

What we're doing when we are designing.

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Royal College of Art
Postgraduate Art & Design

Dr John Stevens
Global Innovation Design

Hello.

Dr John Stevens

Senior Lecturer, Researcher, Programme
Director, Royal College of Art.

Design-led innovation in a range of contexts

BSc Molecular Biology from King's College,
London,

MDes Industrial Design Engineering from
RCA / Imperial College

PhD Design and Strategy from Cambridge
University's Institute for Manufacturing.

Design?

Objective

Subjective



Technological

Ideological

Function

Meaning

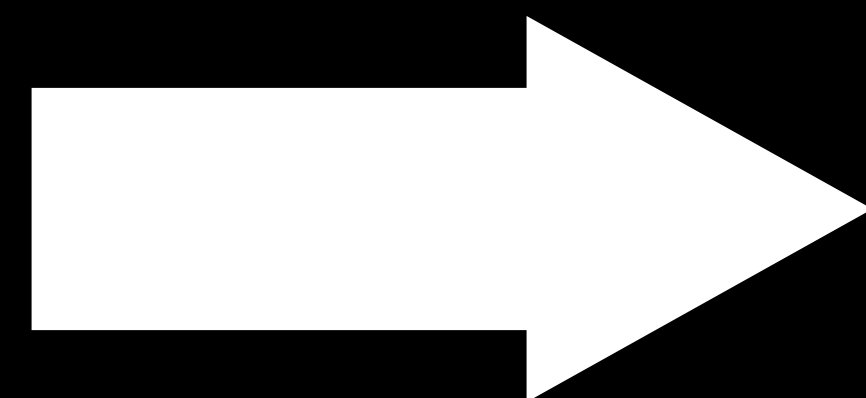
Logic

Values

**To devise courses of action
aimed at changing existing
situations into preferred ones**
– **Herbert Simon**

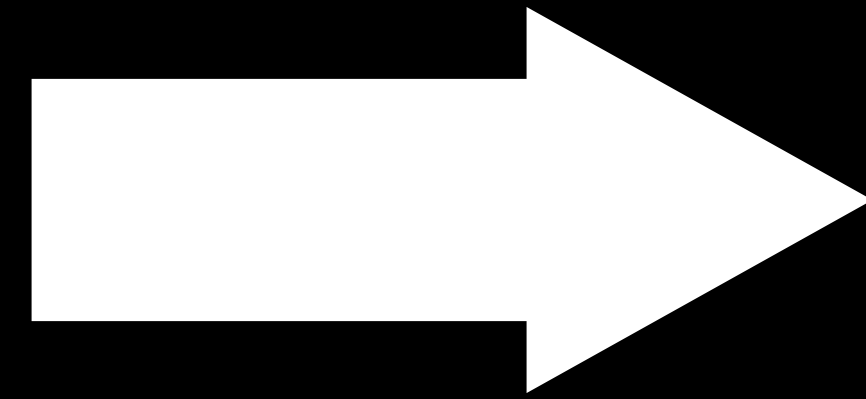
Change

This



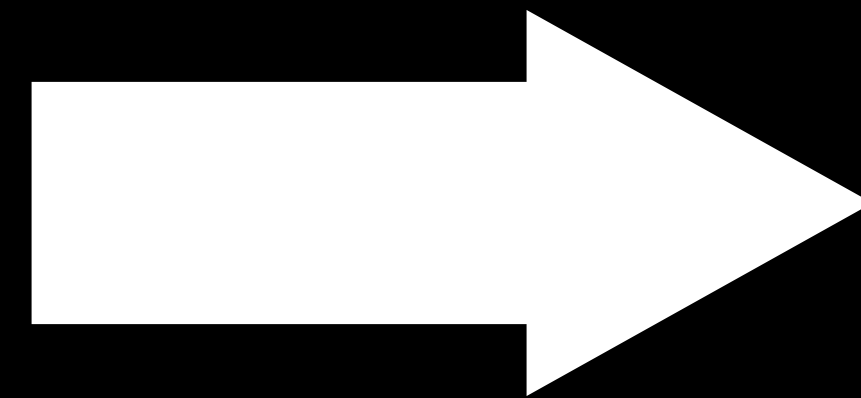
That

Good



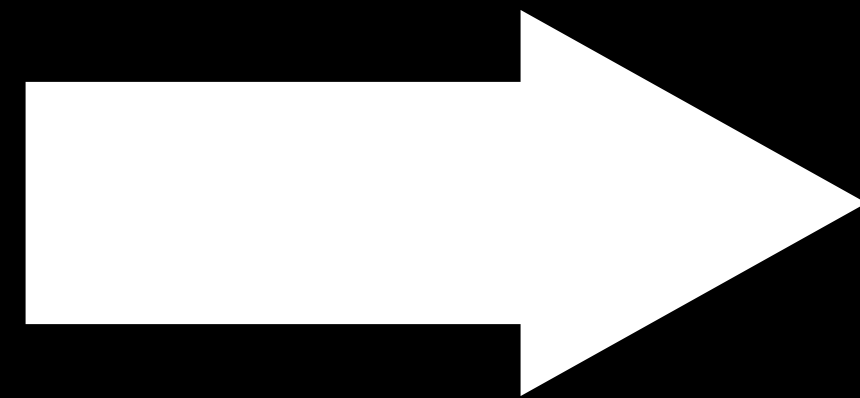
Better

Now



Next

Fiction



Fact

Four core principles of Design

UK Design Council

Put people first.

Build on an understanding of people, their needs, strengths and aspirations.

Communicate visually and inclusively.

Help people gain a shared understanding of the problem and ideas.

Collaborate and co-create.

Innovators rarely work alone.

Opportunities lie in the overlap of disciplines.

Everyone's ideas count.

Iterate, iterate, iterate

Spot errors early, avoid risk and build confidence in your ideas.

What is the key untested element of your idea?

How can you test it today?

Fail Fast.

Human Centred Design

You cannot understand good design if you do not understand people; design is made for people.

