

WELCOME!

Create a handful of playful and engaging prototypes, which will allow children to understand digital technology.

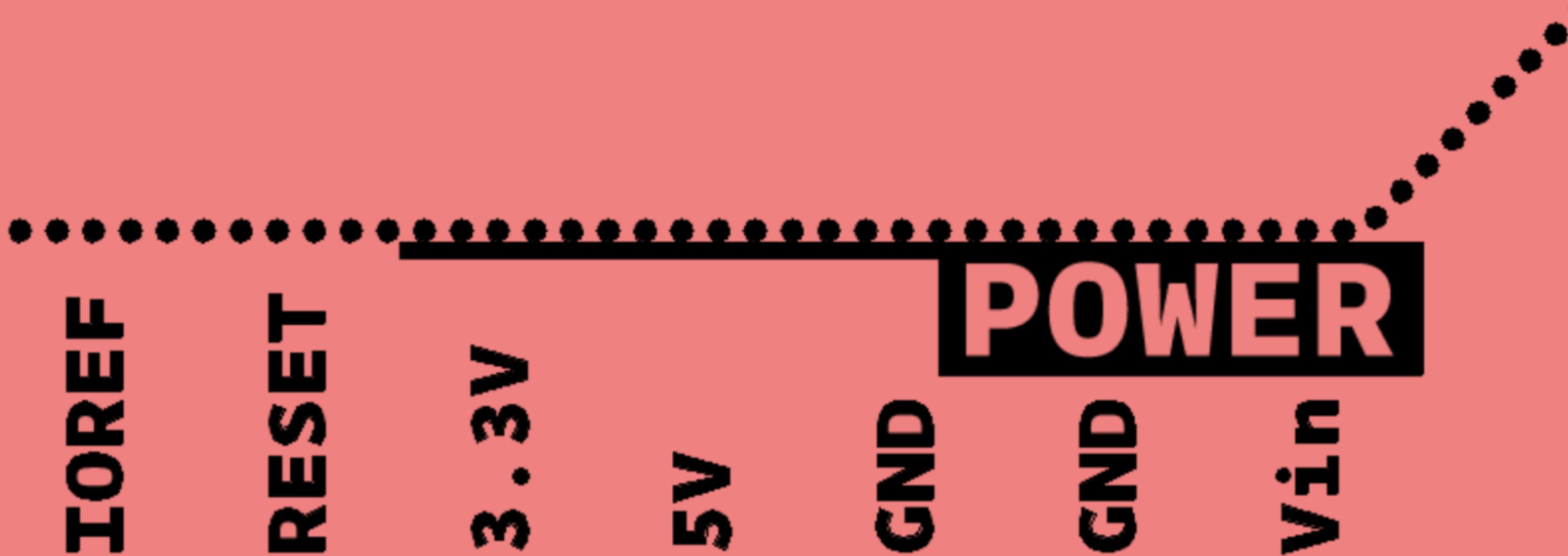
Our Brief



Innovative learning approaches encourages children to have a direct experience of the world.

A radical departure from the classic lecture-based system.

Our Brief



The world we live in is going through a radical digital transformation.

To make it more accessible we need to encourage children to understand how digital tools work.

Our Brief



Our objective in this class is to design interactive objects that can help kids understand the building blocks of the digital world in an experiential and playful way.

Our Brief



A Costa Rican school wants to offer innovative learning tools to its students, but has a limited budget.

Students and teacher should be able to build everything themselves.

UN Sustainable Development Goals



The outcome of this workshop will be designing innovative educational tools that can be used in classrooms around the world.

Children of any gender will be able to build and experience these tools, therefore understand the foundations of digital technologies.

Our Agenda

Day 1

- * Workshop Introduction
- * Lectures:
 1. Active education
 2. UX and innovative tools for education
- * Tech building blocks
- * Form groups
- * Brainstorming
- * Concept development

Day 2

- * Class presentation
- * Lecture:
IoT technology tools
- * Work on the concept and make a paper prototype
- * Status update and Concept freeze
- * Work on the project
- * Lightning talks

Day 3

- * Class presentation and review
- * Work on the project
- * Status update
- * Work on the project

Our Agenda

Day 4

- * Class presentation and review
- * Lecture:
Run a user testing session
- * Work on the project
- * User testing
- * Include user feedback on your project

Day 5

- * Project Wrap up
- * Presentation
- * Crit and documentation
- * Reflection Time
- * Certificate of Attendance
- * Clean up
- * Party!

Survey

OS: Mac, Win, Linux

Arduino Web Editor + Plugin // Desktop IDE
Brainstorming
User testing

Prototypes
Lasercutter / 3D Printer

Previous experience with IoT

Teaching experience

ACTIVE EDUCATION

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Maria Montessori



The Montessori Method Principles



1. Respect for the child
2. The Sensitive Periods
3. The Absorbent Mind
4. Mixed Age Groupings
5. The Prepared Environment
6. The Curriculum Areas
7. The Montessori Materials
8. The Role of the Teacher



