

TEACHER'S MANUAL



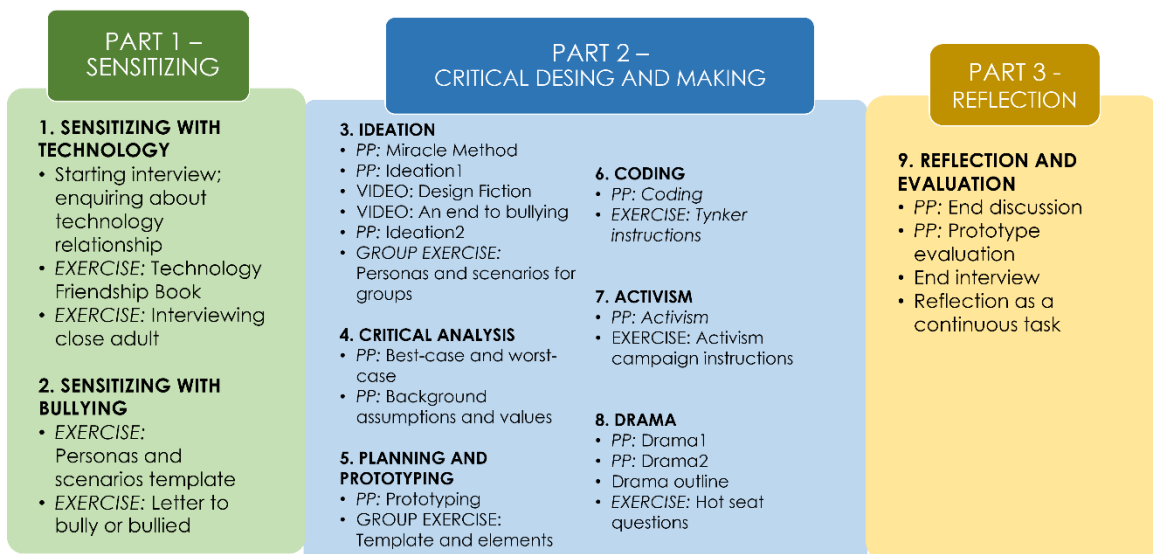
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[Make-A-Difference](#) project (2020-2023) is University of Oulu's INTERACT research units research project, financed by the Academy of Finland, which aims to understand and facilitate the emergence of critical designer and maker identities among children. The project studies how children can be supported and encouraged to embrace critical designer and maker identities by involving children in different designing and making activities. The project began in January 2020 and throughout the years over a hundred children from three different schools have participated in the project. All materials used in the project, such as videos and exercises given to the students are now downloadable and can be used in teaching.

The purpose of the teacher's manual is to provide additional tips and background information on all available material. The guide contains step-by-step advice on the phases, mentions of possible materials needed for the tasks and other useful information.

All parts, phases, and files in the photo below:

- All **EXERCISE** files are meant for children.
- **PP** (PowerPoint) files are meant to be shown in the classroom to all students.
- All other files are meant for the teacher.



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About project and tasks in general

The tasks are divided into three main parts. The first part, [sensitizing](#), is for gaining awareness on technology and bullying by doing for example interviews and creating personas. Part two, [critical technology design and making](#), is the largest section, which includes brainstorming, prototyping, and drama workshop. The final part is [reflection](#), which sums up all previous sections. Reflection can, and is recommended to, also be done as a continuous task at each phase (see [Reflection as a continuous task](#)).

In the context of this material the word **technology means only digital and smart technologies**, such as smartphones, gaming consoles, smart-TVs, etc. For some students, it can be difficult to distinguish the difference between electrical and technological devices so the students should be reminded to focus on considering these kinds of technological devices and they should not consider for example vacuum cleaners or other electrical devices.

Most of the tasks in this project can be completed as individual tasks that do not require linking to previous or subsequent tasks. However, some of the tasks do require some other tasks to be done beforehand, and that is then mentioned with the task.

The tasks have been carried out with 2nd, 3rd, 6th, and 7th graders. It was noticed that some of the tasks were too challenging for the second graders while the sixth and seventh graders were able to do all the given tasks expectedly. Hence, the assignments can be modified to students of different ages. For example, tasks that require writing can be jumped over or made easier if needed, and when creating the prototype, younger students may need more guidance. The teachers can make edits to the assignments based on their own knowledge and experiences.

Preparing for the drama section during other phases

It is good to start preparing for the drama phase by doing warm-up exercises already in the earlier phases. These warm-up exercises are a good lead up for the other tasks and when the actual drama phase starts these exercises are already familiar so they can be taken a step further in the drama workshops. Even if doing the actual drama phase is not planned, for example ideation is easier after these short warm-ups.

In addition to warm-ups, the perspective of theatre and drama is already highlighted in previous phases, such as the reflection of scenarios and personas.

Warm-up exercises

If it is possible, the warm-up exercises should be done in a circle, where everyone can see each other. With larger groups, short and physical exercises tend to be better than those that require concentration.

Example exercises are listed below. The first four exercises are easier and good warm-ups for the first phases. Exercises 5-9 are a little more challenging and those can be used at the beginning of drama exercises.

