DSI4EU FABLAB

SKILLS & LEARNING

1. INTRODUCTION

The past few years have seen a rapid growth in the number of people using digital technologies to tackle social challenges in areas ranging from healthcare and education to democracy and the environment. This phenomenon, which we call digital social innovation (DSI), aims to:

Reorient technology to social ends, and to harness it to improve lives and benefit the many rather than the few.

Empower citizens to take more control over their lives, and to use their collective knowledge and skills to positive effect

Make government more accountable and transparent

Foster and promote alternatives to the dominant technological and business models — alternatives which are open and collaborative rather than closed and competitive

Use technology to create a more environmentally sustainable society

Despite the many inspiring initiatives taking place across Europe and the world, relatively few have grown to deliver positive social impact at scale, for a range of reasons which we and others have explored in depth.
DSI4EU is an EU-funded project which aims to support the scale and growth of digital social innovation, tech for good and civic tech in Europe. Working with six partners across Europe, we have been carrying out a range of activities including working on research, policy, network-building and practical support for innovators.

2. SKILLS AND LEARNING CLUSTER

Learning and education are key topics for generating positive changes in our society. They are the basis of tomorrow's society. Through our work and others', we know about many inspiring projects using DSI both as a learning method and a way of delivering positive social changes.

In this context, DSI4EU's Skills and Learning Cluster, led by Fab Lab Barcelona, aims to develop and expand new educational models and skills for the modern day, building upon new digital technologies which democratise access to information, knowledge and fabrication at all levels and generate impacts that were unimaginable in the past.

We are facing a great challenge, but at the same time a huge opportunity, to influence a new educational model which is open, accessible and inclusive, with a clear focus on social innovation. We are working hard to reduce entry barriers, prejudices and even costs to build the path towards the development of skills and learning with a social sense.

To reach our goals, we explore different sides of this topic. Central to our cluster approach is our peer learning model, where the horizontal figure of the educator is rethought to create space for a transversal model, giving rise to cooperation and distributed learning. For example, the core element of our Fab Academy programme is peer learning, with students physically and remotely working with peers from all over the world, and exchanging knowledge and skills globally to grow together.

nesta · betterplace lab · waag society · Iaac|FAB LAB BARCELONA · Barcelona Activa · Fundacja ePaństwo

3.PEER LEARNING

This document is a practical methodology which can be used to develop ideas for digital projects with a social impact. It aims not just to stimulate new ideas but also to be a fun stimulus for group-work and creative thinking.

This methodology was developed through and informed by a series of peer learning events organised at Fab Lab Barcelona in Autumn 2018, which involved over 40 education experts, teachers, academics, DSI practitioners, makers, social entrepreneurs, NGOs and policymakers. We implemented a "learning by doing" approach to explore the skills of the future (such as creativity and collaboration), how the education system can be harnessed to deliver social impact, and how new innovation methods can be used for good. This document aims to bring the outcomes from those workshops together in an open, accessible, inclusive and practical educational tool, with a strong focus on social innovation.

In our first **peer learning event**, participants discussed and developed lists of what they thought will be the most important skills in the future. All the groups agreed that the most relevant skills are related to human interaction and personal development, with Interpersonal skills and high cognitive skills topping the list.

In the second peer-learning event we worked to understand how different elements of education—teachers, students, resources, environment, content and methodologies—can be organised to maximise their social impact. he main conclusions people reached during these session were: that teachers and students have shared responsibility, and that the educational environment is more relevant than resources. The environment defines which resources and contents are necessary, but at the same time, the resources should be open, global, shared, collaborative and available online—an approach which can be summed up as "glocal".The groups also suggested that

available online—an approach which can be summed up as "glocal".The groups also suggested that sometimes methodologies are more relevant than content itself. Given the availability of content and information online, the major challenge is teaching students in an engaging way.

Given the availability of content and information online, the major challenge is teaching students in an engaging way.
In the final peer-learning event, we explored how limited public budgets can be best distributed to build a sustainability framework for our vision of technology-enabled, collaborative and glocal education.

- **Funding & Governance:** Sources of funding, uses of funds, co-funding, agency, role of parents.

