
Co-design with children on societal challenges reveals their empathy and radical innovations.

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Abstract

Despite growing use of co-creation and co-design methodologies in the public and private sectors we are yet to see many examples of children being taken seriously as co-designers in relation to societal and environmental questions. In this position paper we will share insights revealed through a child-centered co-design process on the child's ability for empathy and perspectives for radical change; some suggestions for formulating interesting creative question(s) plus the importance of physical prototyping with children in co-design.

Author Keywords

Participatory design; co-design; social design; children; empathy.

Introduction

If you ask children, 'What would you like to change in the world and what could you make to create that change?'. Then they don't, as some people might expect, call for more sweets or playtime. In fact in our repeated experience in *designathons* they come with concepts such as a 3D food printer to tackle hunger amongst homeless people, or a prototype for an electric bicycle for a friend with a physical handicap. Or they design a sort a google car that cleans the streets which you can text to come and clean your own street. The

children make semi-working prototypes of their concepts to communicate their ideas, they learn to make things that they see as highly needed. [1]

Example outcomes of children's innovation

Here follows a description of two innovations, which have emerged in designathon events held in different cities around the globe.

Example 1; city: Nairobi; event: Global Children's Designathon, 2014; theme: waste; team: three 10 year olds, 2 girls and 1 boy; concept: an air-cleaning drone, specifically intended to fly alongside traffic-jams and filter car pollutants out of the air in order to spare the people walking alongside the traffic. As the team of young designers correctly noted, the people walking to work are generally less well off than those travelling in private cars and as walkers they are more exposed to the unhealthy car fumes. This concept illustrates two phenomena we regularly see in designathons, firstly a concept which reveals empathetic insight for a group of people the children might not be expected to care for and secondly a solution which is more radical in it's thinking. With radical we mean the drone idea uses flight rather than ground travel, is very local in it's orientation and presumes availability of a technology, that of cleaning air of pollutants which is not mainstream. On further investigation the presumed technology is known as carbon scrubbers, it is being developed and piloted however it is unlikely the children have heard of these tests.



Figure 1: Simone in Nairobi with the drone air cleaner, 2014, Global Children's Designathon

Example 2; city: Amsterdam; event: school workshop, 2016; theme: mobility; team: two 11 year old boys; concept: a mobile park bench, specifically intended to bring old ladies with heavy shopping from the supermarket to the park comfortably. The team had noted that old ladies are often seen with heavy bags to carry and also that these same ladies like to chat with friends on park benches. The children combined the two and invented a mobile bench, which would allow friends to sit and talk while carrying their shopping home (or at least to the park). Similarly to example 1, the two boys, from in this case an inner-city environment may not have been expected to be aware of the struggles of older people, and their innovation presumes the application of a technology from mobility devices such as hover boards to park benches, and similar Nairobi example is very local in its application.

Designathon method

Here follows an explanation of the designathon method and its steps as taken from the Designathon Guidebook [2]. A designathon is a design project for children around a real-world issue. The word 'designathon' is inspired by the words marathon and hackathon. It's a period of time where children get designing. A designathon always works with a certain theme. Children choose which aspect of that theme they wish to work on. In a designathon the children research, ideate and make, after which they present and reflect and can be done in one sitting or spread out over weeks. It is aimed at children from 7 to 12 years. All designathon projects follow the same design cycle, see figure 2.



Figure 2: The Designathon method design cycle.

The steps explained:

Step 1. THEME:

Each designathon introduces the theme with a slide show, sometimes with videos, to inspire, inform, and invite the children to think and discuss. Theme is a real-world issue: things that trigger children to think about how they might actually contribute to making the world a better place. Theme examples are waste, mobility, food, water, people with a disability amongst others.

The theme presentation and discussion is there to:

- inspire and inform the children about the variety and diversity of problems and solutions;
- to draw the children into the theme, to get them thinking and wondering;
- to have a philosophical discussion.

Step 2. RESEARCH:

Children investigate a problem or a theme further lead by a series of questions on research sheet.

The aims of the research is for children to:

- explore the theme from their own perspective;
- narrow down the theme to a single aspect or problem they want to 'ideate' on;
- learn more about the context of the theme using new facts and information;
- learn more about existing solutions and technologies often used in the thematic area.

Step 3. IDEATE:

Children are encouraged by the questions on the ideation sheet, to choose a problem within the theme that they want to work on.

The aims of the ideation is for children to:

- practice their creative thinking skills;
- come up with an idea or invention that will help to solve the chosen problem;

- learn that creativity is a process that you can apply to a question;
- practice how to communicate about and choose ideas in a team

Step 4. SKETCH:

Visualizing ideas for an invention in the sketch worksheet. The aims of sketching is for children to:

- learn to communicate their ideas;
- learn to make an annotated sketch;
- translate the idea in their head onto paper in discussion with team mates

Step 5. MAKE:

Developing an idea into a prototype using a combination of recycle materials and the design kit. The aims of the making is for children to:

- learn how they can give shape to their ideas;
- work with a variety of (electronic) techniques, materials and tools;
- learn to construct things in 3 dimensions.

Step 6. SHOW:

The children present their own work and reflect in the form of specific feedback. With the help of the presentation guidelines. The aim of presenting is for children to learn to:

- tell about their work and the process;
- get feedback;
- give specific feedback to other children;
- ask meaningful questions to other children during their presentations.

REFLECT:

Reflect throughout the whole process. The aim of the reflection is for children to:

- develop their reflection (meta-cognition) skills;
- discuss what they learned from the process.

Formulating interesting creative questions for children

In a design thinking process the creative question is the challenge put to participants to tackle. Formulating a creative question is an art in itself, one of shaping an interesting balance between abstraction in order to illicit radical answers yet closed enough that it defines an area such as an answer is possible. In the designathon method children are invited to formulate their own problem within a thematic area. This we believe allows for the child to choose, a for them relatable problem which in turn reveals what engages them. Problem formulation is an important companion to problem solving' [3].