Dieter Rams

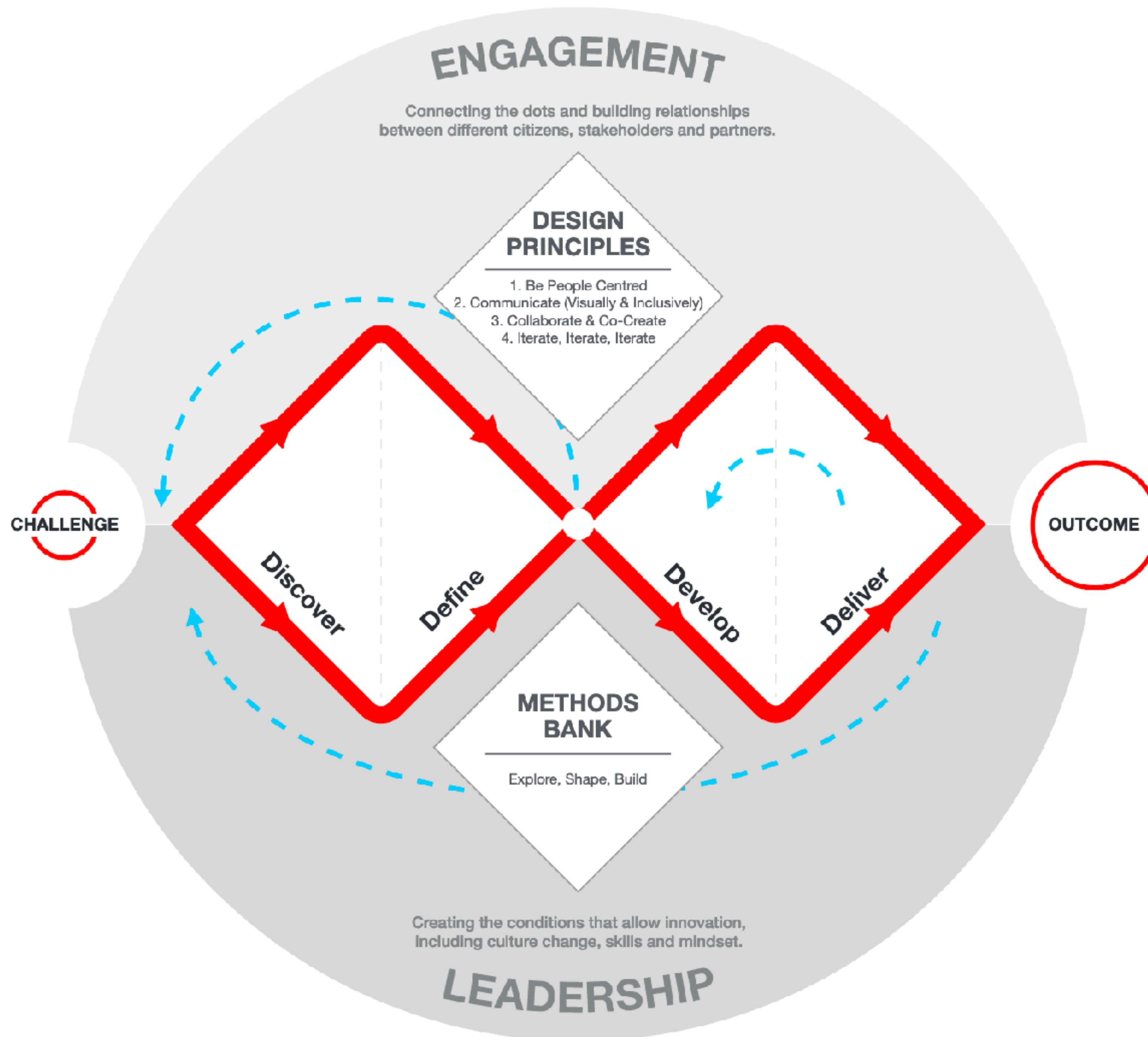


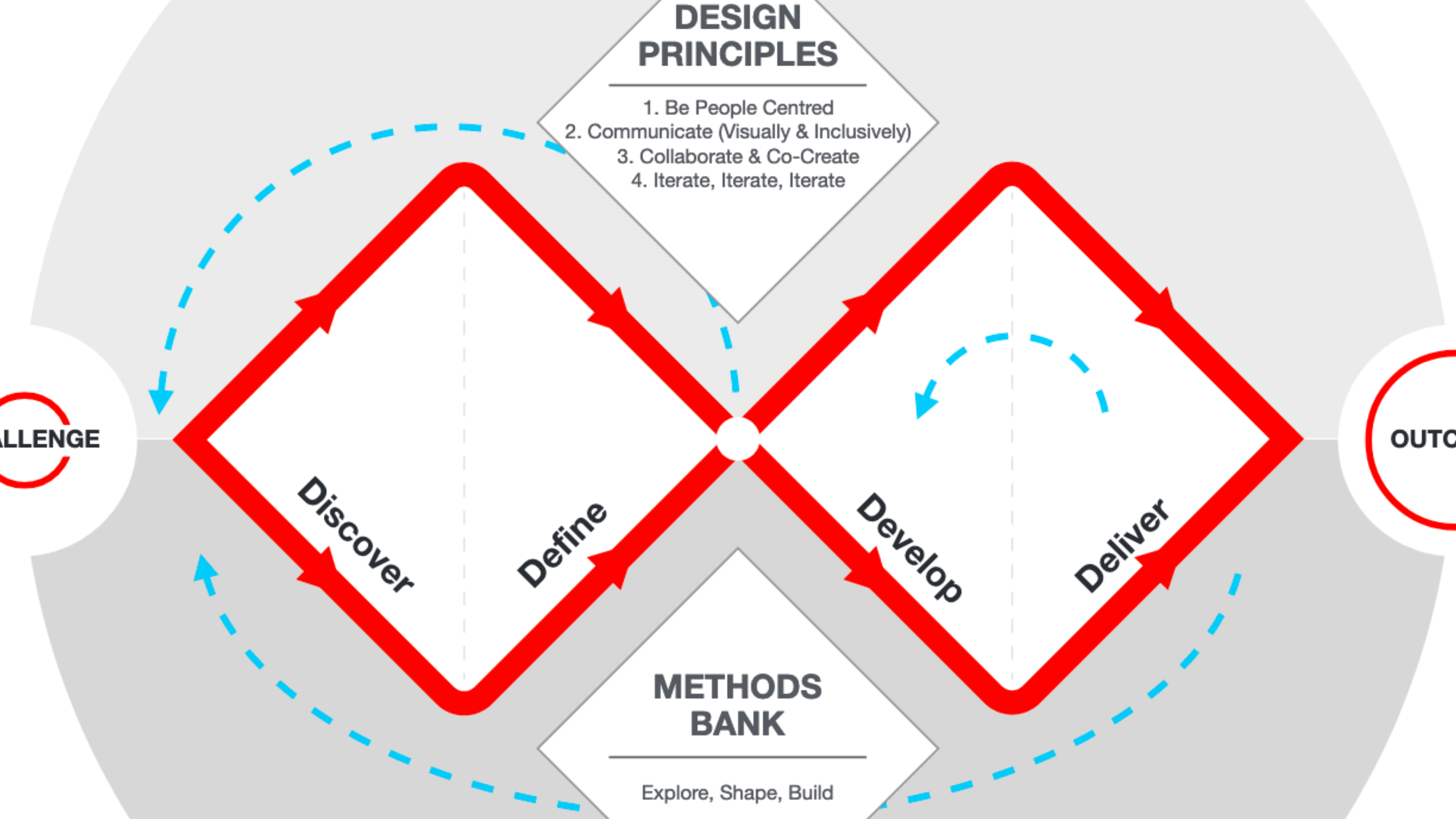
sketch

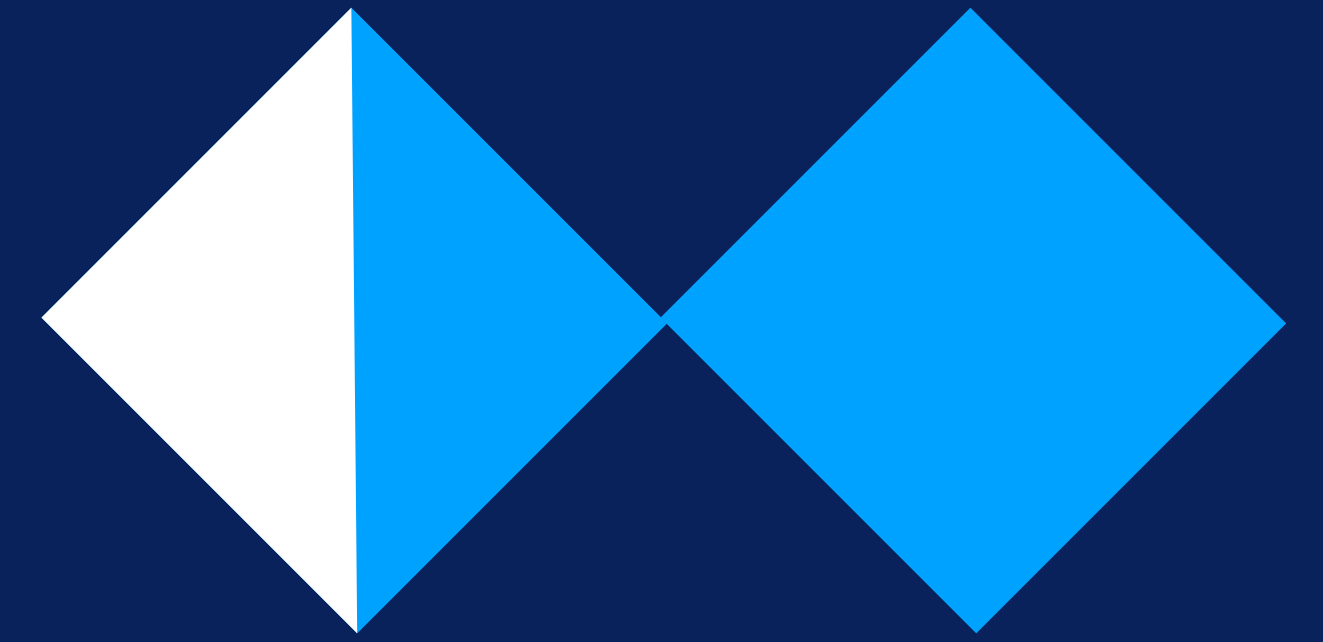
A rough or unfinished drawing or painting, often made to assist in making a more finished picture.

A rough or unfinished version of any creative work.

Process



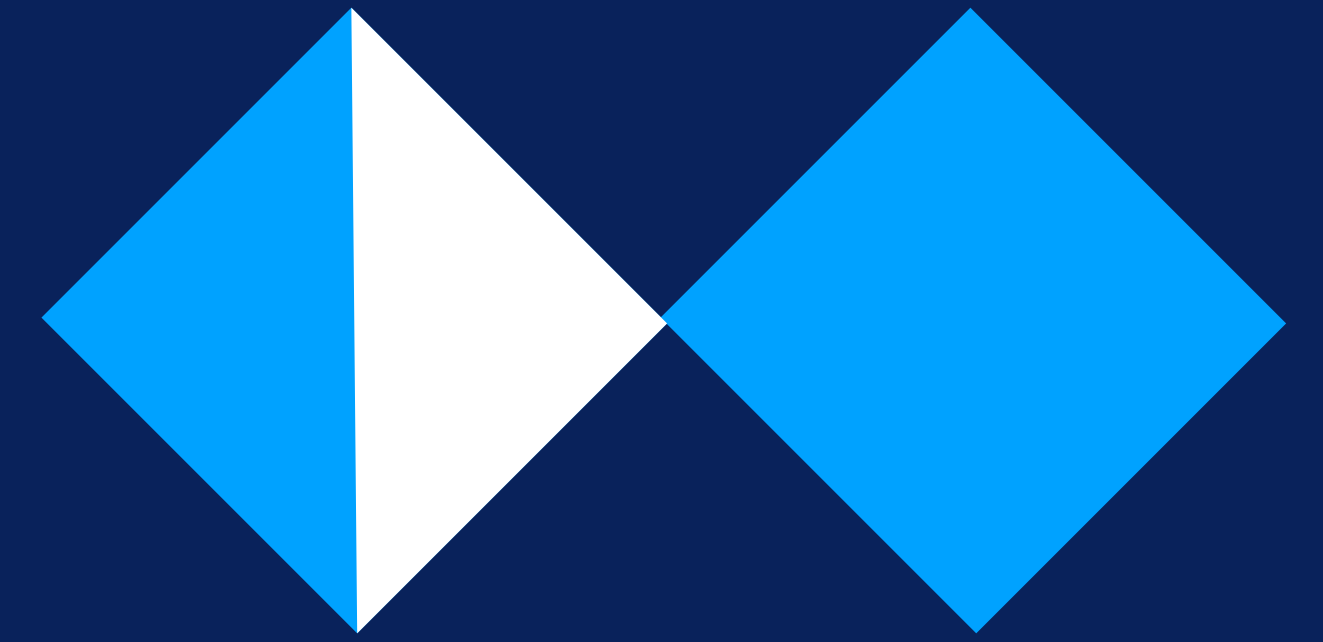




Discover.