- **Social & Economic Outcomes:** Local development, job opportunities, social impact.

- **School environment & international connections:** Learning environment, motivation, wellbeing of students, curriculum, students & teacher mobility.

- **Research & Innovation:** Investment, early childhood focus, methodologies, trends, learning environment, involvement of professionals in education contexts.

We developed the following guide based on the insights and learnings we gathered from the peer learning events. We developed this guide to help develop digital social innovation projects through a process that prioritises the importance of interpersonal skills and high cognitive skills and applying open, accessible and inclusive tools in order to maximize our social impact in the educational environment.

Changing the world is not an easy task (but not impossible). It is done little by little: every little effort to build a better world is worthwhile, and it is necessary to create the sustainable society of which we dream.

This is the story of a group of individuals who have decided to take action and give a sense to technology and improve the lives of their community.

This story begins at _____place_____ , when a group of individuals, known as _____name of the team_____ , decide work together and collaborate. Thanks to the determination and motivation of :

names of participants + teachers + parents

_____

_____

_____

The secret of the success of _____name of the team_____ is that they have complementary skills that are means to improve their local environment.

Each member of _____name of the team_____ has their own strength, such as: list of skills of each member

_____   _____   _____   _____

_____   _____   _____   _____

_____   _____   _____   _____

_____   _____   _____   _____

_____   _____   _____   _____

_____   _____   _____   _____

_____   _____   _____   _____

_____   _____   _____   _____

1. Define your team skillls

Instructions:

- Choose a color for each member of the group.

- In the graphic, choose the skill you feel most connected. Being **8** the one you identify the most and **1** you identify yourself the less.

- At the end of the exercise, all the participants will have defined their skills and you'll be able to know what skills you have within the team.

○ SET OF SKILLS ○

empathy   curiosity   creativity   ethics

inclusive   global awareness   critical thinking   resilience

empathy

critical thinking

curiosity

resilience

0 1 2 3 4 5 6 7 8

creativity

inclusive

global awareness

ethics
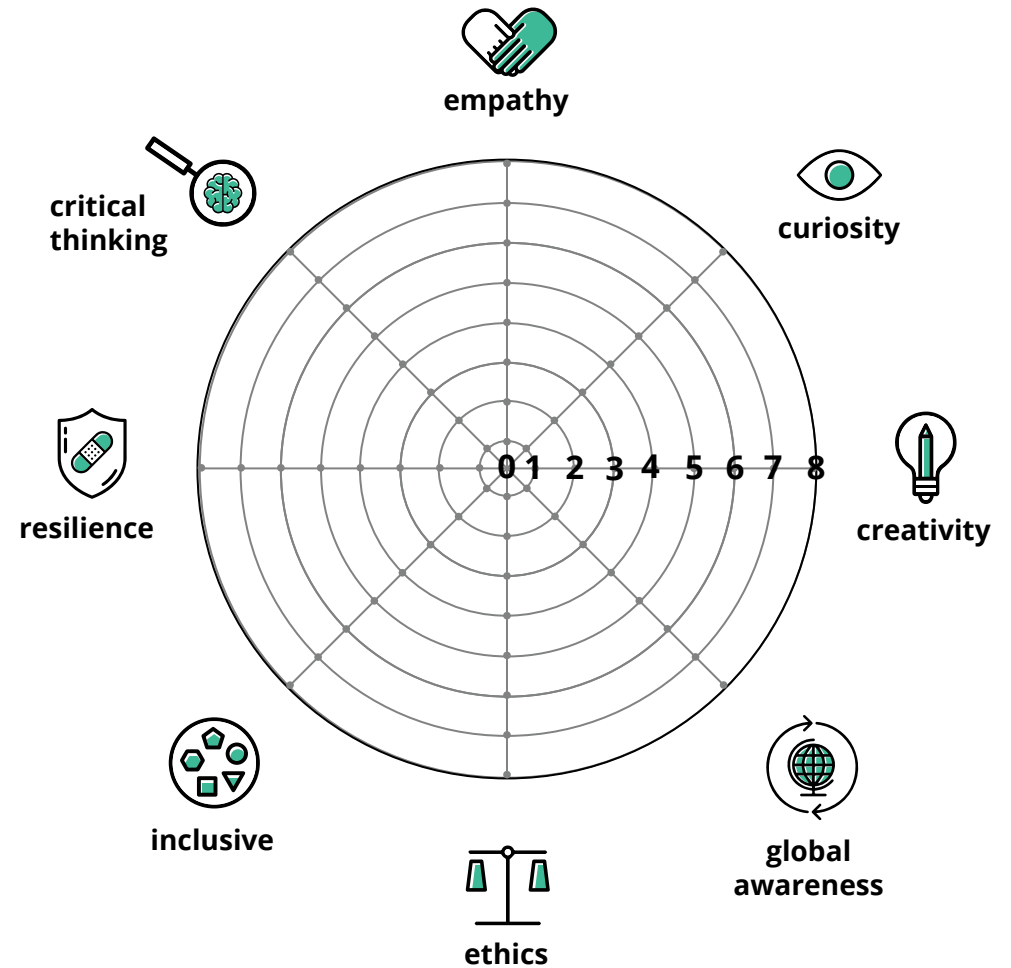
* Source: Future Learning Unit, Fab Lab Barcelona.