#1 Respect for the child

#2 Sensitive Periods



#3 Absorbent Mind



#4 Mixed Age Groupings



#5 Prepared Environment



#6 Curriculum Areas

Language

Phonic & Vocal
Reading
Writing
Listening

Sensorial

Size & Shape
Comparing
Sequencing
Colors

Culture

Diversity
Language
Religion
Social Harmony

Enrichments

Arts & Crafts
Colouring
Music & Songs
Dancing

Maths

Counting
Numbering
Adding
Subtracting

Practical Life

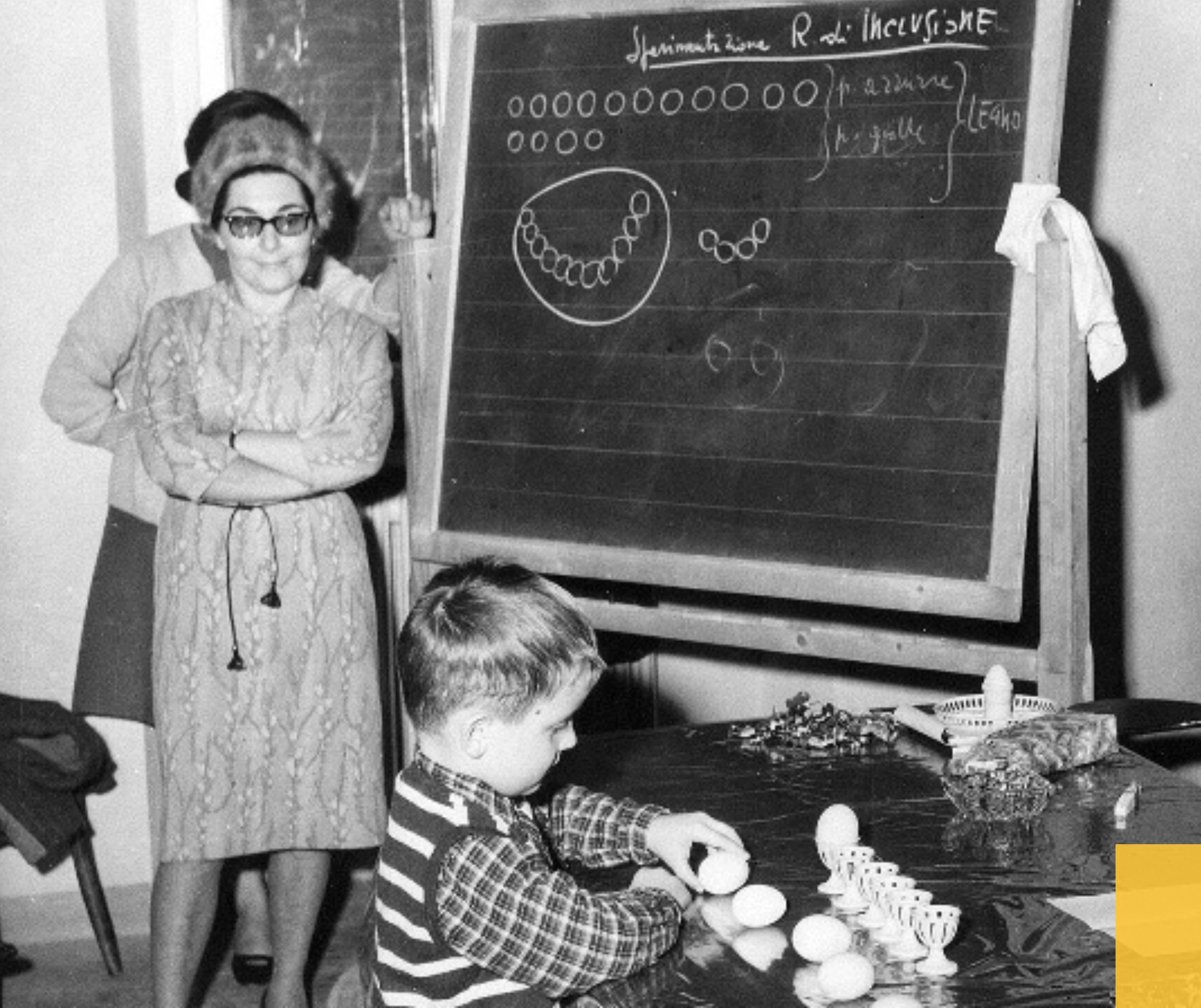
Grace & Courtesy
Daily Living
Mutual Respect