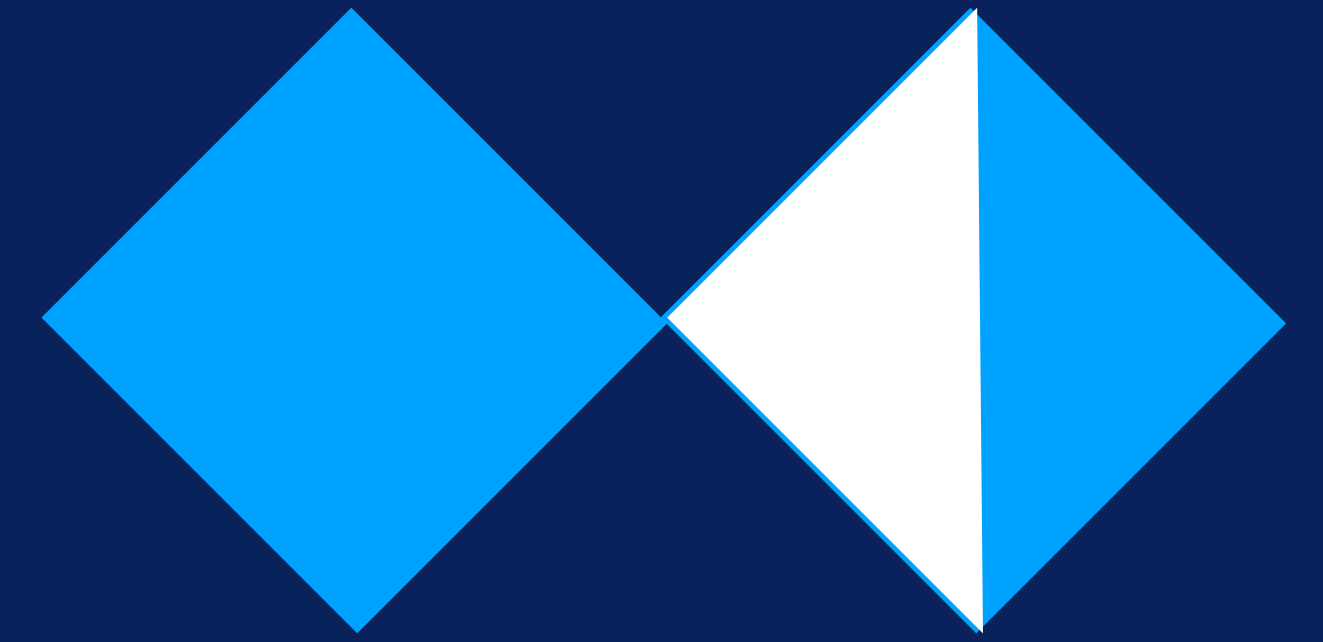
Better understand, rather than assume, what the problem is.

Speak to and spend time with people who are affected by the issues.



Define.

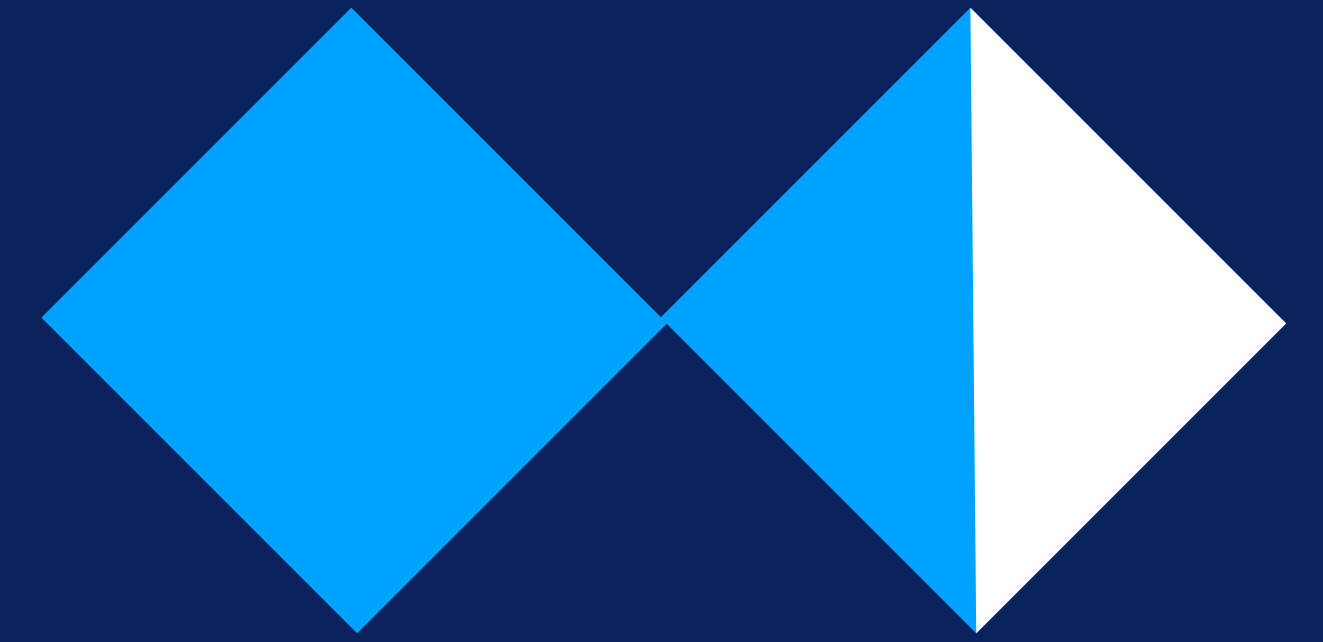
Insights gathered from the discovery phase can help you to define the challenge in a different way. Synthesise knowledge into insight, focusing on the most compelling opportunities.



Develop.

The second diamond encourages people to seek inspiration from elsewhere and co-design with a range of different people.

Time to explore the best potential solutions.



Deliver.

Delivery involves testing out different solutions at small-scale, rejecting those that will not work and improving the ones that will.

An iterative process of elimination, refinement.

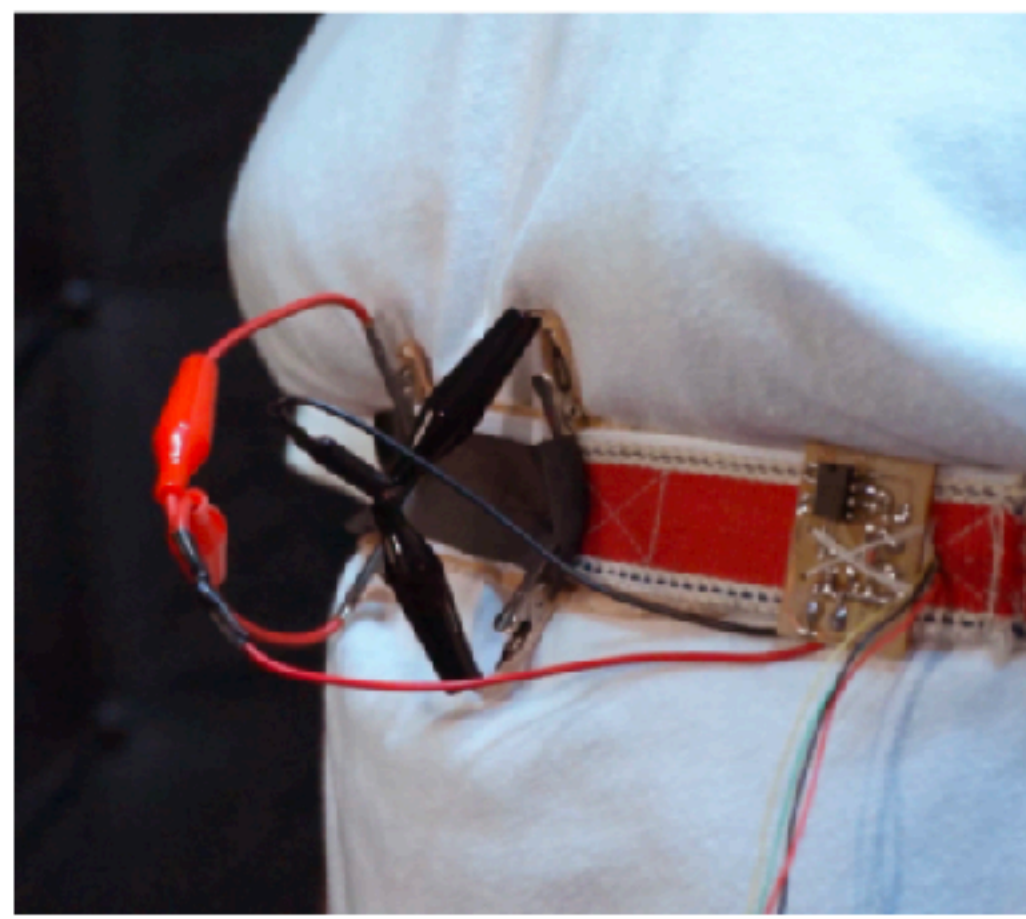
Prototyping

Helps us answer

- Is it useful, useable, desirable?
- Technical, functional - does it perform?
- 'Looks like' vs 'works like'...

An idea is an output of the
innovation process, not the start
point.

Works like...