The _____ are very
name of the team

engaged with the idea of improving their community,

but they did not know how to do it.

They finally understood that a best way to make a

change was to start at home, carrying out small

actions at the local level. Based on this idea, they man-

aged to define the resources they needed, motivate

their community and grow step by step.

The first step is to investigate and collect evidence in

their neighborhood, so they discovered that the chal-

lenge they wanted to work on _____
local challenge

based on _____ that affected
evidence

_____ .
stake holders

2. Define the local challenge

Instructions:

Related to the figure in the next page.

- In the Problem box, describe the local challenge that you want to work on in a sentence, be as simple as possible.

- In the SDG box, choose one or more SDGs related goals to the challenge defined in the first box.

- In the Evidence box, write down the evidence that confirms that it is a real problem. You can use articles, news or research in related groups.

- In the Impact box, write down a list of consequences of why addressing this problem is important? How it affects us? Who is affected? etc.

- In the Causes box, write down what are the causes of the problem. To access the causes it will be necessary to ask yourself a few times: why? discuss with your group your reflections.

- In the Recommendations box, make recommendations to solve the challenge, the simplest way to do it is to try to reverse the causes defined in the previous box.

  These steps will support you to have a better understanding of the problem you wish to tackle, it's evidences, impacts, causes and context, which it's a will be used in the following steps to create the project.

PROBLEM ANALYSIS CANVAS

Title/ Team

Problem-Definition

SDG - Sustainable Development Goals *

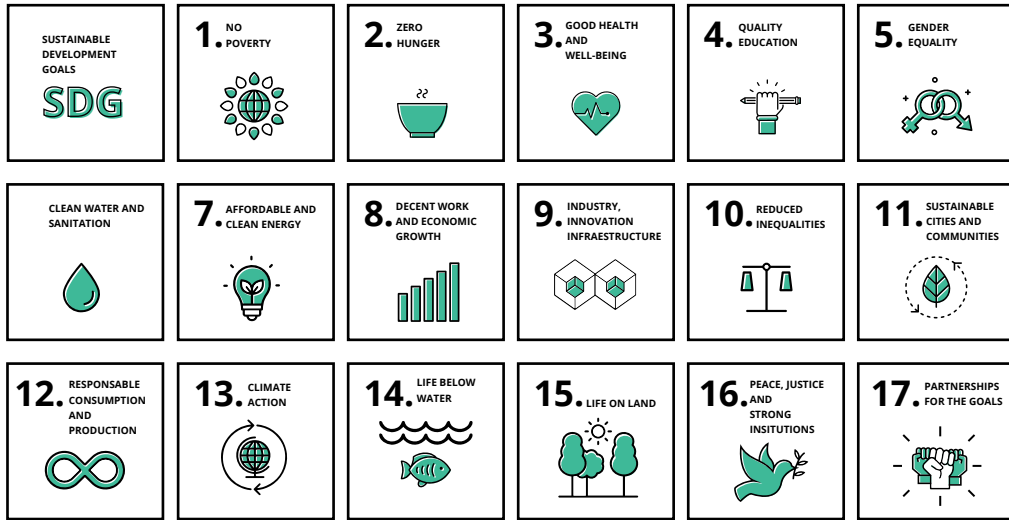**Evidence** - What's the proof that the problem is real?