1. *Picking apples*: Reach with your hands and "pick apples from a tall tree", stretch your hands from side to side and downwards, warming the sides and back.
2. *Shaking*: Shake only toes first, then shake knees, then butt, then shoulders, then wrists and finally the head. Shake the whole body for a moment (you can also add some sounds) and then slowly stop.
3. *Cross-jumping*: Touch left foot from the front of the leg with the right hand, right foot with the left hand. Repeat the same movements behind the legs. Keep repeating the movements, jumping and accelerating as fast as possible. Slowly stop the movement.
4. *Drawing circles*: While inhaling, draw a large circle with your hands and leave the hands on top of your head. Exhale and slowly bring your hands back down, you can



even bend your knees a little to give the movement more flexibility. Repeat a few times.

5. *Giant and dwarf.* As a giant walk with your toes and try to make yourself as big as possible. As a dwarf squat down and make yourself as small as possible. You can make different sound effects while walking.
6. *Clap' and stop:* Someone (teacher) claps hands and everybody starts running in their spot, staying in place not moving. With two claps everybody turns around, making a circle and continues running. Three claps mean the movement stops. Students can also decide for themselves different meanings for claps.
7. *Stretching:* Students can suggest stretching movements. As a final movement, tense up your shoulders to your ears and let them down/roll your them back.
8. *Swish, bojoing, bang:* Standing in a circle, you take turns swinging your hands in a big round movement towards the next person, standing either on your left or right, going in the same direction as the previous person send it, and say *swish*. This movement rotates until someone says *bojoing* and raises their hands as if to fend off the *swish* movement. The *swish* movement then changes direction. With a *bang*, you can "throw" the movement anywhere in the ring by pointing or "shooting" the movement towards another student.
9. *Categories:* Stand in a circle, either a one big circle or multiple smaller circles. Throw a ball from student to another in the order specified in the first passage. Once everyone is familiar with the order, start saying some category (car brands, flowers, colors, numbers...) in another order in the ring. Finally combine these things so that the ball moves from student to student and the words are stated one by one.



PART 1 – Sensitizing

In the sensitizing part thoughts about technology and bullying are brought out.

The part is divided into two different phases. The first phase involves technology awareness tasks and the second involves tasks related to awareness of bullying, without going too deeply into the students' personal experiences, which could make participation difficult for some students.

1. Sensitizing with technology

Tasks for this phase are:

- Start interviews for students to map their initial relationships with technology, their previous use experiences with technology and critical thinking.
- A technology friendship book for students to fill in, which allows them to provoke their thoughts on technology and its use.
- Interviews for children to do with their close adults as a homework assignment.

Files related to this phase:

- Starting interview; enquiring about technology relationship
- EXERCISE: Technology Friendship Book
- EXERCISE: Interviewing close adult

Starting interview; enquiring about children's technology use

The starting interview has been used to gather background information from participants on what kind of technology users they are, whether they have previous technology design experience, or if their family members or close relatives have these kind of skills or experience.



All these things have a role to play in what kind of technology user or designer the student is. Even if this information is not collected it is good to get the students to think about this topic. These interviews function as a good orientational exercise for the whole project. They can be conducted as individual interviews, or they can be modified to be group interviews or group discussions in the classroom.

Technology Friendship Book

The Technology Friendship Book has a wide range of tasks related to technology. Some tasks are more challenging than others, and it is not intended that the friendship book is done all at once. The students can fill up the Technology Friendship Book whenever there is "extra time", for example when a group finishes their tasks faster than others or parts of it can be given as homework.

Interviewing a close adult

Interviewing a close adult at home such as an older sibling, parent or grandparent allows students to put into practice what they have experienced in their own interview. The home interview provides more detailed information on the use of the technology of their families or other close adults, which may be relevant to student's own activities, but it also can increase their knowledge of interviews in general.



2. Sensitizing with bullying

Tasks for this phase are:

- Defining the different personas associated with bullying (bullied, bully, bystander) with the help of templates.
- Creating bullying scenarios.
- Students' letters to a bully or a bullied

Files related to this phase:

- EXERCISE: Personas and scenarios
- EXERCISE: Letter to bully or bullied

Personas and scenarios

By defining made-up stories and characters, it can be easier to go through things and reflect on bullying situations from other people's perspectives. When considering different personas, there can also be a slightly deeper discussion about the fact that there are not only one types of bullies or bullied people, what makes the bully a bully, and how the persona of the bullied is perceived as. The scenarios present a scene where bullying happens.

Defining personas and scenarios is carried out as an individual task at this stage.

Letters to a bully or a bullied

Letters to a bully or a bullied can be executed in both paper and electronic form. This task can be combined with learning ICT skills and students can send their letters via email.

PART 2 - Critical technology design and making

3. Ideation

In this phase, students should be divided into groups of 3-5 people. When working in groups, each group should have as calm and separate space as possible, so that they can only focus on the activities of their own group. If possible, groups can be divided into different corners of the classroom or any other peaceful, empty space there is available.

[Warm-up exercises](#) are recommended before any ideation tasks.

Tasks for this phase are:

- Miracle method according to the instructions.
- Two separate ideation events, guided by the provided PowerPoint slides.
- The first ideation session includes two videos that help to understand design fiction and already existing solutions.
- Developing scenarios and persona descriptions as a group based on the guide and templates.