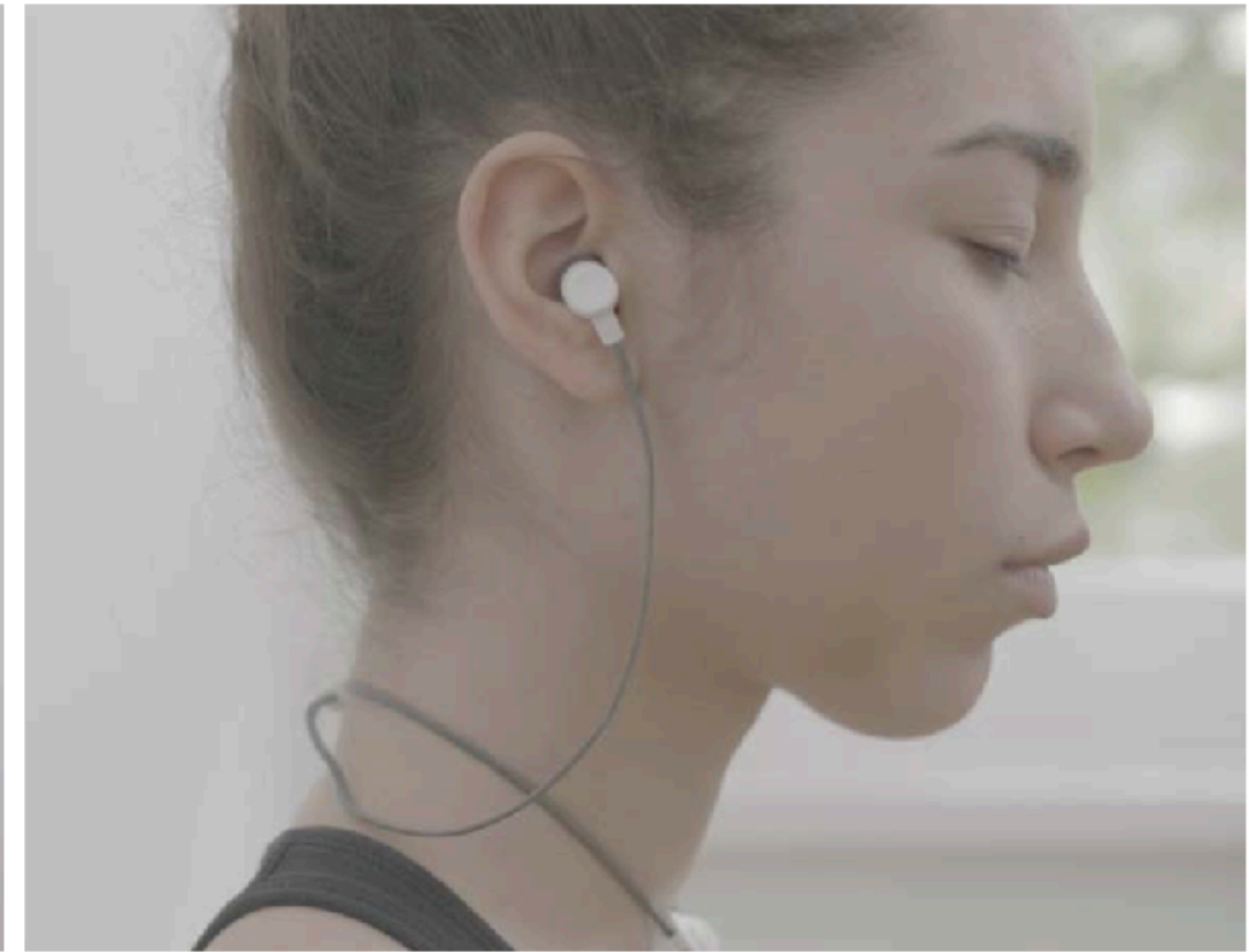


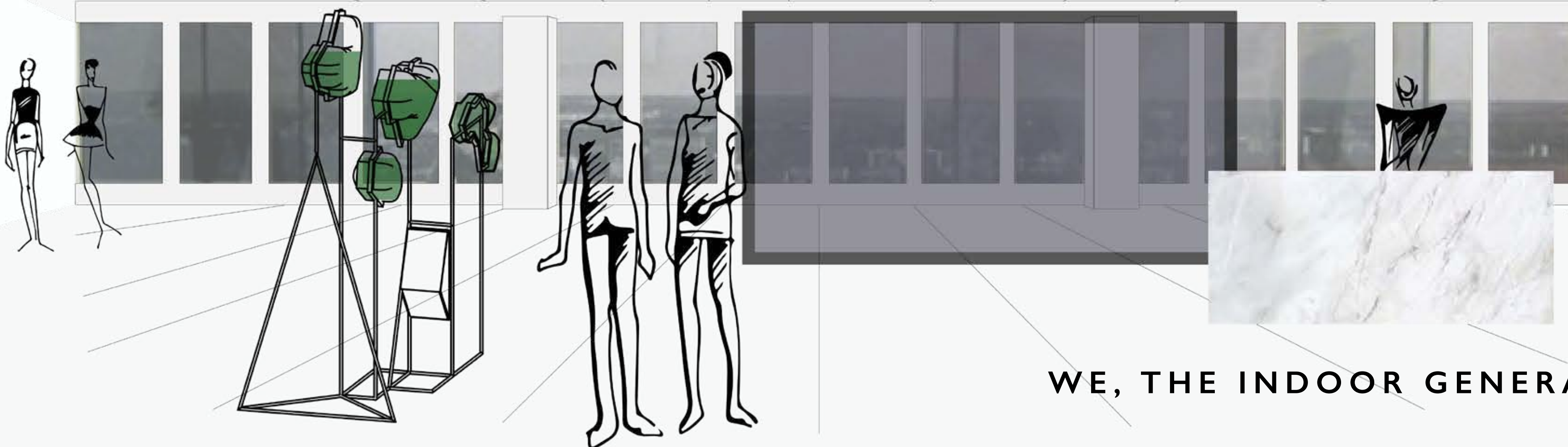
USER TESTING.

The technology was tested on novice meditators twice; once with the intervention enabled and once as a control. Results showed that the intervention increased the time the subject spent focusing on their breath.



Looks like...





WE, THE INDOOR GENERATION

WE SPEND 90% OF OUR TIME INDOORS.

The air we breathe in the places we live and work, is often 5 times more noxious than walking on the street. Prolonged exposure to high CO₂ levels negatively affects our physical and mental state.

Symbiont is a system that fosters the growth of micro algae to purify the air of indoor working spaces based on the idea of symbiosis. Using sunlight as the energy, micro algae *Chlorella Vulgaris* consume carbon dioxide, essential to their growth. As a by-product they release oxygen into the air, essential for our breathing. Symbiont is a living object that explores a future where our everyday life is interconnected with micro-organisms by creating mutually beneficial relationships.

SYMBIONT

THE SCIENTIFIC EXPERIMENT

STUDIO CULTURE



LAB CULTURE

According to the literature review regarding the remediation of anthropogenic carbon dioxide from oceanic biota, 15L culture of *Chlorella Vulgaris* could purify the air of a 15 m² office space. However that refers to a controlled environment of a laboratory.