Impacts - Why do we care? **List consequences**

Causes - What's driving the problem? **WHY**

Recommendations
Simple! Just reverse the cuases

* You´ll find SDG list in the next page

SUSTAINABLE DEVELOPMENT GOALS **SDG**	**1.** NO POVERTY	**2.** ZERO HUNGER	**3.** GOOD HEALTH AND WELL-BEING	**4.** QUALITY EDUCATION	**5.** GENDER EQUALITY
CLEAN WATER AND SANITATION	**7.** AFFORDABLE AND CLEAN ENERGY	**8.** DECENT WORK AND ECONOMIC GROWTH	**9.** INDUSTRY, INNOVATION INFRAESTRUCTURE	**10.** REDUCED INEQUALITIES	**11.** SUSTAINABLE CITIES AND COMMUNITIES
12. RESPONSABLE CONSUMPTION AND PRODUCTION	**13.** CLIMATE ACTION	**14.** LIFE BELOW WATER	**15.** LIFE ON LAND	**16.** PEACE, JUSTICE AND STRONG INSITUTIONS	**17.** PARTNERSHIPS FOR THE GOALS

With the challenge in mind, it is time to have brain-storming brilliant ideas! That's how working as a team, they decided to make a jam session of ideas, using all their skills and talents to think of possible solutions for _____ local challenge _____ .

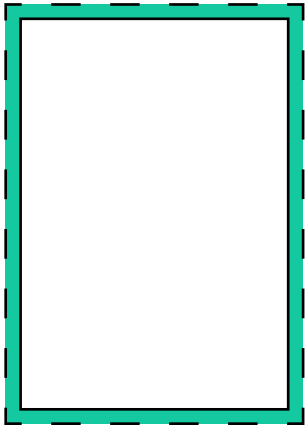Some of the ideas have emerged in the jam session

_____   _____

_____   _____

_____   _____

Jam Session

Instructions:

- Based on the problem identified, all the members of the group will contribute of possible solutions. Use post-its to point your ideas. This phase objective is to generate as many ideas as possible, regardless of whether they are viable or not, the idea is to be creative and write down different options.

- Hang a paper on the wall (or draw) an arrow that says "easy" on one side and "impossible" on the other.

- Classify all ideas from easy to impossible, using the arrow.

- Each member of the group will vote to select 1 idea that seem the more likely to be implemented. The idea with more votes is the winner that will be developed in the next phases.

