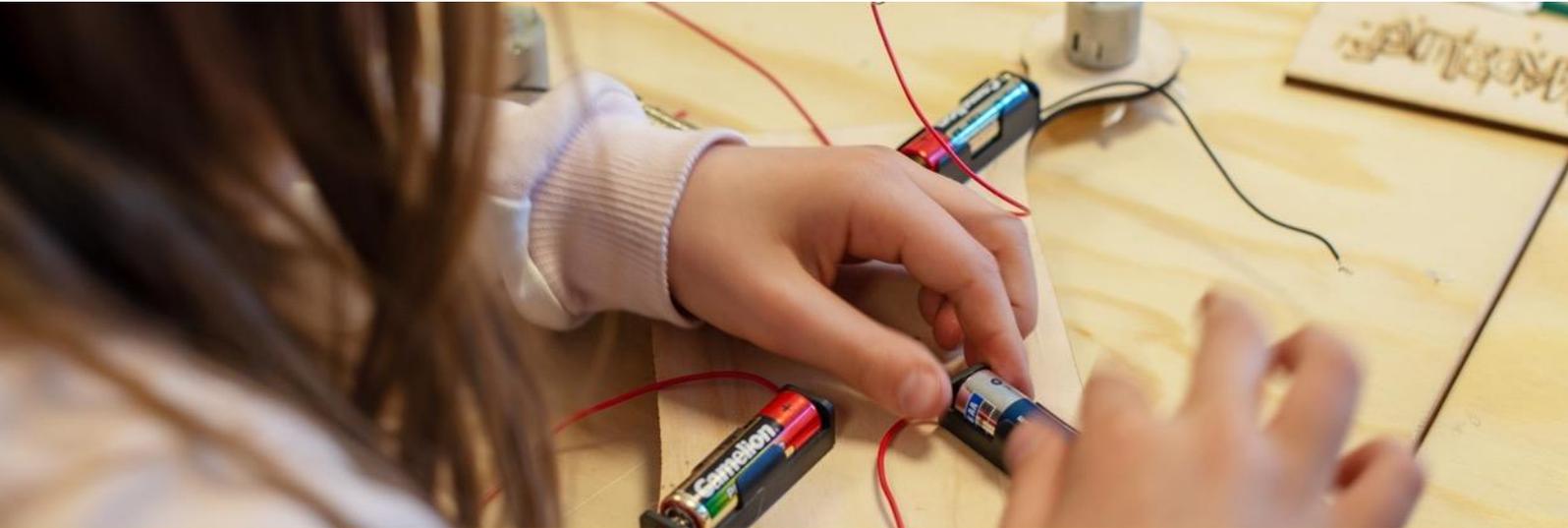Entrepreneurial skills
for young social innovators
in an open digital world

Workshop Description
BUILD YOUR FUTURE SCHOOL

FyXXi

Build your future school (eduCentrum)

The students were asked to think about problems they experienced in their own school environment and list them. The next step was to choose one of the problems and try to find and build a solution to fix it.
The first step of a build is to look at what's already there. They created an overview of these solutions and then started to make a design drawing for their own solution.

They built the basic prototype with a few iterations. After each workshop they reflected on the process, made adjustments and compared their prototypes with other groups.

The first prototype was a white foam model, afterwards they started building in cardboard and enhanced the prototype with electronics or micro-controller where needed.

Workshops: 8x3 uur
Setting: primary school, 5th and 6th form
Group size: 4-5 children per group
Age: 10 – 11 years old

Objectives

- ✓ have a better knowledge of basic prototyping skills, use a glue gun, solder
- ✓ come up with a solution to a problem and work out how to make it real
- ✓ iterate using a creative design process
- ✓ fail and start again
- ✓ use math to measure accurate dimensions and use geometry in real life
- ✓ learn to work and plan in groups for different phases of a prototyping project
- ✓ know how waste can be a valuable resource
- ✓ visualise ideas
- ✓ feel empowered through building hands-on
- ✓ feel creatively stimulated

Preparation

We built mainly cardboard prototypes, so we provided lots of large cardboard sheets. We also try to encourage using waste material, so empty boxes, rolls, cups, ... were also present.

We used cutting knifes, scissors, cutting mats, hot glue, contact glue, different kinds of tape (e.g. electrical tape in different colors can be used to decorate), pens, markers, ... We also had some LEDs, electrical wire and soldering tools, and some micro-bits for those who wanted to use them.

We printed 1 A3 brainstorm poster (0XX_C019: Brainstorm Find your problem) and 1 A3 Design poster (Z_converted to C020_(0XX_C021: PROTOTYPE - Design)) for each group, though we made sure to have some extra. We also provided some extra blank papers to use as draft or take notes on.

For the workshops, we divided the group into small groups of 4 or 5 children. The children worked in the same group throughout the sessions.