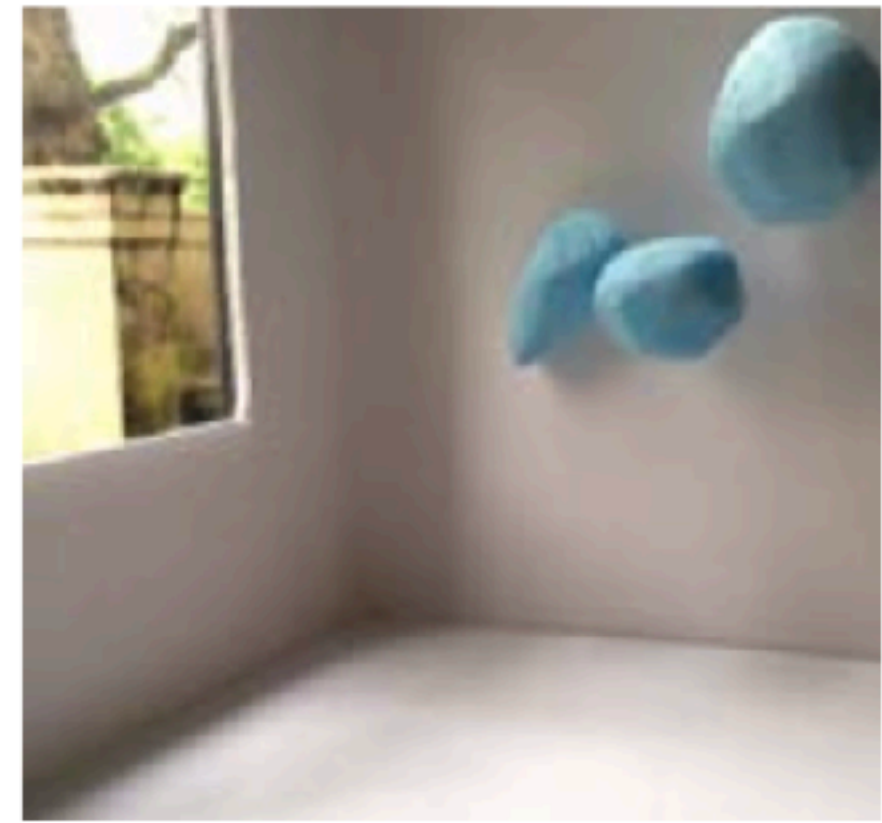
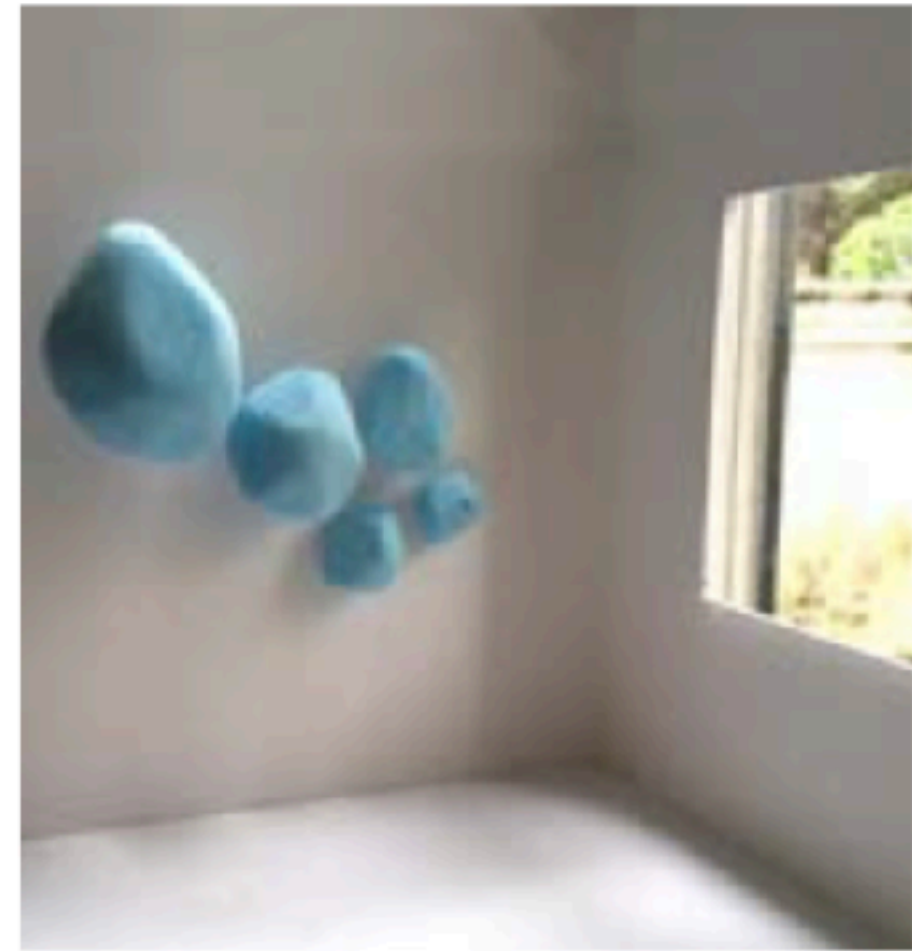
The scientific experiment I conducted showed that actually this is the case in the non controlled environment too which validates the functionality of the concept.

To run the experiment, two cultures were set, one in the Microbiology Department of Imperial College serving as the control group and the other one in the studio at the RCA, which simulates a working space environment.

In order to measure the amount of CO₂ fixated by the cultures, in collaboration with Irina Shayek, we were measuring every three days the optical density of a sample from both cultures. That was a first indication of the growth rate. For more detailed results, we were measuring the amount of dry mass production at the same frequency. Our results showed that the culture in the studio actually performs better than the control group.

A 15 L culture could actually fixate daily as much carbon dioxide as a tree.







The making of this project was a challenging process due to its size, strength requirements, complex and organic shapes when the overall goal is to give this effortless feeling of function.

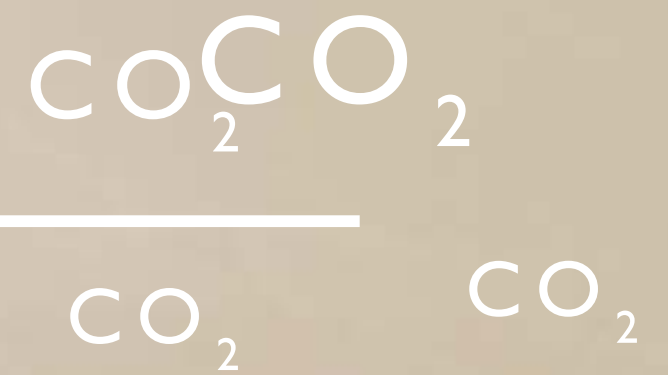
The vessels were made out of thermoplastic which was blown like glass to achieve the organic forms, a process I came up with and perfected during the prototyping phase.

I also learned how to tig weld myself to construct the whole structure. High level of craftsmanship was important to achieve a visually stimulating design in this size.



Outlet

For the Oxygen release



What about today?

Be open to understand other people, their needs, strengths and aspirations. You are not the user. Don't judge.

Communicate visually and inclusively. Sketch big & free. Don't worry, none of us can draw.

Collaborate and co-create. Share, listen, build together.

Make, break, repeat. Spot errors early, but don't kill the idea.

Don't focus only on the tech.

Part 2

Me again

97% of the world's population growth in LMICs between 2013 - 2030

How might we, in a developing world context, ...

1) Prevent and diagnose disease?

Malaria: half of the population is at risk and 93% of the 435,000 deaths occur in the African continent

HIV: 25.6 million/69% patients in sub-Saharan Africa

Cholera: up to 143,000 deaths/year, two thirds of which in developing countries

2) Address climate change and ensure environmental sustainability?

The vulnerability of crop production to climate change is higher in these regions, due to their geographical location and lower infrastructure resilience.

3) Advance food provision?

Childhood undernutrition contributes to an estimated one-third of all deaths to children under 5.

4) Advance energy provision?

It is predicted that more than half a billion people will remain without electricity in Sub-Saharan African by 2040.

5) Urban planning?