CIID Summer School Costa Rica

#8 Role of the Teacher





Loris Malaguzzi

The Reggio Emilia Approach principles

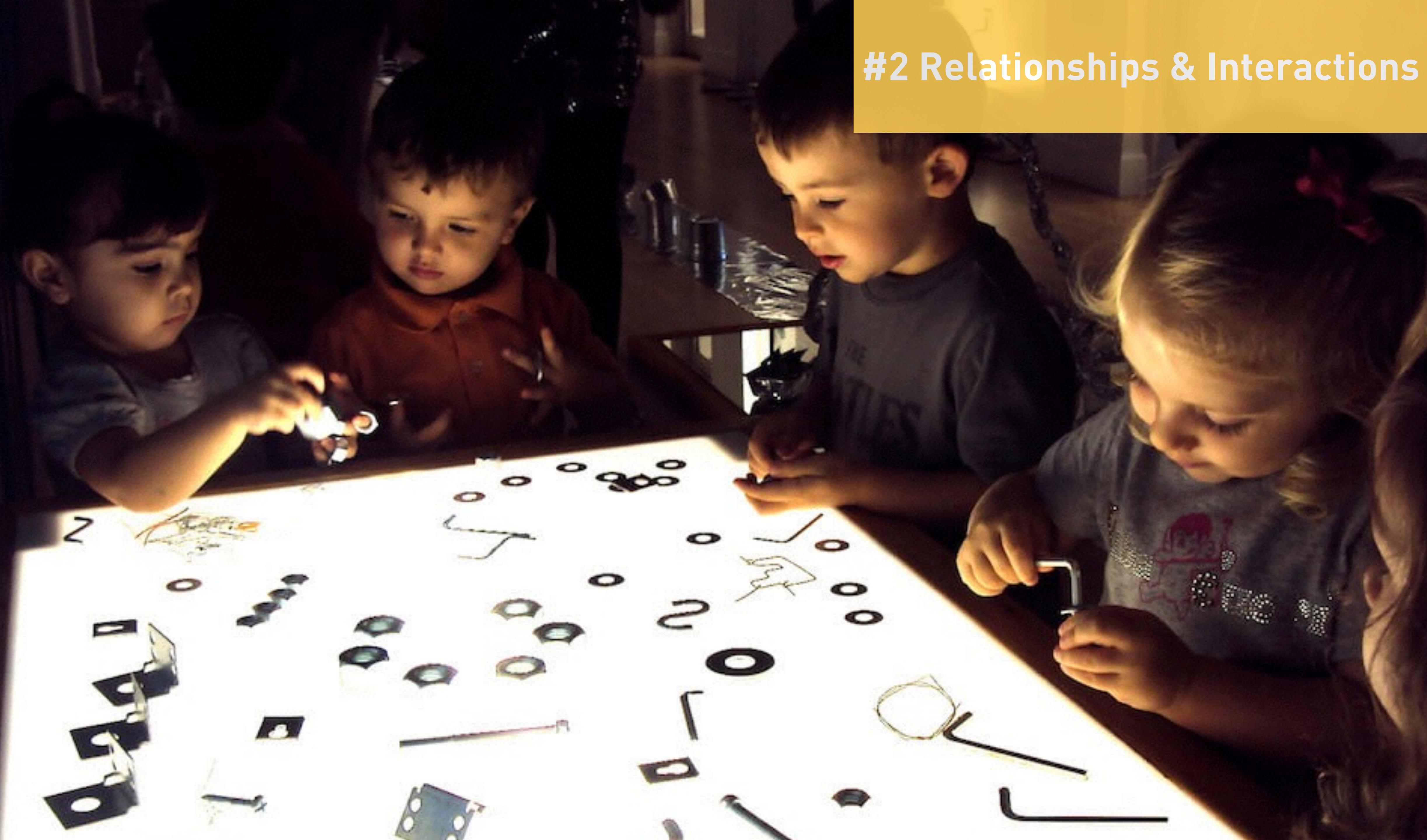


1. **The image of the child**
Children's relationships and interactions within a system.
2. **The role of parents.**
3. **The role of space: amiable schools.**
4. **Teachers and children as partners in learning.**
5. **Not a pre-set curriculum but a process of inviting and sustaining learning**
6. **The power of documentation.**
7. **The many languages of children.**
8. **Projects.**

#1 Image of the Child



#2 Relationships & Interactions



#3 Role of Parents



#4 Role of Space





#5 Teachers & Children
Partners in Learning

#6 Inviting & Sustaining Learning



#7 The Power of Documentation

Thursdays - Making the Story
 As part of Storytelling Night we like to have a Hospital Record of your preferences from the children in your class. This will be a small sample of what your children experience during the activities provided. By the end of the evening, you will have written & illustrated a story for the Blue Class.

Flow of the Evening
 Over the past few days we have been performing what from your children about what they like about our Blue Class. We will use these insights to plan better stories and be connected with their experiences from now on.

We will start by dividing you into 3 work groups to discuss the some ways we do during our regular day. The purple group will be responsible for the beginning of the story, the green group will write the middle of the story & last, but not least, the yellow group will finish the story.

In order to tie the 3 parts of the story together, groups the green & yellow groups will listen as the first group writes the beginning. Once the purple group is satisfied with their portion they will break out to the studio with Susan to illustrate their story. We will proceed the same way with the Green & Yellow groups.

In this basket are ideas generated by your children. We asked them to name a favorite thing about the Blue Class & for their favorite stories. Each member of a work group may pick an idea strip. You may use as many or as few of these ideas as you like as inspiration for your story.

Favorite things about the Blue Class

- Clean up chores
- Slide
- The duck house
- The game table (green)
- Jump it where we play in the Big Room (jumping)
- Marks at the message center
- Going down the big slide
- Coming off the swings

Blue Class Daily Reflection
 Thursday, 10/29/09

PARENTS' STORY
 The children had a lot to say about the night their parents came to school and about the special book their parents wrote and illustrated for them.

What do you like about the story?

- Dominick - He couldn't smell because he didn't have any nose.
- Owen - All the parts. The shiny teeth.
- Groce - The duck.
- Amelia - Why did he take his bill.
- Madeleine - That's a nice way to friend.
- Koala - He took his nose off teeth.
- Will - I liked all the people helped.

How long do you think the story is?
 It will go to the game table.
 It will go out side.

#9 Projects





Bruno Munari

UX AND INNOVATIVE TOOLS FOR EDUCATION

WHAT IS UX AGAIN?

Design and User Experience



“The only way to experience an experience is to experience it.”

– Bill Moggridge



*If a picture is worth a 1000 words,
a prototype is worth a 1000 meetings.
- IDEO*

Human-centered design

Human-centered design is a **practical, repeatable approach** to arriving at innovative solutions. Think of these Methods as a step-by-step guide to unleashing your creativity, putting the people you serve at the center of your design process to come up with new answers to difficult problems.



INSPIRATION

In this phase, you'll learn how to better understand people. You'll observe their lives, hear their hopes and desires, and get smart on your challenge.