Files related to this phase:

- POWERPOINT: Miracle Method
- POWERPOINT: Ideation1
- VIDEO: Design fiction
- VIDEO: An end to bullying
- POWERPOINT: Ideation2
- GROUP EXERCISE: Personas and scenarios for groups

Miracle Method

Miracle method is an interview method inspired by solution-oriented therapy (you can read more about this topic [here](#)). Purpose of miracle method is to imagine life without a discussed problem, in this project that problem is bullying.

The miracle method can be used to discuss how the problem (here bullying) becomes visible to different actors and how the lives of different actors would change if it no longer existed. The method helps to understand what all showcases the problem and what is needed to change it.

Practical instructions for the miracle method:

1. Divide participants into smaller groups so that it is easier to discuss among the group. A good group size is e.g., 3-5 people. For the discussion, choose a peaceful place so that everyone's voice can be heard.
2. Read the story from the introductory slide aloud in class: *When you go to sleep tonight...*

Suppose, when you go to bed tonight...

In the middle of the night, during your deepest sleep a good elf arrives without you knowing it and waves his/her magic wand and a miracle happens:

There is no bullying anymore!

Because this miracle happens while you are sleeping, you are not aware of it in the morning, of course.



3. Go through the question themes one by one and try to get the group to imagine how things would be different if the problem was not there.
4. Encourage participants to describe in detail how the world would be different when the problem no longer exists.



Instructions for ideation tasks

Ideation 1 phase involves brainstorming with pre-existing solutions.

This task is started individually and after that the ideas are discussed within their own groups. Depending on wanted outcomes, objects, or pre-existing solutions, such as applications, can be used to help with brainstorming. It is important to notice that the chosen “inspiration material” will most likely affect the students’ work. If the small toys are used for ideation, the solutions might have elements of the toys, and if the pre-existing solutions are used, the ideas can have features of those.

Examples of what has been used in brainstorming:

- Small toys, keychains, etc. small stuff
- Students’ own toys (combined with toy day)
- Threads, crafting materials
- Stones and sticks
- Pre-existing anti-bullying applications

The goal of brainstorming with the small objects is to find completely new meanings for these objects; how this object could be used to prevent bullying. If students have difficulty ideating, additional questions for helping the students to ideate can include:

- Does it see anything? Is there a camera?
- Does it hear or make noises? Does it have a microphone or speakers?
- Is there anything else that can be detected? Does it have sensors?
- Does it change its size? Is it big or small?

At this stage, it is important to produce a lot of ideas, and they should not think about how those ideas could be implemented or are those in any way rational. The more ideas, the better.



Group discussion on ideas

In the group discussion, it is important to go through everyone's ideas. Each member of the group presents their ideas to others and enough time should be reserved for this. Then try to look for the *most important qualities* of each individual idea, such as functions their common idea should include and how one common idea be created out of many separate ideas.

At this point concentration should not be in the appearances, general positives sides or to how likely the implementation is. It is good to point out to the students that everyone's ideas have something good in them, their ideas do not need to be fully finalized at this point and that they do not have to think too hard about, for example, the future of the idea.

Personas and scenarios

At this phase, the personas and scenarios are implemented in the same way as the personas and scenarios of the sensitizing with bullying phase, but this time it is done as group work. Groups can for example divide personas between the group members so that everyone is responsible for writing at least one persona and as a group they figure out how the personas work in the scenario.

The personas made at this stage are the roles in the upcoming [drama phase](#) and the scenario forms a body for the play. If you are planning to go to the drama phase, it is good to inform the students at this point that they make the personas and scenarios so that they can be used in the drama. Those can still also be modified during the drama phase.



4. Critical analysis

In the critical analysis phase, the students will think about the meanings behind the ideas and the idea's significance for the future. They will think about the best possible situation when the idea is in use and the worst possible situation if the idea is working incorrectly or is not in use at all. On the other hand, the group discussion ponders the problems of bullying and explores the underlying values of the ideas.

Tasks for this phase:

- Drawing the best-case and worst-case scenarios based on the idea.
- Group discussions on background assumptions and values behind the ideas.

Files related to this phase:

- POWERPOINT: Best-case and worst-case
- POWERPOINT: Background assumptions and values

Best-case and worst-case scenarios

Best-case and worst-case scenarios are done based on the group's own idea. Reserve at least A3 or A4 size papers and drawing equipment for this task. It's also possible to use other drawing or painting tools if those are available.

The goal of this task is to think what the best possible and worst possible consequences of the idea would be. What would be the consequences of introducing the idea for the future? What a positive future would be like when the idea is in use, and everything goes smoothly or what a negative future would be like when the idea is in use, and everything goes wrong? It is up to the groups to decide which situation they will draw first.



When both images are ready, the group should consider if and how their idea should be changed so that the worst-case situation does not happen. Depending on the idea, for example, should it have some control mechanisms, firewalls to prevent outside intruders, or whatever else the groups find suitable.

At this point the groups can still make changes to their idea before moving to the next phase.

Background assumptions and values

Background assumptions and values material starts by making these terms familiar in the contexts of design, prototyping, and product development. After this both topics are discussed firstly in groups using the questions and viewpoints given in the materials, after which these topics are discussed together.

While thinking about background assumptions and values, children realize that the ideas can be varied. They have chosen a type of idea but there are other options too. They might emphasize for example bullying prevention, creating a good atmosphere or individual or community points of views in their ideas. However, it is good to concentrate on the positive future and school community points of views. It is possible to change and develop the group's idea based on the discussion. Further information about background assumptions and values can be found for example from these articles: [Zaman and Abeele, 2020](#); [Iivari et al., 2021](#).