EASY ←—————————————————————————————————————→ **IMPOSSIBLE**
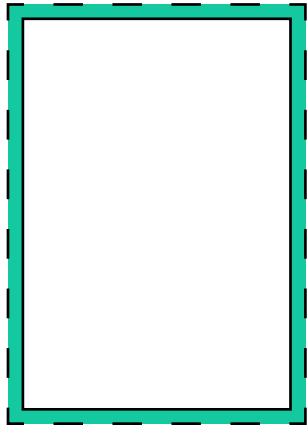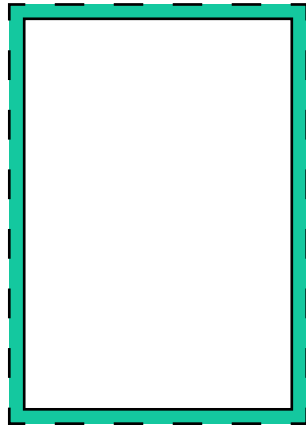
IDEA 1	IDEA 2	IDEA 3	IDEA 4	IDEA 5
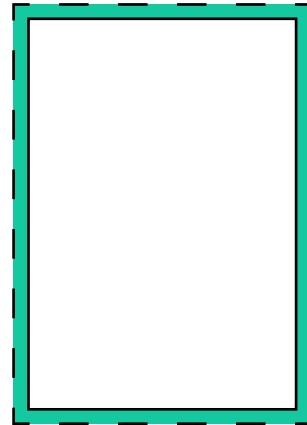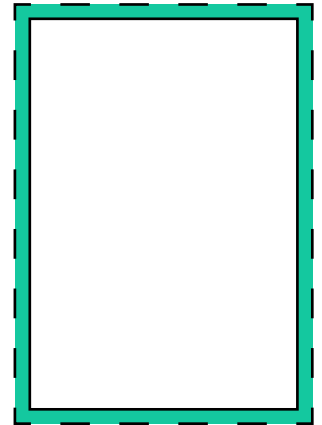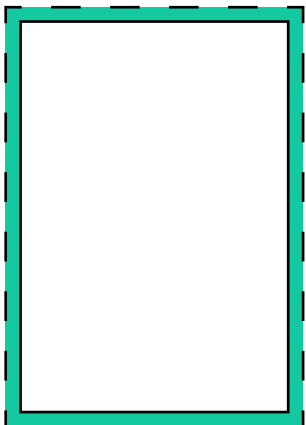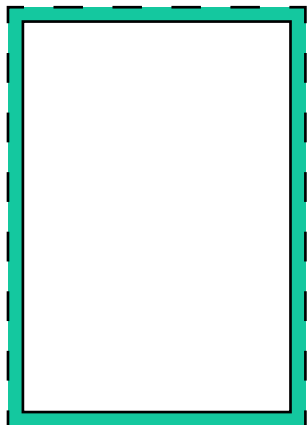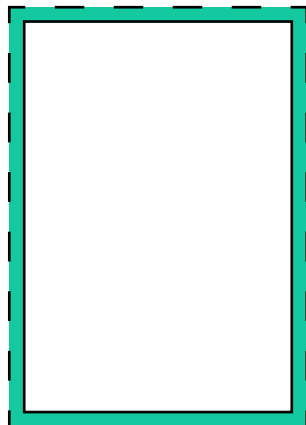
IDEA 6	IDEA 7	IDEA 8	IDEA 9	IDEA 10
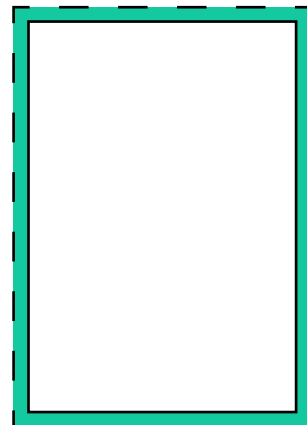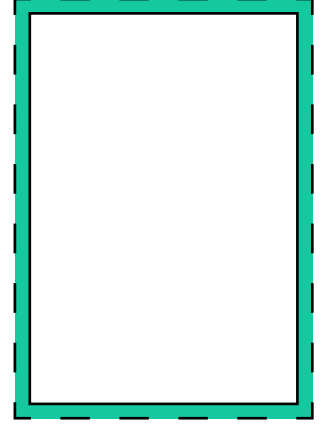
Write and describe your final ideas:

_____

_____

_____

_____

_____

_____

_____

*Source: Future Learning Unit, Fab Lab Barcelona.

After evaluating the different ideas, The

_____ decided to continue
name of the team

working in _____ .
final idea

 User Validation

Instructions:

This tool will help you to validate your idea with real users and end the phase with a project / product / service. You can do the interview as many times as you want, the more the better!

- In the first box, ask the user if he has _____ , and if so,
your idea
  which, write down the answers.

- In the second box, ask the user that you would like him to do

  about _____ . Write down the answers.
your idea

- In the third box, ask the user what they like and what they do

  not like about _____ , write down the answers.
your idea

- In the fourth box, you may ask the user how it would

  be _____ ideal, what it has and what it does not
your idea
  have, write down the answers.

- Finally, with all the information collected with the users,

  draw _____ , including all the parts and pieces
your idea
  that will have. As a reference you can use the example of technical drawing that we present. The important thing is to have a

  clear idea of the scope of _____ with as much
your idea
  detail as possible.

YOUR IDEAL ...