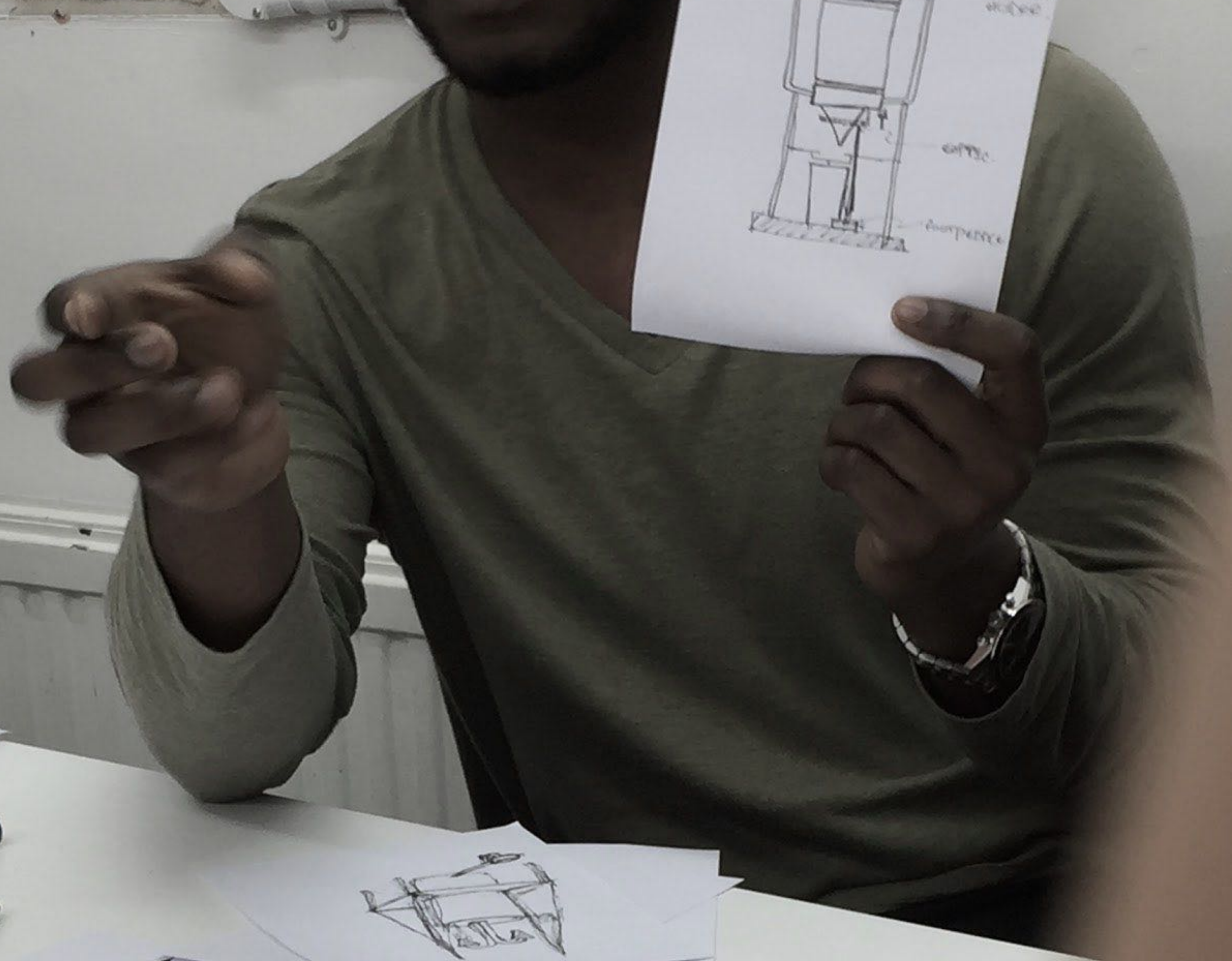
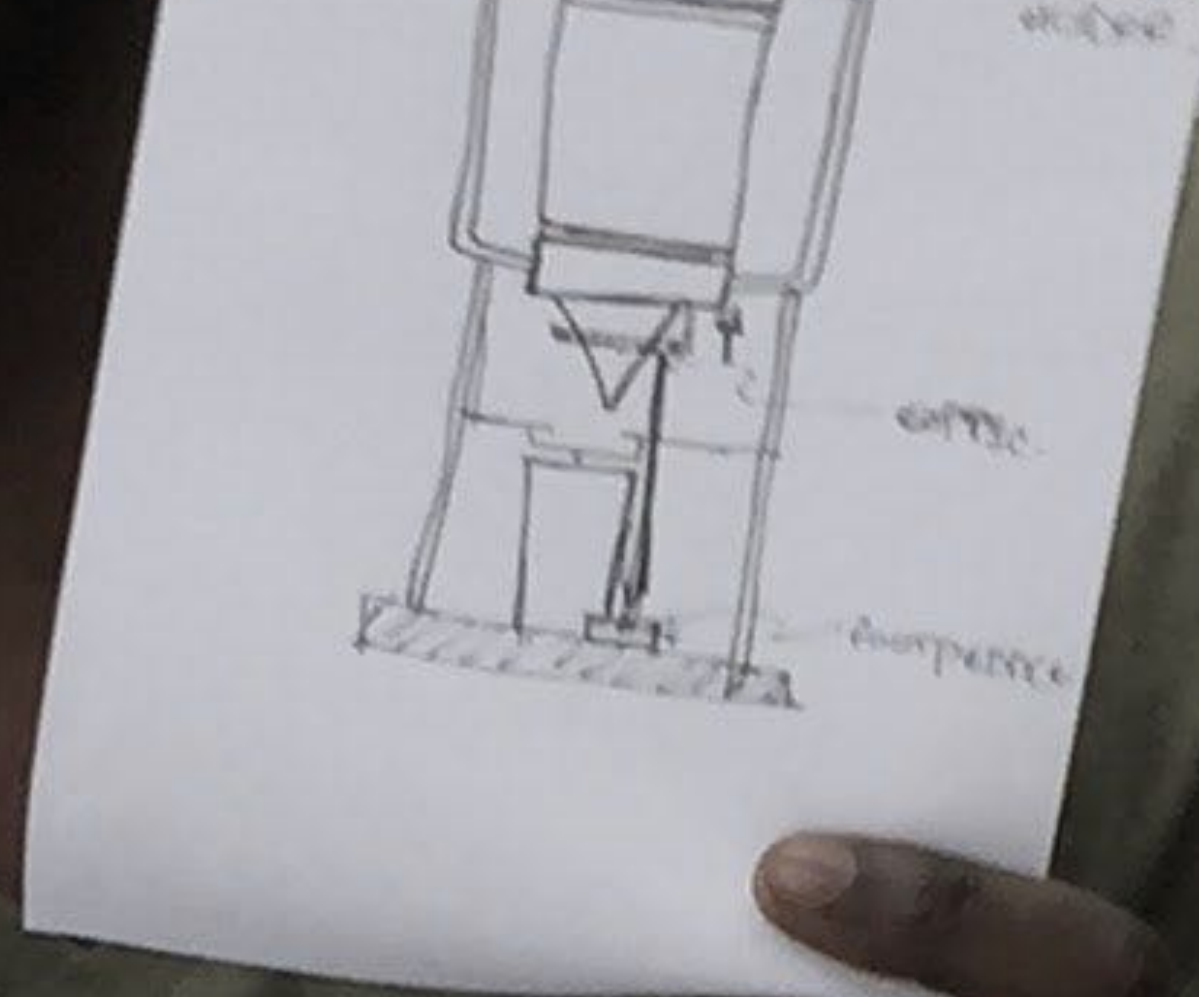
Half of the African population will be urban by 2035.

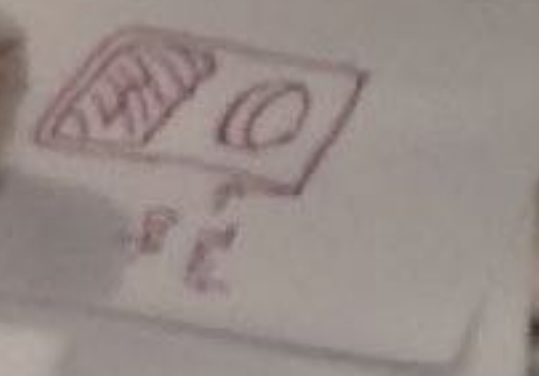
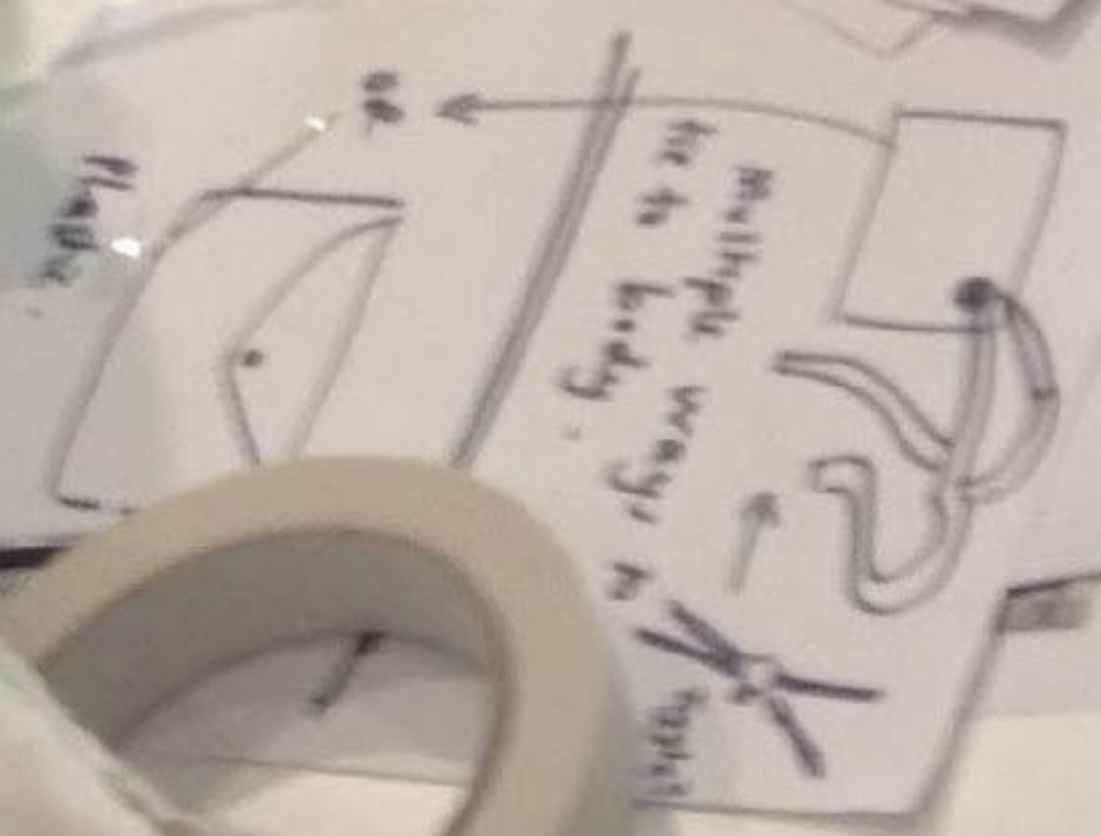
1) **I am confident that I could contribute to...**

1) **I would be curious to explore with colleagues in the room if I could contribute to...**