5. Planning and prototyping

In prototyping, the ideas are implemented into the testable versions.

The technological solutions designed by the students are drawn or built using cardboard and other craft materials so that the idea and functionalities can be tested. If the ideas are applications, it is recommended to use the *Template & elements* file to support the prototyping.

Tasks for this phase are:

- Designing and creating the prototypes.

Files related to this phase:

- POWERPOINT: Prototyping
- Template and elements

Prototype creation, paper prototype

Making the low fidelity (Lo-Fi) prototypes requires arts and crafts materials. At its simplest, only white paper and coloring pens, if it is a mobile application prototype or cardboard boxes and glue, with which bigger prototypes can be made. Also, other available crafts materials can also be utilized. Suitable materials are for example:

- Cardboard boxes and colored papers
- Styrofoam balls and cones
- Hot glue, tape, wood glue
- Different stickers and adhesive decorations
- Wooden sticks



Examples of paperprototypes can be viewed on YouTube, for example, with the search terms *cardboard prototype examples*, etc.

If the idea is to continue onto the drama phase, it is also worth considering its features based on that: how to show audience the functionalities, whether the prototype has many parts, and whether the prototype is used in the scene as such or in some way modified.

Technological making as part of prototypes

An important part of the project is the use of technology and that is why it would be useful at this point to include technological making as a part of the project. Coding and technological making can be done as a part of prototyping or as its own separate phase.

For clarity all technological making has been combined under section 6 [Coding and technological making](#), but technological making can be done as a part of this phase as adding interactivity as mentioned in Prototyping PowerPoint file.

6. Coding and technological making

Interactive elements can be added to the prototypes ([prototypes of devices](#)), features of the prototypes can initially be done by coding ([prototypes of mobile applications](#)) or in the coding phase it can be mainly concentrated on getting familiar with the tools and trying them out. Prototypes can also be fully created with technological tools, such as [Figma](#).

However, technological making requires some knowledge from the instructors and suitable hardware. The success of the project does not depend on this, so this phase can be ignored if necessary. Then again, coding as a separate phase is easy to facilitate even if there is not a lot of knowledge on the topic beforehand.

Tasks for this phase:

- Adding interactivity to the prototypes or coding.

Files related to this phase:

- POWERPOINT: Coding
- EXERCISE: Tynker instructions

Adding interactivity prototype devices

With cardboard prototypes, for example these technological solutions could be utilized with the prototypes:

Makey Makey	https://makeymakey.com/
LilyPad	https://www.sparkfun.com/lilypad_sewable_electronics
CodeBug	https://www.codebug.org.uk/
Lego Education	https://education.lego.com/fi-fi



Below are some short descriptions on how the previously technological solutions have been used as part of students' prototypes. More detailed descriptions and pictures of prototypes can be found in [Appendix](#).

1. Makey Makey and Scratch. Makey Makey and Scratch programming language helped students learn simple coding, which allowed connectors connected to the prototype and their movement to produce sound through a computer.
2. LilyPad Sewable Electronics Kit. LilyPad LED lights were sewn into stuffed animals, and the lights then flickered according to the students' wishes.
3. CodeBug. CodeBug was incorporated into the prototype so that by pressing a button it displayed the information text the students wanted it to show.
4. Lego Education. Lego Education sets helped students make the prototypes movable. Lego bricks were used to add tires to prototypes, and these prototypes were mobilized by controlling them with tablets.

Adding interactivity prototype applications

In the paper application prototypes interactivity was added with Tynker mobile coding application. The application was downloaded onto the available tablets, the students took pictures of their paper prototypes and made a sound making button by using simple block-based coding.

A more detailed description of using Tynker mobile coding application can be found as an Appendix and the exercise sheet for the students includes detailed instructions on how to do this task.

Coding as separate exercise

If adding interactivity to the prototypes feels too difficult or there is no required hardware available, coding can be introduced in other ways. There are uncountable amounts of video material and introductory simple coding games that the students can try guided or at their own pace.

Examples of useful websites:

CodeMonkey	https://www.codemonkey.com/
CodeCombat	https://codecombat.com/
Code.org	https://code.org/
Scratch	https://scratch.mit.edu/

7. Activism

One solution against bullying is activism.

The activism phase starts by getting familiar with what activism means on a general level and different forms of activism are introduced. After that students get to design their own activism campaigns against bullying themselves in groups.

Tasks for this phase:

- Getting familiar with activism and forms of activism
- Making own activism campaign

Files related to this phase:

- POWERPOINT: Activism
- EXERCISE: Activism campaign instructions

Activism education

In this material activism is defined as cooperation in which the goal is to reach a better and fairer world, in which everyone finds good to be in. Introduced forms of activism are voting, demonstrations, art, and way of dressing up. The source used for the materials is City of Oulu's leaflet [Näin voi vaikuttaa!](#) (Translates to This is how you can make an impact, this material is only in Finnish).



Activism education activities are comprised of setting common goals, common actions, and critical thinking of how well things went. Important aspects of activism education are to understand one's own possibilities for making an impact, cooperation with existing stakeholders and learning to solve problems together. More information on activism education can be found on for example these sources: [Kishner, 2007](#); [Torres-Harding et al. 2018](#).