Title/ Team

Do you have a ... **What is it?**

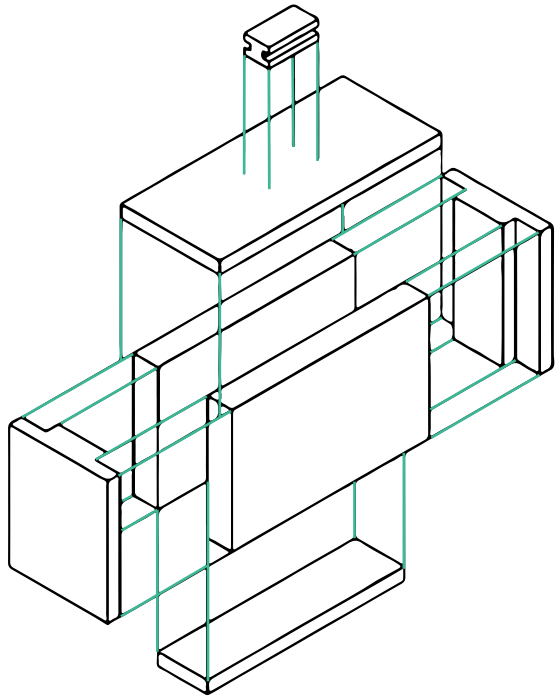**DRAW** the ideal ... you've thought about

What do you like about it?

What do you dislike about it?

What would you like it to do?

How would your ideal ... be like?

TECHNICAL DRAWING

The next step was to bring that idea to reality. What started as an idea ended up becoming a project / product called _____ name of the product/

. _____ service / project _____ that serves

. _____ how it works _____ using

_____ name the components and describe the process _____ .

In this way a first prototype was created using _____ prototyping tool _____ . The process consisted of _____ step by step documentation

_____

_____

_____

_____

_____

_____

_____

5. Prototyping

Instructions:

- To have a clearer idea of how your project is in 3 dimensions we will do a simple exercise.

- Cut the foldable cube that comes next.

  Fold, assemble and glue your cube.

- -When you have assembled the cube, draw your project / product / service in each of the sides, to have a clear idea of how it would look in 3 dimensions. Draw each side, the top and the bottom.

- With the idea drawn in the cube, choose the simplest, fastest and cheapest way to create a prototype. This is following the list of prototyping resources and links we have designed for you.

Library of resources for Prototyping

TINKERING

- Instructables: https://www.instructables.com/
- Arving upta Toys: http://www.arvindguptatoys.com/
- https://www.ted.com/talks/arvind_gupta_turning_trash_in-to_toys_for_learningPapekaura: https://tamasoft.co.jp/pepakura-en/
- Materials: Cardboard, Fabrics, Wood, Paper, Foam.

ELECTRONICS

- Arduino: http://www.arduinoblocks.com/ http://blog.ardublock.com/
- Microbit: https://makecode.microbit.org/
- Tinkercad: https://www.tinkercad.com/learn/circuits