For the hands-on introduction micro-bit workshops we used 1 laptop and micro-bit for each child, although you could have them work in pairs also. Finally, there were some class computers and iPad's for the groups to use and look things up on the internet, if they wanted to.

Week 1: Introduction and brainstorming (150 min)

The goal of this unit is to sensitize and let the children explore the theme and pinpoint problems on their own. They define problems and also try to think up possible solutions for them.

We introduced the DOIT project and theme of the workshop sessions. In our case we asked the children which problems they experienced at school or in the classroom. We also talked about working together, dividing tasks, prototyping and documenting, ...

Introduction – 10 min

We explained the DOIT project and what we would do in the workshop sessions. We also talked about the topic: the school and what they think could be better in the future.

Brainstorm – 50 min

The children used the A3 posters to write/draw 3 possible problems and 3 possible solutions.

Share and give/get feedback – 60 min

Each group presented their problems and solutions. We also allowed comments and feedback to chosen topics. Afterwards the children selected the best problem/solution to continue working on.

As a facilitator, at this stage you should point out recurring problems and similarities. In case the children cannot reach an agreement on which problem to continue with, you can organize a vote..

Research history and existing solutions – 30 min

The children went online an researched their idea and solution. Seeing what had already been done inspired them on how to make their own.

_online_F017: History board (Activity description)_

Sessie 2: Prototype design (180 min)

The goal of this unit is to start the iterative prototype process. We focused on working together, dividing tasks in the group and on creating. At each step of the process we include reflection and feedback moments to keep adjusting and fine-tuning the prototypes.

The first step was to make a more detailed drawing of how the prototype could be made. After fine-tuning the children built a plain prototype using only blank materials so as to focus mainly on shape and function.

First prototype design – 60 min

We let the children make a detailed drawing of the prototype on the A3 paper (Z_converted to C020_(0XX_C021: PROTOTYPE - Design)) to draw the prototype before starting to build.

Build a plain prototype – 100 min

online_0_C038: Plain Prototyping

Show and tell/feedback – 20 min

Each group showed their design poster and prototype. They briefly explained what they were going to make. We also allowed time for questions or comments.

Week 3: Micro:bit redesign of the prototype (180 min)

The main goal of this unit was to let the students know what is possible with micro controllers, and to learn to think with code and electronics.

We started with a hands-on introduction into Micro-bit. You can use one of the many tutorials or workshops to be found online. While one group had a micro-bit introduction, the other group had a look at some example patent drawings to better adjust and redesign their own prototype. We also let them take some more time to research the problems and solutions they selected in the previous session.

Micro:bit introduction – 90 min

The children got to know micro-bit and how to use it in groups of around 25 students.

Redesigning solutions – 80 min

The children redesigned their solution by looking at patent drawings and seeing how they detail things. We used the tool Patent exploration, available at https://www.doiteurope.net/toolbox#/material/patent-exploration , and looked at *https://patents.google.com*.
The children were encouraged to look at some drawings of things they knew, to think about your own project, and make a second version of their design drawing.

Show and tell/feedback – 10 min

Week 4: Cardboard prototype building (180 min)

In week 4 we did the actual building of the prototype in cardboard and other easy to find household materials. We focused on creating, working together, dividing tasks in the group and learning from mistakes.

Cardboard prototype building – 90 min

Refrect and finetune or redesign – 60 min

Show and tell/feedback – 30 min

Week 5, 6, 7: Cardboard prototype building (180 min x 3)

In this unit we continued the building of the prototype. We also provided time and guidance for those who want to use soldering and basic electricity or micro-bit in their projects. The focus was again on creating, working together, dividing tasks in the group and learn from mistakes.
We repeated this unit 3 times.

Cardboard prototype building & finetune design on paper – 150 min

Elektrisch circuit design and building // soldering (ongoing)

First the children drew a simple electric circuit to switch a light on and off. Then they connected everything together and soldered it.
As a facilitator, you should guide this activity by asking questions about the components and how they work, to allow the children to figure out how to connect them themselves. Also showed them how to handle the hot soldering iron and how to solder before they start. If you notice children are afraid to do it themselves, do not push them.

Micro:bit coding and building (ongoing)

Some groups were shown how to read electronic schematics to be able to control the speed of a motor with the micro-bit.

Show and tell/feedback – 30 min

Week 8: Presentation and exhibition (180 min)

The main goal of this unit is to show other children and parents what we made. We printed out all journals as a booklet, exhibited all the prototypes together with the brainstorm and design drawings. The children could answer questions and explain what they did.

Prepare for presentation – 90 min

Presentation to a bigger group of around 60 school children – 90 min

Each group presented their product and marketing poster in a fair setup. Questions were asked about the how and why of their project.