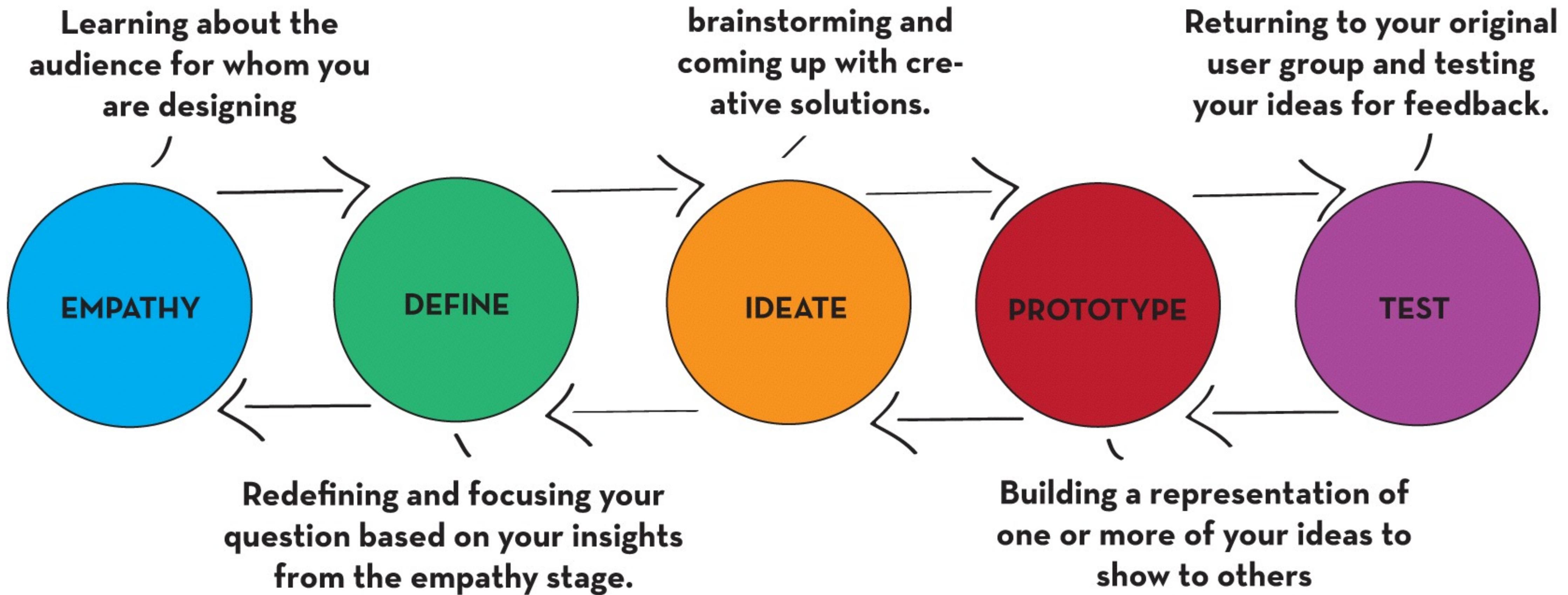
IDEATION

Here you'll make sense of everything that you've heard, generate tons of ideas, identify opportunities for design, and test and refine your solutions.

IMPLEMENTATION

Now is your chance to bring your solution to life. You'll figure out how to get your idea to market and how to maximize its impact in the world.