CODING

- Scratch: https://scratch.mit.edu/
- Python: https://www.python.org/

DIGITAL FABRICATION

- Additive fabrication (3d Printing:):
- Thingiverse: https://www.thingiverse.com/
- Tinkercad: https://www.tinkercad.com/
- OpenJSCAD: https://openjscad.org/
  Subtractive fabrication (Laser cut, Vinyl Cutter & Milling Machine (CNC):
- Autodraw: https://www.autodraw.com/
- Inkscape: https://inkscape.org/
- Template Maker: http://www.templatemaker.nl/?lang=en
- SVGNest: http://svgnest.com/
- Makeabox: https://makeabox.io/
- Festi.info: https://www.festi.info/boxes.py/
- Nesta's prototyping framework: https://media.nesta.org.uk/documents/proto-typing_framework.pdf
  Support worldwide networks:
- Fablabs: https://www.fablabs.io/
- Makerspaces: https://makerspaces.make.co/
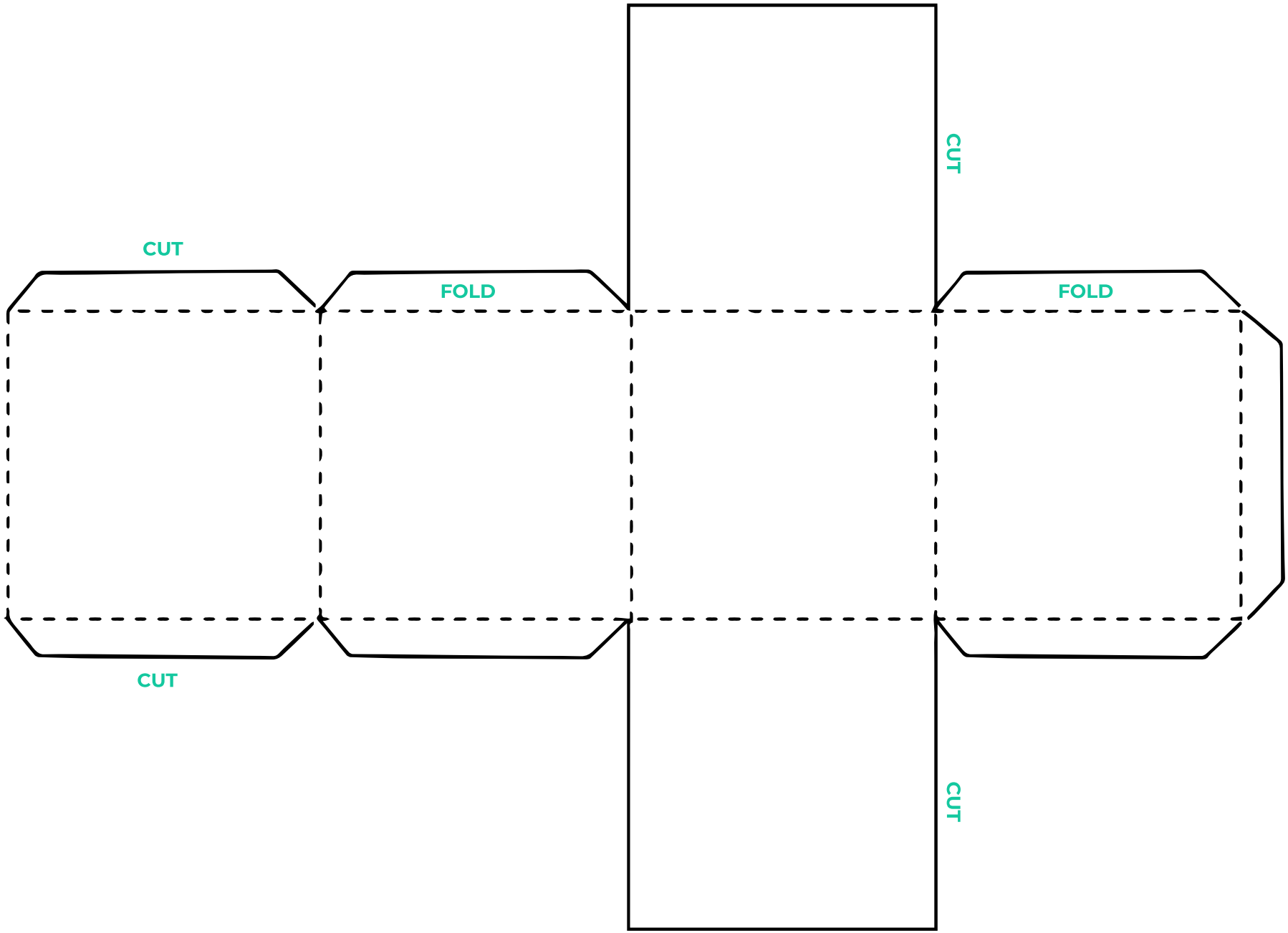
The_____ had already developed
the first prototype of _____
name of the product / service / project

this was the moment of truth, to make everyone they
knew about _____, about how

it worked and above all, that it had been created
for _____.
local challenge

To spread the word, they decided to set up some com-
munication pieces, with the aim of_____,
Goal

to engage_____, and create
stakeholders

awareness of the problem. To achieve the objectives,
they decided to use _____.
comms channels

6. Communication

Instructions:

- To understand how to communicate effectively with the actors involved in the project, we must understand how to attract their attention, both their interests and motivations, and the channels through which they communicate or receive information.

- The first part is to define the objective. For that, in the first box, we define who these people are, what their role is in the project, etc.