Ideation







8b: Text, icon & decorative variants

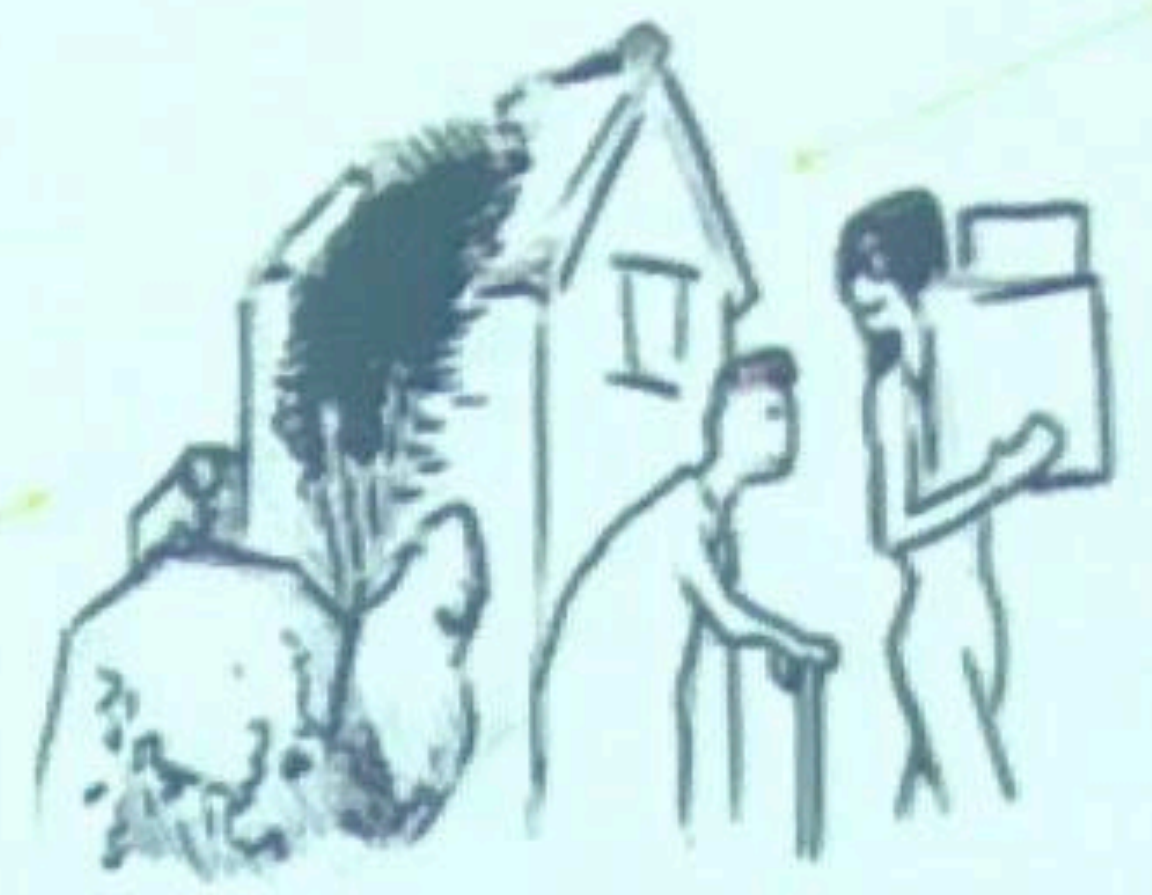


Graphic, text and pattern variants based on location and culture. English, Arabic and Swahili shown.

Misaki comes across ad
leaflet for recruitment



Misaki helps her area when a
disaster strikes by talking to elderly
people through the disaster and
helping them move their belongings



Misaki goes to
other areas
is called
region-sp...

Misaki, 34 years old,
Athletics Teacher

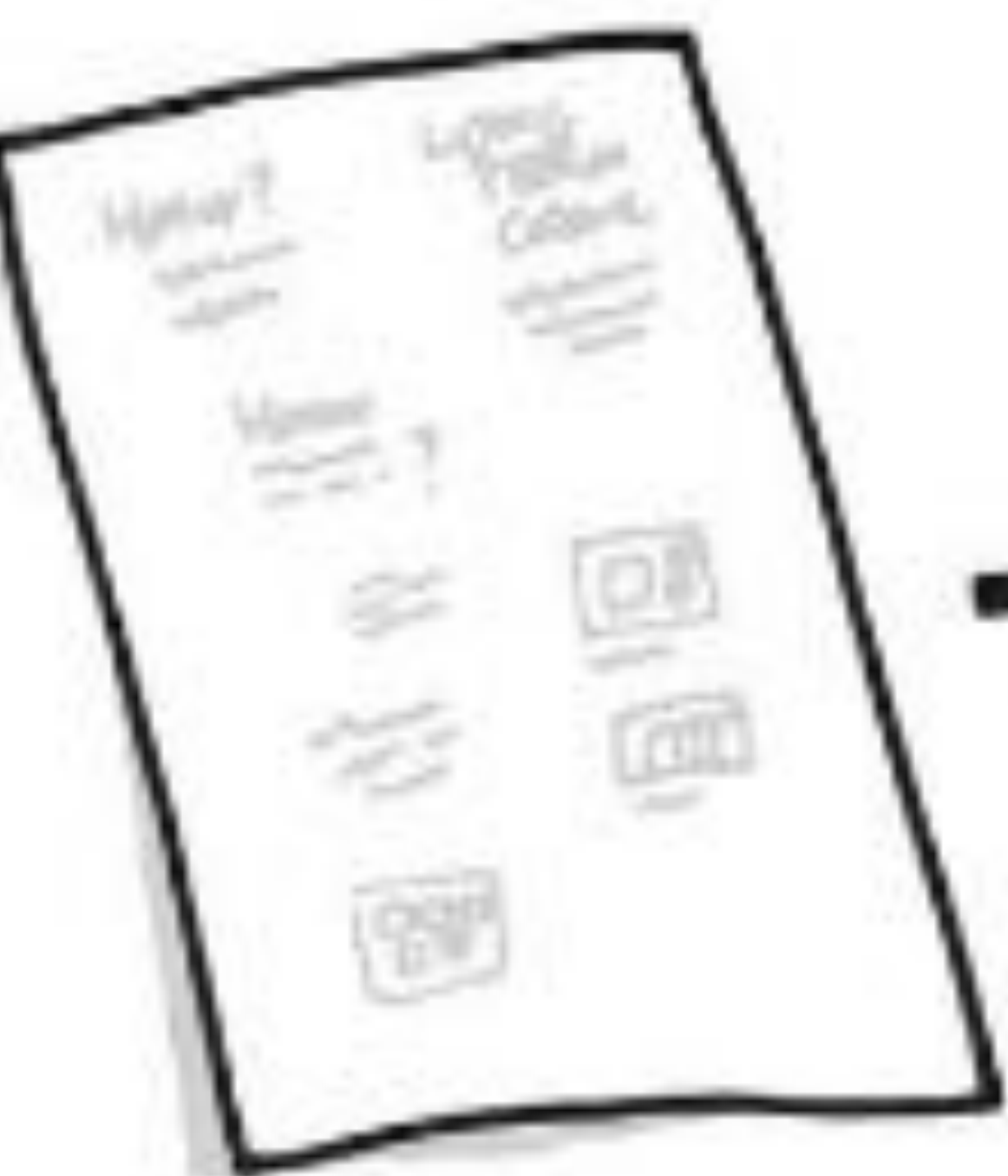
Misaki signs up to be an
ambassador online and
fills out a profile



Misaki comes home
her family after 3
of disaster relief in
neighboring city



①
NOTES



Gather
key info
20 min.

②
IDEAS



Doodle
rough solutions
20 min.

③
CRAZY BS



Try
rapid variations
8 min.

④
SOLUTION SKETCH



Figure out
the details
30+ min.

Identify your
subject / theme / challenge

“How might we..?”

An open-ended challenge to achieve a given aim.

or

“With this we could...”

A tech start point – ‘Push innovation’

Use cases

In your group identify as many use cases for smart imaging as possible.

Accelerated project focus

Rapid research - agree on sub-themes, then divide (15').

Laptop research – find all you can to feed back to the group (20').

Any Qs for experts?

Summarise key insights - statements (**not** ideas or solutions)



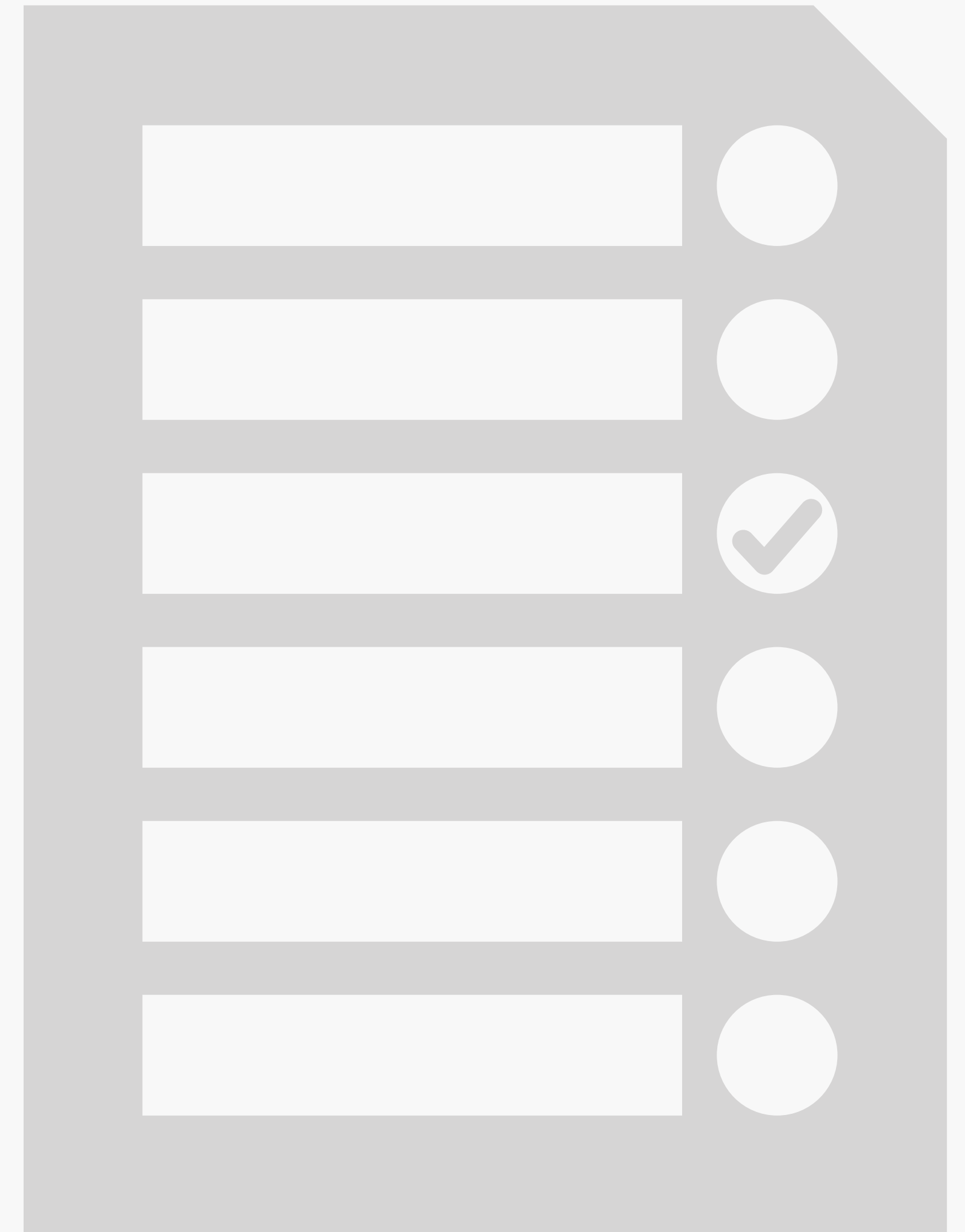
Now work alone...