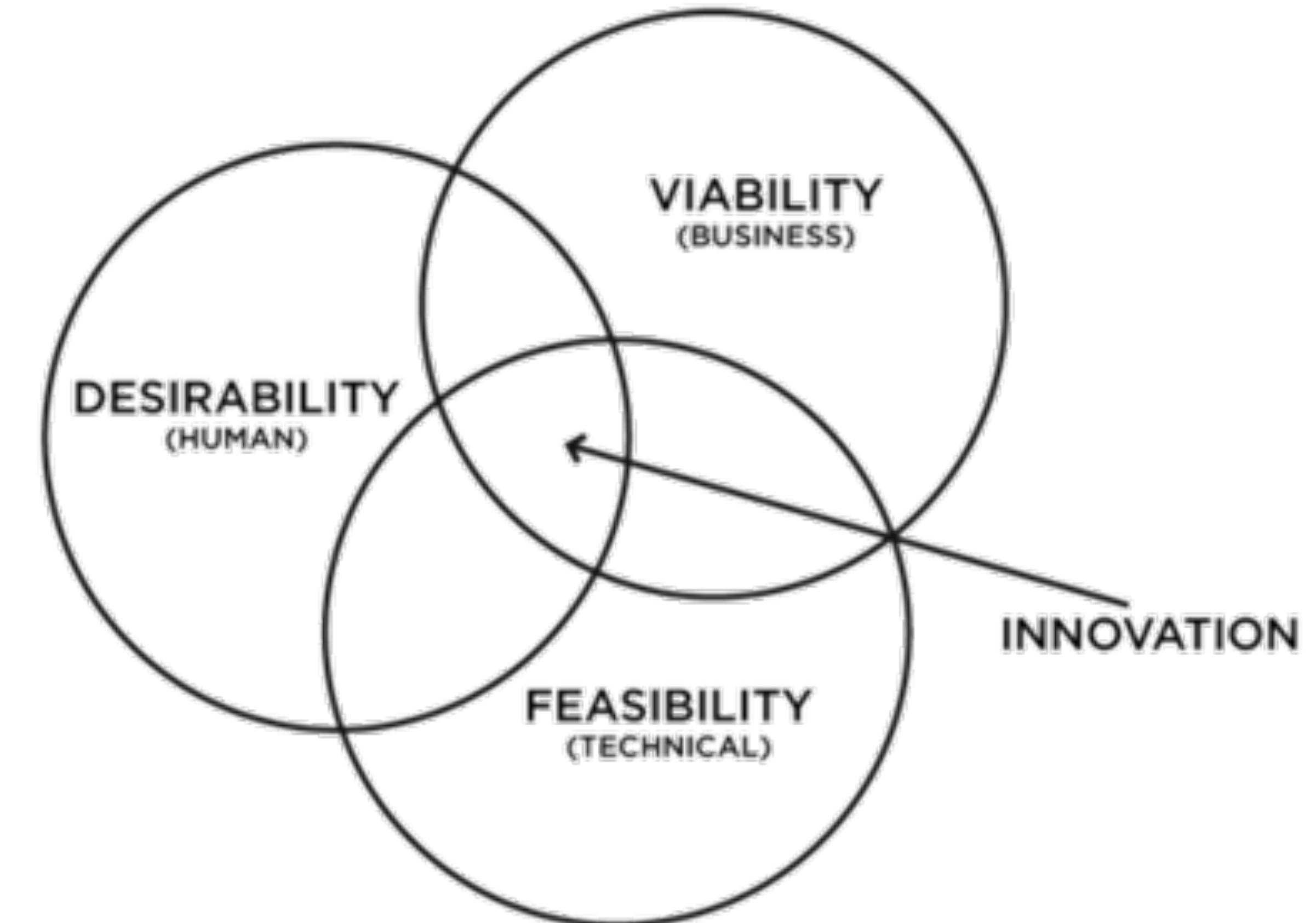
The Process



The Sweet Spot

*“Design thinking is a human-centered approach to innovation and **problem-solving** that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.”*

—Tim Brown, IDEO



INNOVATIVE TOOLS AND INSTALLATIONS FOR EDUCATION

Make it audible // barcode

Make it move // waves



Make the invisible visible // wifi connection

Make it really slow // binary system

Make it tangible // algorithms

Make it visual // connected sequencer

University of Applied Sciences and Arts of Southern Switzerland
Department for Environment, Construction and Design
Laboratory of Visual Culture

SUPSI

**Master of Advanced Studies
in Interaction Design
2013 / 2014**

Make it big // laser printer

Make it interactive // geometry

Pas a Pas.

at Hellerup Montessori Kindergarten
Copenhagen (Denmark)

Draw it yourself // scanner

University of Applied Sciences and Arts of Southern Switzerland
Department for Environment, Constructions and Design
Laboratory of Visual Culture

SUPSI

**Master of Advanced Studies
in Interaction Design
2013 / 2014**

Break it down in small steps // sound

SOME MORE INSPIRATION

Record it yourself // hierarchy

University of Applied Science and Arts of Southern Switzerland
Department for Environment, Constructions and Design
Laboratory of Visual Culture

SUPSI

**Master of Advanced Studies
in Interaction Design
2013 / 2014**

Thesis Project Module

Advisor
Andreas Markdalen, Frog Design

Change context // Internet

The Internet Phone



Change the medium

Source: <https://www.youtube.com/watch?v=4HdRGaZ0bIQ>

Change the medium



Change the medium

Turn it into a social game

More References

Eames, short film on the computer

Tim Hunkin, Secret Life of Machines, TV series

Experimentarium, Copenhagen

Exploratorium, San Francisco

Cite' des sciences, Paris

Science Museum, London

Dan Foss Universe, Danmerk

MIT Museum, Boston

TECHNOLOGY BUILDING BLOCKS

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What are the building blocks of the digital world that fascinates you the most, from binary code to artificial intelligence?

BRAINSTORMING

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What is the goal of a Brainstorm?



The goal isn't a perfect idea, it's **lots of ideas**, collaboration, and openness to wild solutions. The last thing you want in a Brainstorm is someone who, instead of coming up with ideas, only talks about why the ones already mentioned won't work. Not only does that kill creativity, but it shifts the group's mindset from a generative one to a critical one.

The only way to get to good ideas is to have lots to choose from.

Brainstorm Rules

Defer judgement. You never know where a good idea is going to come from. The key is to make everyone feel like they can say any idea on their mind and allow others to build on it.

Encourage wild ideas. Wild ideas can often give rise to creative leaps. When devising ideas that are wacky or out there, we tend to imagine what we want without the constraints of technology or materials.

Build on the ideas of others. Being positive and building on the ideas of others take some skill. In conversation, we try to use “yes, and...” instead of “but.”

Stay focused on the topic. Try to keep the discussion on target, otherwise you may diverge beyond the scope of what you’re trying to design for.

Brainstorm Rules

One conversation at a time. Your team is far more likely to build on an idea and make a creative leap if everyone is paying full attention.

Be visual. In Brainstorms we put our ideas on Post-its and then put them on a wall. Nothing gets an idea across faster than a sketch.

Go for quantity. Aim for as many new ideas as possible. In a good session, up to 100 ideas are generated in 60 minutes. Crank the ideas out quickly and build on the best ones.

How might we design playful and
engaging experiences for the
classroom to explain how
[selected technology] works?

Vote your favorite ideas! And bundle them



We will now have 5 votes each. Let's vote for the ideas that resonated with us the most.

You've probably noticed that many ideas start to resemble each other—which is a good thing. Bundling Ideas takes you from strong individual concepts to solutions of substance. Think of it as a game of mix and match, with the end goal of putting the best parts of several ideas together to create more complex concepts. Try different combinations; keep the best parts of some, get rid of the ones that aren't working, and consolidate your thinking into a few concepts you can start to share.

A Very Few Rules

Pick something you can actually prototype in a 3.5 days (no research on ferrofluid)

