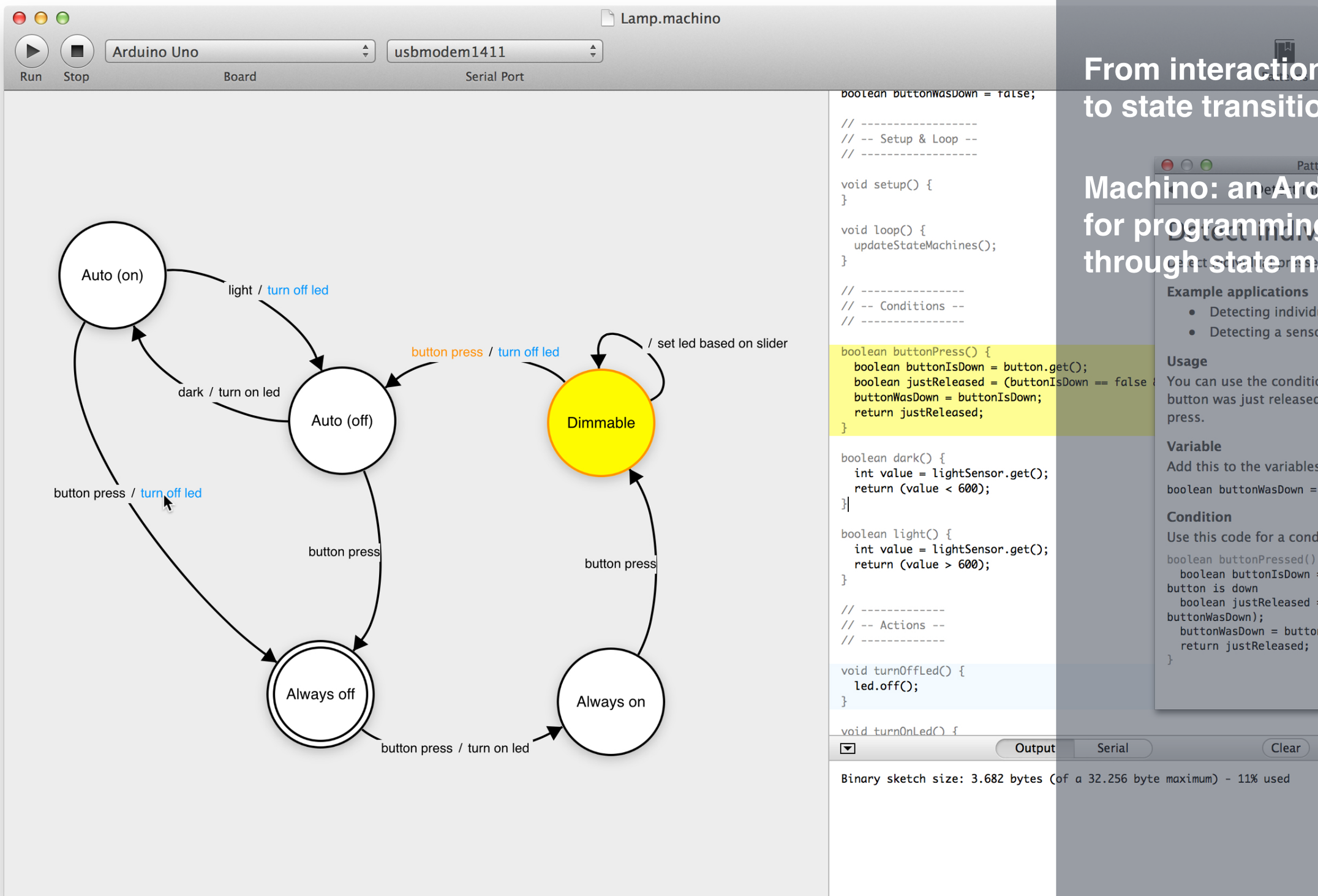
Arduino with Grove shield



Tools

From interaction scenario to state transition diagram

Machino: an Arduino IDE for programming behaviour through state machines



Tools

Max by Cycling74 - A visual programming environment for physical computing