Words first

Take 30 mins to write a dozen or so ideas down simply and succinctly.

Circle about 3 of the most promising.

This is **not** quantity-over-quality brainstorming.



Crazy 8s

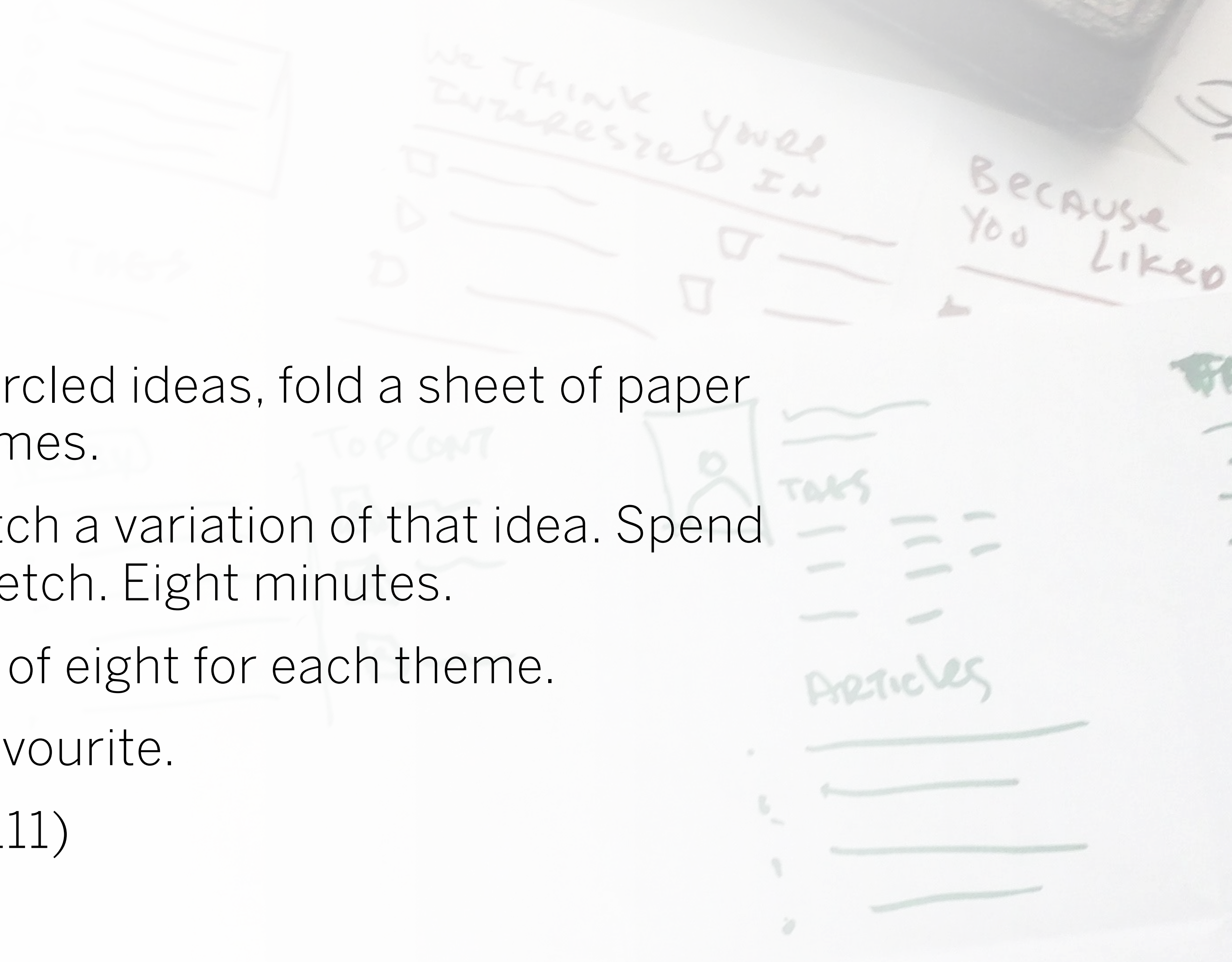
For each of your circled ideas, fold a sheet of paper to create eight frames.

In each frame sketch a variation of that idea. Spend one minute per sketch. Eight minutes.

Repeat, one sheet of eight for each theme.

Again, pick your favourite.

(Sprint, Knapp p. 111)



Solution sketch.

For each final favourite:

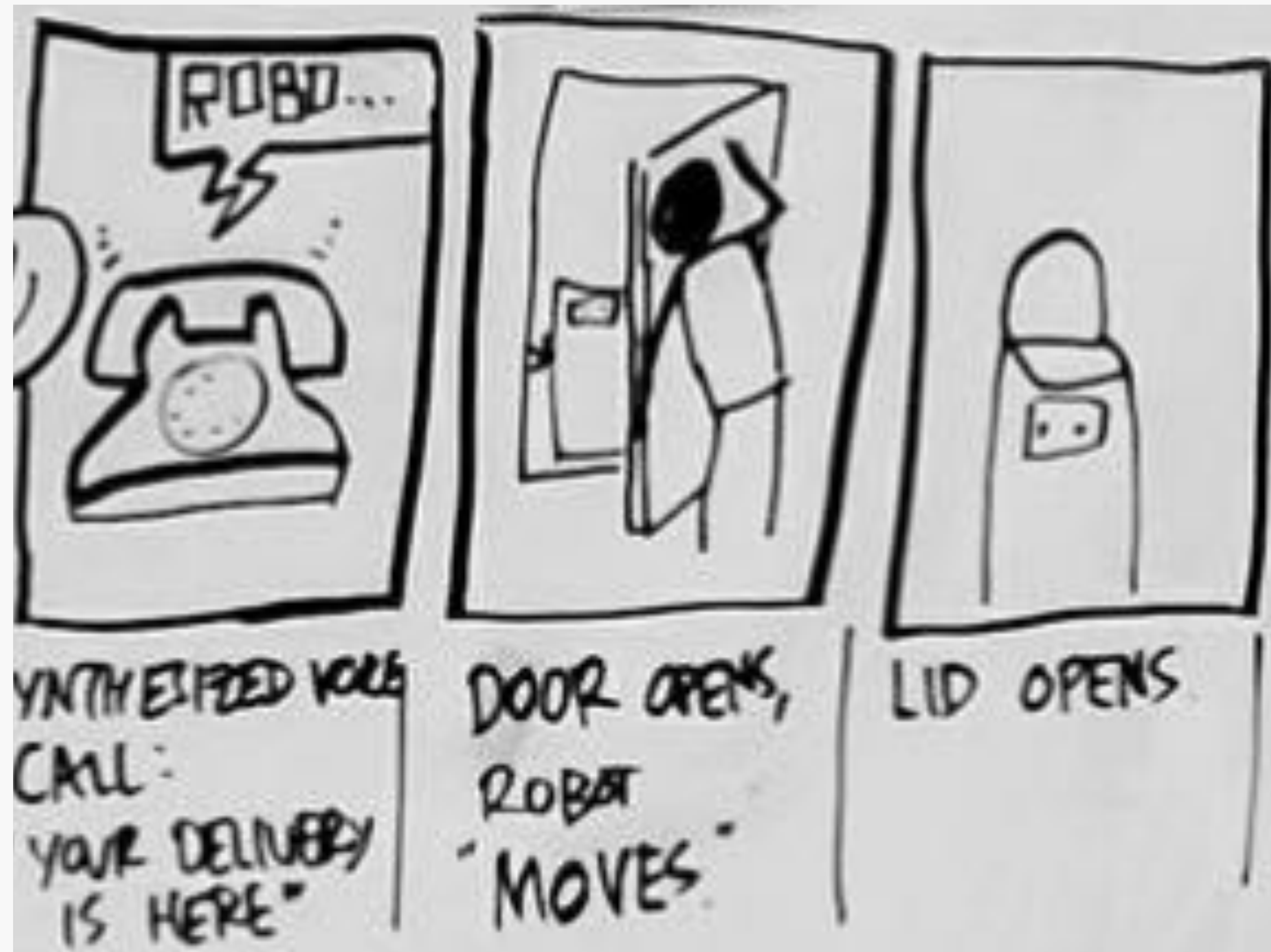
Create a three-panel storyboard by sketching in thirds of an A4 sheet of paper.

Make it self-explanatory.

Keep it super-simple!

Regroup with 2-4 great ideas each!

(Sprint, p. 114)



Now regroup & share

Impact / Difficulty matrix

Our products / services _____

helps customer segment _____

who want to jobs to be done _____

by "avoiding, reducing..." pains _____

and "enabling, increasing..." gains _____

(unlike existing alternatives, competition _____).

Storyboard – the power of narrative

Tell the *story* of your concept in use.

Who, why, how?

Problem to solution.