Everything has to be tangible, no graphical user interface, no renders

Demo demo demo, presentations are based on prototypes and paper, no powerpoint

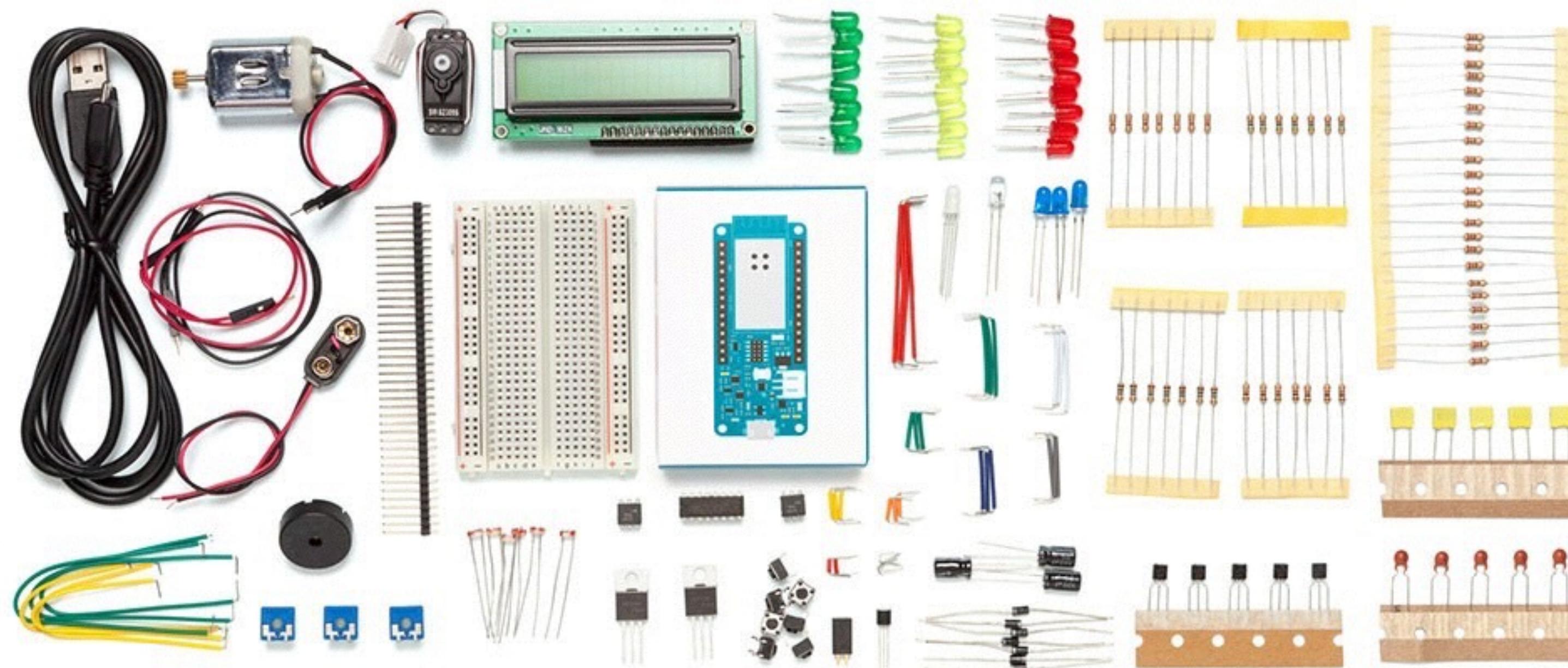
Work on prototypes of increasing fidelity

AVAILABLE MATERIALS

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MKR1000 IoT Bundle

More infos at <https://store.arduino.cc/usa/arduino-iot-mkr1000-bundle>



Example IoT projects:

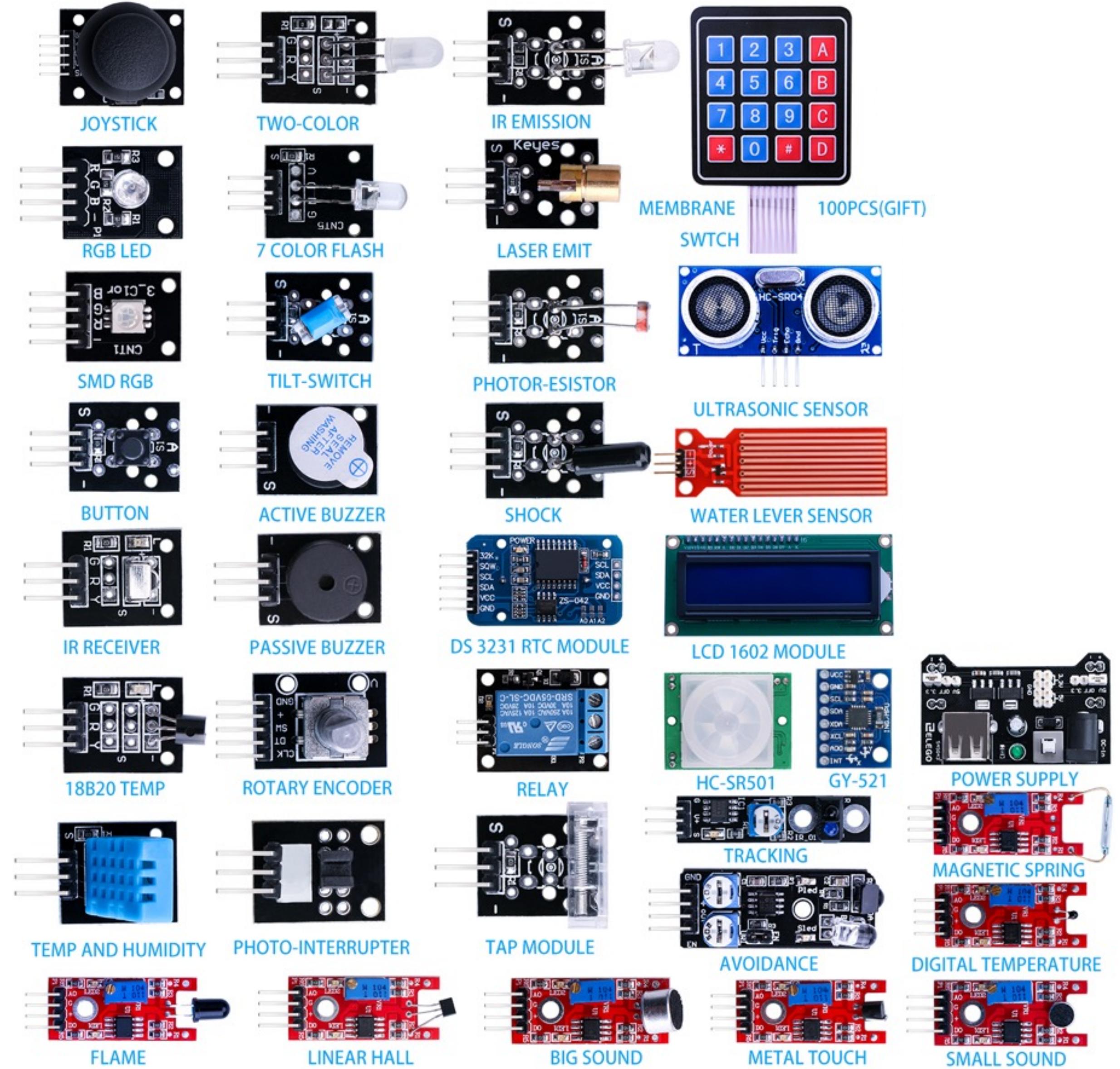
Pavlov's Cat: using a [Telegram Bot](#)
I love You Pillow: using a Telegram Bot
Puzzle Box: using [Blynk](#)
The Nerds: scanning available Wifi networks
Plant Communicator: using [Zapier](#) and [ThingSpeak API](#)