About activism campaign instructions

Activism campaign instructions form guides students in making their groups activism campaigns. In the form the students are guided to make up an anti-bullying message that they want their campaign to convey and to choose with which form of activism they want to convey that message.

Also, concrete actions in making the campaign are noted: time and place for holding the campaign, actions that need to take place to make the campaign and the task allocation within the group. In the form there are spots to fill in all this information so that the content of the campaign and the progress of making the campaign can be easily followed.

Activism campaigns implementation

The activism campaign can be done in many ways. The groups' anti-bullying messages can be highlighted by making posters out of them and by attaching them to the schools' hallways or by holding an event in which they are on display.

The messages can also be added to pins, shirts, or canvas bags, and then arrange a small, peaceful demonstration. Places other than the school premises can also be used for holding the campaigns if possible. Ways to implement these activism campaigns are not limited to what is mentioned above but other ways to hold a campaign can be ideated and utilized as well. The students can also be given the freedom to make campaigns in their own ways.

8. Drama – Theatre of the Oppressed

In the drama phase, the personas and scenarios made in the earlier phases will be turned into plays. If the personas and scenarios have not been made in the earlier phases, it is now good to utilize for example the *GROUP EXERCISE: Personas and scenarios* file found in the [Ideation](#) phase.

In drama rehearsals it is important to establish an open and safe environment in which everyone can express themselves freely and everyone needs to be given an opportunity for that. The most important rules of the drama workshops are: *We don't compare ourselves to each other. We don't judge others or ourselves.* These rules are also shown in the PowerPoint-slides and the students should be reminded of these rules during rehearsals.

Tasks for this phase:

- Warm-up and feeling exercises.
- Scene planning, training, and preparing for the presentation.
- Presenting the scenes to the audience and interaction with them.

Files related to this phase:

- POWERPOINT: Drama1
- POWERPOINT: Drama2
- Drama outline
- EXERCISE: Hot seat questions

Warm-up and feelings exercises

The workshops should be started with [warm-up exercises](#) and the feeling exercise is also recommended. Feeling exercise is meant for the students to practice performing different emotions with their faces and gestures. This feeling exercise is explained in the Drama1 PowerPoint.



The task can be taken further by continuing discussing about different emotions:

- Where is each emotion felt in the body? Put the palm of your hand where it feels. Does sadness feel at heart, where does happiness feel, etc.?
- What level the feeling is at? High on its toes or at floor level. Express the feeling with your body.

Scene designing, rehearsals and preparation

It is good to remind the students during the rehearsals that the drama scene is meant to tackle some bullying related problem and strives to resolve it. It is also important to remind the students that **they are not acting as themselves in the play but as a chosen character.**

When rehearsing scenes, you can encourage the backstory to be prepared. How the situation/conflict arises or what were the events that led to it. It is worth stressing that the scene has a beginning, a middle - when a twist occurs and the prototype enters the picture - and with the effect of the twist, a final situation that should show a change in the dynamics and emotions of the characters.

Outfits, props, and staging are nice additions to the scenes if those can be arranged. They help to engage with the roles and keep them separate from the actors themselves.

Questions to support the rehearsals:

- Are props or staging used in the scene?
- Are dolls/speech/music used? How is the prototype used?
- Which way is the audience seated? Do they see and hear everything they need to?
- Is there a director in the group or is the teacher's help needed?
- Do you need to come up with lines for the characters and write them down?



When groups think they are ready, they should show snapshots i.e., statue shots of certain moments in the play. Where the situation starts, some scene in the middle of the play and where the play ends.

As a part of the drama rehearsals deeper discussion can be held on the topics of bullying, being in someone else's shoes and understanding of others:

- Why are you making scenes based on the ideas and performing them?
- Why is it important to have discussions about the scenes and understand the characters?

One-scene or two-scene tactic?

It is possible to create the plays with one-scene or two-scene tactic. When having only one scene, the situation based on the scenario is performed – the problem of bullying, the solution, and the change the solution provides to the situation are introduced. After the scene is finished, it is discussed with the actors and the audience using the [Hot seat questions](#).

In the two-scene option, after the introduction of the problem, the first scene would continue until the end without the intervention of the prototype or anyone else. After the scene ends it is discussed with the actors and the audience members, and for example about what consequences bullying could have. Here the actors can be asked [Hot seat questions](#) and the audience can be asked some of the questions below:

- Was the scene realistic? Could you relate to it?
- Who was bullied? How?
- How could the bullied act differently?
- What would be the worst-case scenario if nothing is done or nothing changes?
- How about the best-case scenario if there is a change?
- What would be a solution to this situation?



After the discussion the scene where the prototype comes, and the problem gets solved with it is performed. After this the group's solution is discussed. The group can present their solution and prototype's functions in more detail than can be seen during the play between the scenes.

The two-scene option is more challenging and complex for both the audience and the actors. It requires students to be enthusiastic and interested in discussing the topic and rehearsing two differing scenes. Moreover, the two-scene option takes considerably more time.