Schizzo - a small wireless Arduino for prototyping interactive environments

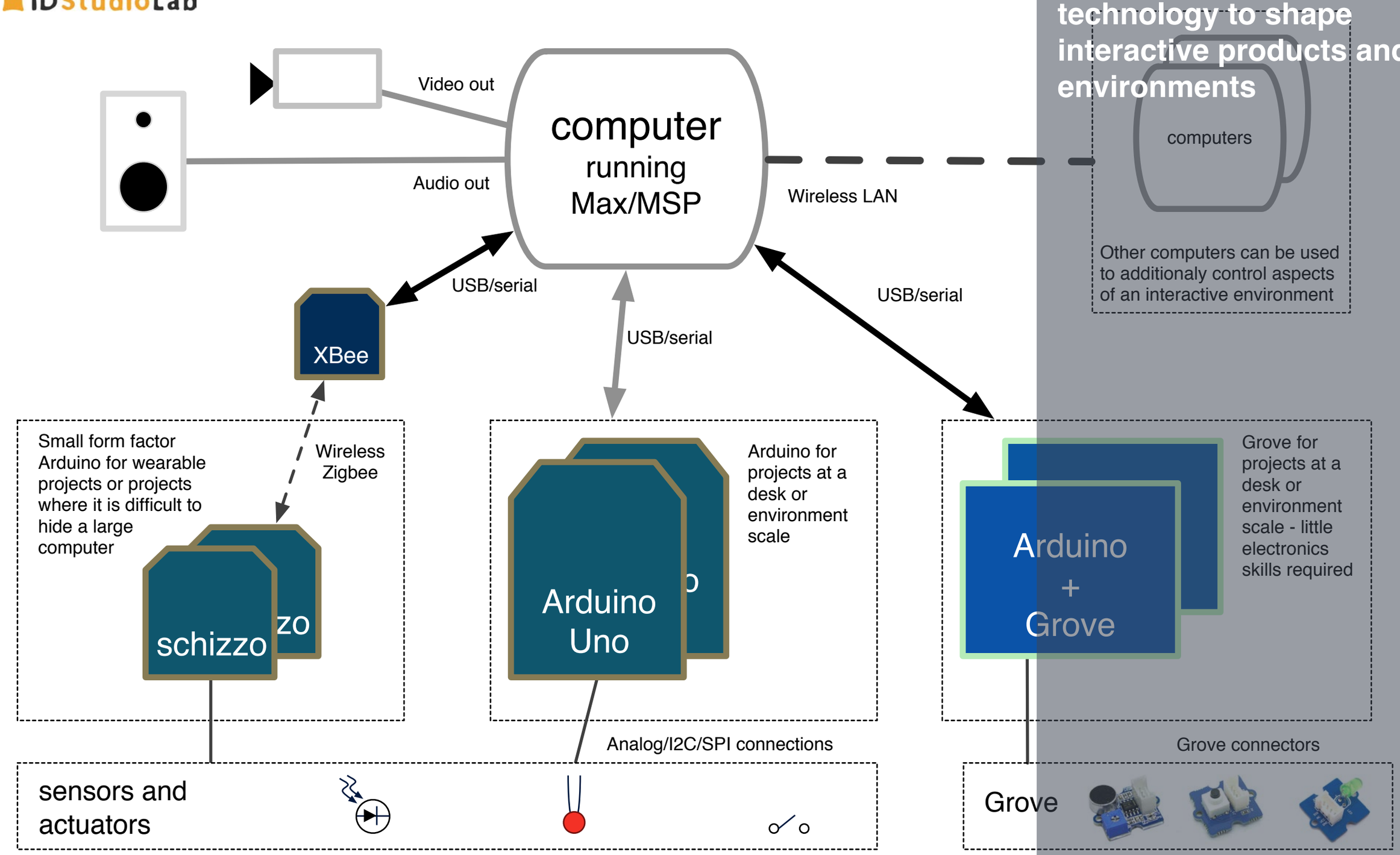
Tools

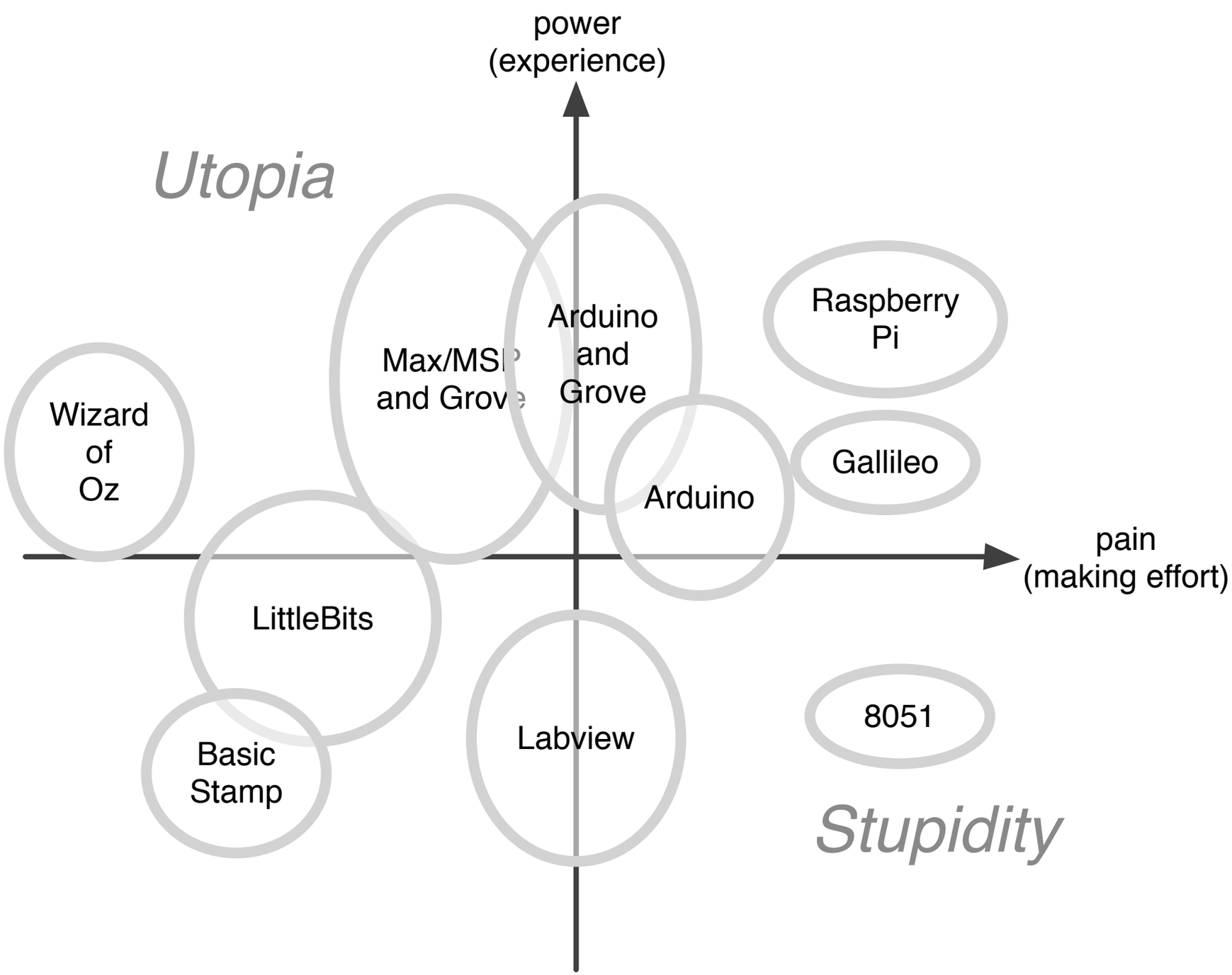
Reference diagram for use of technology to shape interactive products and environments

Technology in ITD

Reference diagram for hardware and software tools

IDStudioLab





Criteria selecting a technology tool for interaction design

Should support sketching

Large user community

Help/Examples/Tutorials

Rich capabilities: networking, video, audio, 3D, etc.

The Future

Technology tools to support the design of objects and environments to allow for embodied interaction