Elegoo 37 Sensors Kit

Tutorials

Sample code + Schematics

Libraries



USER TESTING

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Extremes and mainstreams

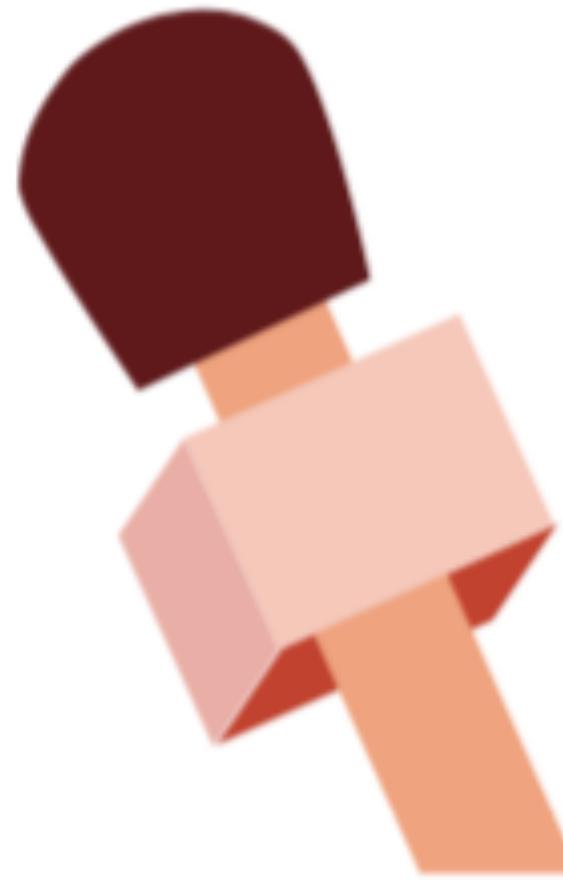
Designing a solution that will work for everyone means talking to both extreme users and those squarely in the middle of your target audience. The Gaussian curve.



Examples of designing for extremes that than becomes mainstream. Design for disability rather than the norm as a great drive for innovation:

- One handle faucet (motor disability)
- Text Messaging (deafness)
- Arduino (design students)

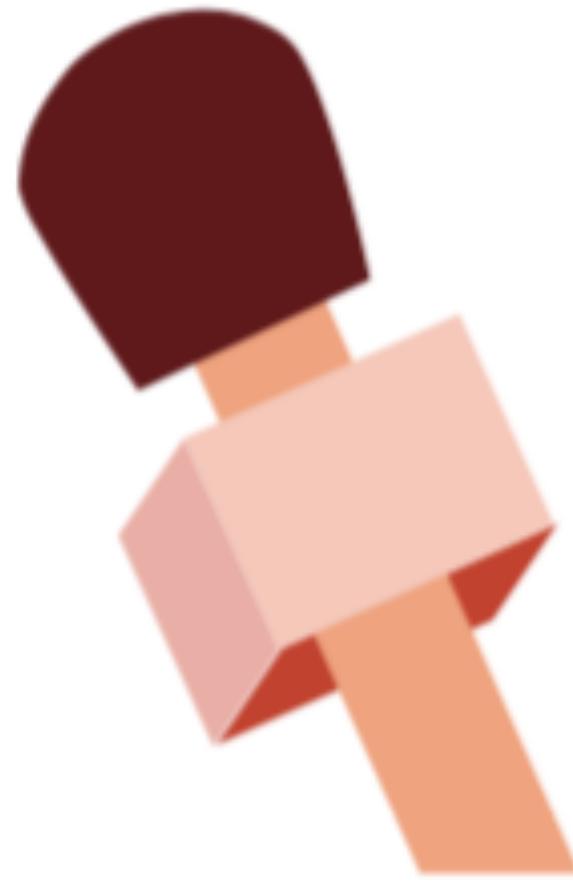
Interviews



There's no better way to understand the hopes, desires, and aspirations of those you're designing for than by talking with them directly.

- ★ **No more than three research team members** should attend any single Interview so as to not overwhelm the participant or crowd the location. Each team member should have a clear role (i.e. interviewer, note-taker, photographer).
- ★ **Come prepared** with a set of questions you'd like to ask and a set of props you would like to use. Start by asking broad questions about the person's life, values, and habits, before asking more specific questions that relate directly to your challenge.