Theatre of the oppressed and digital solutions

At some point in the drama workshop the Theatre of the oppressed can be presented, as well as how theatre can be used to illustrate the functioning of prototypes in real life. Recommended timing for this is the beginning of the second rehearsal, when the structure of the performances is presented. More information about Theatre of the oppressed can be found on these sources: [Boal, 2000](#); [Boal, 2006](#); [Heikkinen and Viirret, 2003](#).

Idea behind theatre of the oppressed briefly:

- The theatre of the oppressed is on the side of the weaker, and when doing it, the aim is to get empowered together and as individuals and to improve the position of the disadvantaged.
- In the theatre of the oppressed, the space is open to discussion and ideas to eliminate the problem of bullying. It's important to discuss each other's scenes and ask questions about the scenes.
- In the theatre of the oppressed the audience is not passive, but an active and conversational part of the theatre and can, for example, propose different solutions to the situation. The world of theatre is completely imaginative, so you can safely experiment with different solutions and situations where anything can be possible.
- It may be difficult for outsiders to understand the group's idea, but with the help of theatre it can be resurrected and thus show others how the idea works.



- Digital solutions and theatre both strive to find different perspectives and solutions to build a better world. By combining the two, you can try together and through discussion to take ideas further and see how they can work.

Hot Seat questions

Audience asks *the Hot Seat* questions from the acting students. Questions can be practiced beforehand, so that they are easier to answer during the drama presentation. More information about hot seat questions can be found here: [Hot Seating](#)

It is important to emphasize that the questions are asked **from the character, not the actors**. For smaller students, this can be difficult to understand, and questions can be translated into "What your character thinks", etc.

- How do you (your character) feel?
- What are you thinking?
- Are you familiar with a situation like this or is it completely new?
- What happened to you earlier today?
- Could you have done something differently in the situation? What?
- What could have happened to you if the prototype hadn't existed?
- What would be the worst-case scenario if the prototype hadn't come to the rescue?
- What do you think _____ could do?
- Who could help you?
- Do you and _____ have something in common?

Drama outline

The presentation of the plays begins with a welcome speech, which briefly explains the idea of the plays and prepares the audience. If the audience is outsiders, it would be a good idea to show the design fiction video from the [ideation](#) phase, or to preface the work and mindset behind the performances. The basic idea of the theatre of the oppressed could be explained and the audience should be encouraged to participate when they are given a chance to do so. The above-mentioned hot seat questions can be given on paper to the audience.

The presentation should include a director, who gives presentation shifts, hosts the presentation event, asks questions, and shares question turns. It would be good for the director to be the same person who has directed the drama workshop, for example teacher.

The outline of the plays with one-scene tactic is described below:

1. The first performing team will come onto stage. Each member of the group introduces themselves and their characters:

"I'm ___ and I'm playing ___ in the scene."

2. The group starts playing their scene. When the scene enters the conflict, and the prototype has not yet been introduced, the director stops the scene with three claps.

The actors freeze into statues and the director asks the audience questions:

- Is the situation realistic? Can you relate to a situation or characters?
- Who is oppressed/bullied and how?
- How could an oppressed one act differently in this situation?
- What would be the worst possible situation if nothing was done about it?
- What would be the best possible situation if something was done about it?
- What could be the solution to the situation?
- Why do the characters behave like this?
- Does the audience want to ask questions from the characters?



3. The group continues to finish the scene. If the break was very long, the group can start the scene again from the beginning.
4. Each character sits on the Hot Seat, where the audience asks questions. Within time, a good number of questions is 1-3 per character. The director can help in both directions in the conversation with help questions above.
5. If the functioning of the prototype has not yet been clearly stated, the group will present the prototype and its functioning to the public.
6. Thank the audience for the questions and the group for the presentation. The group bows and the next group arrives on stage.

If there is time left, the plays can be discussed in general. It would be a good idea to reserve about 30 minutes for the reflection as soon as possible after the performances, it can be in the next lesson or the next day.

- How did acting as the character feel like?
- What thoughts did you get about acting/bullying/roles?
- Did something feel bad about the play? How about good? What?



PART 3 - Reflection

9. Reflection and evaluation

Tasks for this phase:

- Present and evaluate the previously made prototypes.
- A group discussion together with the whole class about the project goals, background assumptions, and values.
- End interviews

Files related to this phase:

- POWERPOINT: End discussion
- POWERPOINT: Prototype evaluation
- End interview
- Reflection as a continuous task

End discussion

The end discussion is a task for the whole class. In this discussion students' thoughts on the earlier phases and reaching the goals related to the phases in their own groups are discussed.

Also, bullying and technology related background assumptions and values are discussed again here. With this you are trying to see if the students' background assumptions and values have changed through doing the earlier tasks.



Evaluation of prototypes

In the prototype evaluation task, the prototypes are presented to the rest of the class, and together is assessed what is good or bad in which prototype.

This task can be done, for example, with post-it notes so that each prototype is placed on its own table and students move around the classroom. Each student gives each prototype feedback, at least one positive thing per prototype, and one thing per prototype to develop.

Post-it notes are then collected and the groups then read through them, and together consider if any further changes would need to be made to their prototype or its functions before it could be produced.

End interviews for students

The end interview follows the same pattern as the start interview at the beginning of the project and it functions as a good ending task for the whole project. Same as with the start interviews, the end interviews can be conducted as individual interviews, or they can be modified to be group interviews or group discussions in the classroom.