- In the second box, what do we want them to do, what action do we expect from them, etc.?

- In the third box, we write down what these people see, what products they see, what they watch and read, etc.

- In the fourth box, we write down what these people say, what we have heard they say and what we imagine they say.

- In the fifth box, we write down what these people do, how they do it, what we imagine they do.

- In the sixth box, we write down what these people hear, what they hear about their environment, their friends, other people, etc.

- Finally, in the seventh box, we write down what these people think and feel.What are their worries, fears, etc. and what they want, dream, etc.

    With all this information, we can define what message we will communicate (boxes 1 and 2), in which tone we will communicate (box 7) and where and which media channels we will use to send the message (boxes 3, 4, 5 and 6).

EMPATHY MAP CANVAS

Designed for:

Designed by:

1.

WHO are you empathizing with?

Who is the person we want to understand?
What is the situation they are in?
What is their role in the situation?

2.

WHAT do they need to **DO**?

What do they need to do differently?
What job(s) do they want or need to get done?
What decision(s) do they need to make?
How will we know they were successful?

7.

WHAT do they **THINK** and **FEEL**?

PAINS

What are their fears, frustrations and anxieties?

GAINS

What are their wants, needs, hopes and dreams?

What other thoughts and feelings might motivate their behavior?

6.

WHAT do they **HEAR**?

What are they hearing others say?
What are they hearing from friends?
What are they hearing from colleagues?
What are they hearing second hand?

3.

WHAT do they **SEE**?

What do they see in the marketplace?
What do they see in their immediate enviroment?
What do they see others saying and doing?
What are they watching and reading?

5.

WHAT do they **DO**?

What do they do today?
What are they hearing from friends?
What are they hearing from colleagues?

4.

WHAT do they **SAY**?

What have we heard them say?
What can we imagine them saying?

Finally, considering the sustainability of the project and the solution, The _____ name of the team understood that they should complement the project with a general framework to change things, so they proposed a series of public policies related to _____ local challenge They worked considering the existing policies and the influence of the policies in the _____, local challenge with which they proposed new policies for the future, these are his proposals: New policies

_____

_____

_____

_____

7. Policy Making

Instructions:

- In the first box, indicate which are the policies, laws or rules that currently exist and that are related to the challenge of the project.

- In the second box, write down how these policies, laws or rules influence the project challenge, they affect the current problem?, is the problem regulated by these policies? or not?

- Finally, based on existing policies, laws or rules and their influence, create your own new policies or laws that helps to solve the local challenge and support your project.

EXISTING POLICIES

What are the existing polices
related to the challenge?

List the policies that already address the challenge
over the possible ones

INFLUENCE POLICIES

What influence policies have
over the local challenge?

Describe and illustrate how existing policies
influence your challenge

FUTURE POLICIES

Pitch your idea about
future policies

Describe a potential policy to address your challenge
that is also connected to your potential solutions

COMMENTS:

*Source: Challenge, policy context canvas. Co-creation journeys. SISCODE project.

In order to increase your impact and spread your project across the world, share all the documentation, results and tools used within a worlwide network such as digitalsocial.eu, fablabs.io, github.com or any other network that could be used by other communities interested in your project around the world. Through the digital technologies your project could be adapted and replicated by other communities, but also be an inspiration to encourage more people to be empowered.

in this way, using a simple methodology,

The _____ name of the team _____ discovered the power they have to build a future delivering social benefits to their community, representing an example for others and laying the foundations of a new era in which, using digital technologies, we can all have a positive impact on our environment.

8. Reflection

Instructions:

- In the Headline box, explain your project in one sentence.

- In the Image box, draw an illustration to support your message.

- In the Lead Paragraph box, describe your DSI project answering the following questions:
  who? what? when? where? why? and how?

- Finally, in the Explanation box, make a reflection about your project, you can get inspiration from the following questions:

  What is the impact of technology on your project?

  How technology has helped to address your social challenge?

  How technology has helped to empower citizens?

  How your project has helped to improve lives?

  How your project has helped to create a more sustainable society?

  How have you used the technology in a different way?

  How can you scale up the project?

  Other thoughts?