Interviews



- ★ Briefly introduce the scope and context of your research, for instance:
“We are helping our client understand how people live with migraines by meeting them in their houses to see how they set-up their home environments.”
- ★ When you present yourself state that you are somewhat detached from the concepts presented, for instance you can say something like:
“I didn’t design this product, I am just a researcher trying to find out what people think about it, so you can be totally honest with me, my feelings won’t get hurt”.
- ★ Preferably set a reimbursement for your interviewee. If not possible offer a token of your appreciation for their time.

Interviews



- ★ The interview should be an interesting conversation for you both, there are **no right or wrong answers**, for instance you can say: “This should be an easy, fun conversation for you. There are no right or wrong answers. We’re just looking for your opinions.”
- ★ **Take pictures or videos**, provided you get permission first. State that the images are for note taking purposes only.
- ★ Conduct the interviews preferably **in the context** of use of your project (see later on the Immersion and Guided Tour method).
- ★ It is always a great idea to do a **test run** of your whole session before going out in the field.

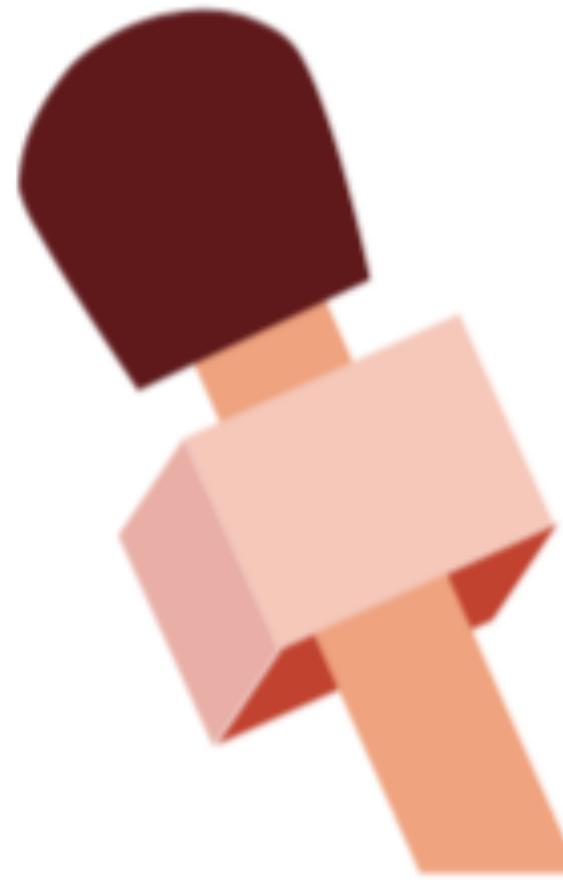
Interviews



- ★ Be sure to ask **open-ended questions** instead of yes-or-no questions.
Don't ask *Would you use this feature?* but ask
How would you use this feature? Oh, and why would you do so?
- ★ Always ask **Why** a lot of times (even 5 times if it doesn't sound too pushy)

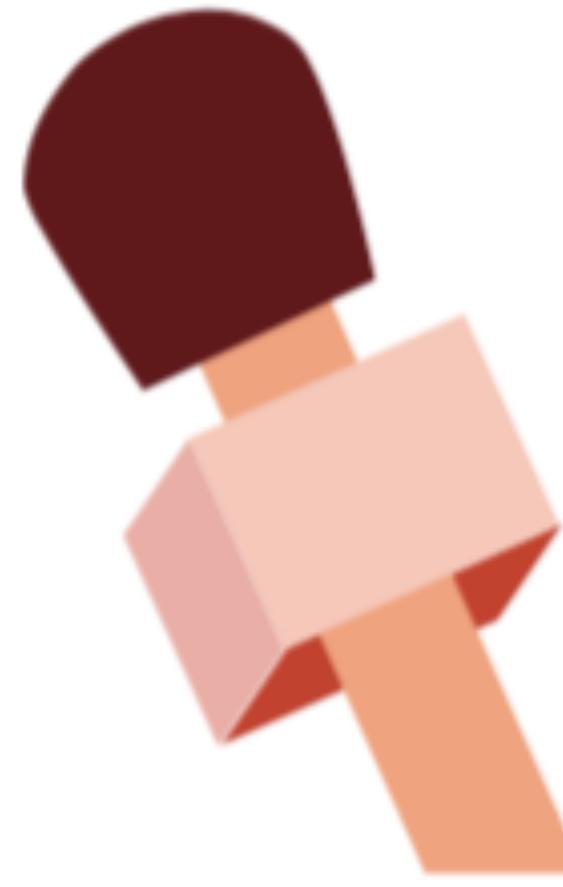
Example: A team conducted a ton of Interviews over the course of a project, each time trying to understand how people save their money. Again and again the team heard, “I don’t save money.” But after asking a few more questions they came to learn that low-income Mexicans may not think of their informal methods as savings in the way that a bank might, but they are certainly socking money away. And understanding how they do it was critical to the team’s ultimate design.

Interviews



- ★ Make sure to **write down exactly what the person says**, not what you think they might mean. This process is premised on hearing exactly what people are saying. Write down memorable **quotes** that can be used in your storytelling.
- ★ What you hear is only one data point. Be sure to observe the person's **body language and surroundings** and see what you can learn from the context in which you're talking.
- ★ Let your interviewees talk, **don't interrupt them to explain something**, how they interpret your idea can be really surprising and interesting.

Interviews



- ★ If you are testing UIs please **remove any dummy text** and make sure the content you are showing makes sense (no random photos or placeholder), it is a great opportunity to test your product in any aspect so don't miss it!
- ★ Never explain what something does, rather just say: 'I actually don't know what this mean or how it works, what do you think it could be for?'
- ★ Ask your Interviewee to think out load through the user testing session

Thank you.