The interview will map the students' role as a technology user and review the project step by step. Critical thinking is a significant part of the final interview and seeing how students themselves perceive the completed project and how they see their role during the project. It is also important to discuss with the students how they think they impacted bullying prevention and how they think they succeeded in that.

Reflection as a continuous task

In addition to part 3, reflection can, and is recommended to be done as a part of all the other phases. Reflection allows students to deal with issues more deeply and to consider their role related to the topic of the phase.



Reflection tasks can be given after sections as a homework assignment, in which case students go through what they have previously learned and consider its purpose. Good questions for reflection tasks are:

- What did you learn in this task?
- What was the nicest thing to do?
- What was the most boring or difficult thing to do?
- What would you tell your friend about this task?

More detailed step-by-step reflection tasks can be found in the *Reflection as a continuous task* -file.

References and publications

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Zaman, B., & Abeele, V. V. (2010, June). *Laddering with young children in User eXperience evaluations: theoretical groundings and a practical case*. In *Proceedings of the 9th International Conference on Interaction Design and Children* (pp. 156-165).

APPENDIX - Technological solutions as part of prototypes

The project in which this material was tested was carried out in three different schools, with six student groups altogether. Example photos are at the end of the appendix.

The participating student groups with the grade levels are specified in the table below.

Group	Grade	Special about the group
A	6	
B	6	Prototyping was done via remote connection
C	2 & 3	This group participated during two different years
D	1-3	Combined of students from multiple grades
E	7	2 classes, at the oldest end of the material user group

The students' ages affected the prototype-building phase and so did the equipment that was found at the school, such as computers and tablets. At the start of the prototyping phase, several different craft materials were delivered to the schools. These materials included cardboard boxes, styrofoam cones and balls, different color pipe cleaners and cardboard, hot glue, stickers and felt. The schools already had basic handicraft materials, such as scissors, craft glue, tape, and crayons.

The students first built prototypes according to their designs using craft materials and then they added interactivity. Technologies used in this phase were: *LilyPad Sewable Electronics Kit*, *Lego Education WeDo 2.0*, *Makey Makey* and *CodeBug*.

All these featured technologies are quite easy to use and designed for kids, but the instructors should know how to use them. When adding interactivity, skilled instructors play a very important role, because getting started was challenging, regardless of which technology was in use or how old the students were. Some technologies also require a computer or tablet to work, which you should have ready-to-use for the prototyping phase. It is also worth checking in advance if the devices need batteries.

LilyPad Sewable Electronics Kit

[LilyPad](#) kit is made for exploring electronic sewing and e-textiles with the help of using their LilyPad system in introductory projects.

The kit includes several useful electronic sewing and e-textile materials. The package also includes some felt sheets, conductive thread, and other sewing materials as well as project templates and a LilyPad Sewable Electronics Kit Guidebook. Check more details on the set and LilyPad itself from their website.

In student group A, LilyPad was used by two groups in their prototypes.

A robot prototype was built from cardboard, transparent plastic, styrofoam, wooden sticks, felt and green pipe cleaners. Cardboard and transparent plastic formed the robot's body so that there was empty space inside it, the head was made from styrofoam ball and limbs were made of wooden sticks and pipe cleaners. LilyPad set's LED lights were added to the robot by first sewing them into a piece of felt, which was then placed inside the robot's body. This way, the LED lights could be seen from the body through the plastic and the piece of felt hid the batteries and other electronics.

The same LilyPad LED lights were also used in another prototype built around a stuffed toy. The LED lights were used as "sensors" and they were sewn onto the stuffed toy's face. The LED lights could then be controlled by pressing from the toy's chest. A styrofoam sphere was glued to the back of the toy and new eyes were added to it. The stuffed toy worked well with the LilyPad set because the wires and batteries could be hidden inside the toy.

In student group C, one group used the LilyPad set for felt made Venetian-style eye masks. The group first cut the right shaped pieces out of felt and then they sewed LED lights into the masks with the instructors. The LilyPad set includes instructions on how to make these eye masks as well as a few other simple pieces for testing. The group used these self-made masks as a costume for their drama presentation.

Lego Education WeDo 2.0

Lego Education WeDo set is a hands-on building set for teaching students computing and science skills. The set comes with regular Lego building elements alongside specialty elements such as motor and motion sensor. The specific set used in previous projects may not be available but there are other alternative Lego Education sets. Check more details on the Lego Education from their [website](#).

In student group A, the Lego Education set was used by two groups. The groups made their initial prototypes out of toys, cardboard and styrofoam. When the prototypes were finished, they built platforms using the Lego Education set to place the prototypes on top of or to attach the prototype to it using pipe cleaners. The prototypes could be moved around with the tires and motors that are a part of the Lego Education set.

In student group B, two of the groups ended up using the Lego set to move their prototypes, as they did in student group A. Groups built devices, pedestals, from Legos on top of which they placed their cardboard prototype. This way they were able to move their prototypes when presenting the results of their prototyping session to researchers via video connection.

In both student groups, students built these movable platforms out of Legos themselves, building based on their past experiences and using the available guides. The Lego Education set, and application include instructions on how you should combine different pieces to make movable Lego structures. In student group A, Legos were controlled using tablets that had the Lego Education application. It allowed students to try and learn by themselves how to build the structure and code it to make it move. In student group B, students used the same application through Lego Education's website.

In student group C, students ended up mainly just testing the Lego Education set. Three groups built a device, but the classroom did not have the needed computers or tablets, so most of the students rejected the devices. However, one student was particularly keen on the Lego set and made his own version, following and modifying the instructions on the Lego set, and it was set moving using the application next time the researchers visited the school.

Makey Makey

[Makey Makey](#) allows you to connect everyday objects to computer and use them as game controllers, musical instruments, and such. The kit consists of the Makey Makey Board, alligator clips and connector wires alongside a guide to get you started. Check more details on the kit and Makey Makey itself from their website.

In student group A, when building a robot, students tried the Makey Makey set. Students added metal clips and foil to the cardboard prototype that were then attached to the Makey Makey set's alligator clips. These clips were then attached to the circuit board and the circuit board was connected with a USB cable to the computer. This allowed commands to run through parts of the prototype to the computer and, for example, when the prototype's hands touched each other, clapping sound was heard from the computer.

The Makey Makey required significantly more time and guidance in use than, for example, the LilyPad and Lego Education mentioned above. Although students in student group A tested the Makey Makey set, they ended up only using the Lego Education set in their own prototype because they achieved results faster with it and felt they were doing more themselves. Using the Makey Makey set also requires understanding Scratch programming language, which is simple but still a little too challenging to learn in one lesson.

Because of the shortness of the prototyping session in student group C, no group used Makey Makey. This technology was not delivered to student group B because it would have required skilled instructors.

CodeBug

[CodeBug](#) is a wearable and programmable device for simple programming and electronic concept introductions with a display and touch sensitive inputs. CodeBug has an LED display, and it uses Blockly-based online programming interface. Check more details on the CodeBug and the interface from their website.

In student group A, one group built a wearable prototype of a large cardboard box that they could use in their play as a costume. They removed the top and bottom of the box, added a harness, front and rear lights of a car and coated it with colored pasteboard. CodeBug was added to this cardboard-built car by taping it to the side of the prototype. Codebug was programmed so that pressing different buttons showed different commands, such as "POLICE" and "Help is on the way."

CodeBug's programming requires a little more programming skill, similarly to the Makey Makey. In student group A, one of the group members had some previous programming experience and therefore was able to use CodeBug after short instructions.

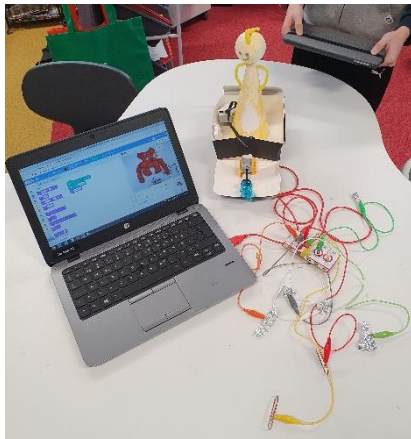
Because of the shortness of the prototyping session in student group C, no group used CodeBug, and it was not delivered to student group B at all. It is also very possible that the use of CodeBug would have proved too challenging for the second graders. However, one of the researchers presented CodeBug's functionalities at the end of the session to those interested in the device.

Tynker mobile application

With the [Tynker](#) coding application students in student groups C, D and E can try out coding by adding interactivity to the paper prototypes. Before the coding sessions, Tynker apps had been downloaded into schools' own tablets by the schools' ICT-staff and these devices and printed example tasks had been distributed to the students at the beginning of the sessions.

After a short info section, the students started to follow the example task that guided them in making a button that produces a sound step by step to a photo taken of their paper prototype. In this example task it is guided how to take photo of the paper prototype, how the button is added and how the sound is made by pressing it.

In groups C and D more help from the instructors was needed. This was mostly because the students did not have the patience to read or follow the instructions carefully enough or at all. In student group E the students were able to do the task more independently as they followed the instructions accurately enough. Also, the need for help was very much based on the individuals and the students did the task at their own pace. The students also helped one another, more or less, in all the schools. Some of the students were able to do more than just the given task in the allocated time.



Makey Makey and Scratch



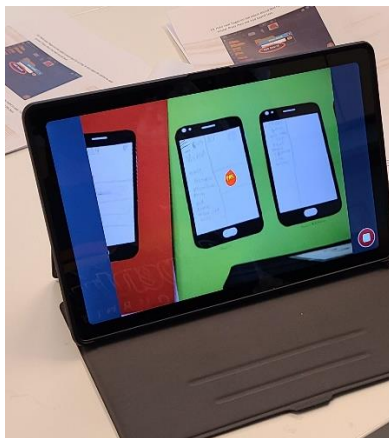
Codebug



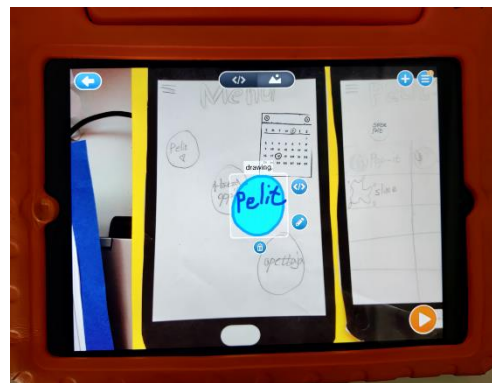
Lilypad



Lego education



Tynker



Tynker