Figure 3: Children using the ideation sheet to formulate their sub-problem. Amsterdam, 2016

To illustrate the different sub-problems children may choose with an example, consider the thematic area of waste. Within waste, some children zoom in on

cigarette butts on the ground because the birds might eat them, while others are concerned about plastic in the ocean and others still want to tackle co2 pollution in the air. Through the creative question process there might be alternative formulations for a problem which helps children to see a problem from different angles and opens up a different possible set of solutions. In many design processes for children, the problem is either over defined, reframing is not allowed or indeed requires an engineering class of solution. Allowing children to define their own sub-problem allows for more creative thinking. "By making this a conscious process, the engineer can greatly improve his chances of arriving at a better solution". [3]

The importance of 3D prototyping (or making)



Figure 4: Making a prototype of a temporary house with solar powered lighting, Berlin 2016, Global Children's Designathon

As Sanders discussed in Post design and Participatory Culture [4]: 'The make tools provide an emerging visual language, that people can use to express unmet needs and ideas that are often difficult to express in words', this is true presumably all the more so, for children, whose vocabulary is less developed than adults.

When working with children in a designathon, we regularly see that the innovation or concept continues to evolve in the 'making' phase. The children don't make exactly what they thought up of or sketched but are continually shaping their idea through physically making it. Indeed some children seem to express themselves more clearly through form and function than through dialogue. Therefore this adds to their possibilities to communicate. Furthermore the children having not foreseen all aspects of their design in the 'ideate' phase, discover more elements and details needed during the making phase. This allows their innovation to be presented in a more complete fashion. By prototyping in a team, this is the moment when everyone becomes aligned around the idea: some misunderstandings, assumptions and different approaches surface during the process and will be solved. To give an example, during a designathon at school in Amsterdam, three 9 year old girls had conceived of a modular car to tackle traffic jams. With their modular car if one was driving alone you would drive with only one piece of car, big enough for one person, while with two people you would drive with two seats, etc. During the making phase they discovered that each girl had a different idea of how to stack the modular car pieces when more than one was needed. One girl saw the individual modules on top of each other, one saw them behind each other like a train and

one that the pieces would click together as in a regular car, 2 by 2. They settled on the 2 by 2 approach with an option for stacking in extreme traffic jams. The natural inclination of children to play and have fun seems to have a positive effect on the innovative solution. Lastly and not unimportantly, in our evaluations of the children's experience of the whole designathon, the making phase comes out as the most enjoyed part of the process for 9 out of 10 children.

Capturing outcomes

We documented the children's design process through: photography; video; discussions with the children throughout the design process and two different questionnaires. We only use photography and video at 'event' workshops such as the Global Children's Designathon [6] this is because in school settings there is often neither time or permission for photography and/or video. This has helped us to capture reactions and outcomes from three perspectives: type of innovation(s), empathy with users and the designathon process itself. We will elaborate on these outcomes in this paragraph.

Radical innovations

The video interview with Tessa [7], one of the participants at the Global Children's Designathon in 2016, is an example of a child explaining their innovation. Interestingly the concept is known, that of an ecological garden roof, but some aspects may not occur to adults.

Empathy

Children's answers to the workshop sheet (appendix I) shows the empathy which children have for the world

around them, At the beginning of a short designathon, just after sharing a series of new technologies, we asked the children to answer 3 questions. This question: "If you could change one thing in the world what would it be?", provided the data for our statement on children's empathy. As mentioned in the introduction, during designathons children invariably come up with concepts that would change the world for the better. Some example outcomes can be found in this blogpost [1].

Designathon process

The questionnaire (appendix II) [8] focussed on finding out more about the increased belief in the children's own ability and their experience of the designathon process. Two notable outcomes were to the following questions:

1. "what part of the designathon process did you like the most?" To which 9 out of 10 children choose the making process.
2. "what was the most difficult part of a designathon?" 4 out of 10 children stated that coming up with ideas was challenging.

In a follow-up focus group discussion with children specifically regarding this answer - as we were surprised that they would find idea generation difficult - we learned that it was the group decision making process as to which idea to choose and take forward that was difficult, The bigger the group, the more ideas and the more difficult to choose. This is less surprising as in a creative process expertise with the convergent part is generally one that comes with experience.

Conclusion

Co-design of societal issues and environmental challenges with children still has a long way to go and including them is not by any means automatic. However by focussing on their contribution as a form of research through co-design [8], we can learn of radical innovation perspectives that may not occur to adults and yet be very valuable. Similarly by continuing development to understand and analyse children's contributions and experiences in co-design activities we can better appreciate children's concerns and values, leading eventually to offering children a seat at the policy making table.

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Appendix I: Workshop "future technologies" 2014

Appendix II: Questionnaire "designathon" March 2017" written by Monique Pijls, 2017, questionnaire designathon, March 2017, Hogeschool van Amsterdam, Faculteit Onderwijs en Opvoeding

Appendix I

Name:

Age:

1. What technology do you like the best?

2. If you could change one thing in the world what would it be?

3. What could you invent to make that change?
Draw your invention!

Appendix II

Vragenlijst Designathon 1 maart 2017

1. In deze Designathon heb ik ...

a) met nieuwe technieken, materialen of gereedschappen leren werken, namelijk

.....
.....
.....
.....

b) andere kinderen geholpen door...

.....
.....
.....
.....

c) iets gedaan waarvan ik niet wist dat ik het kon, namelijk...

.....
.....
.....
.....

d) Iets gedaan wat echt bij mij past, namelijk...

.....
.....

2. Het leukste van vandaag vond ik:

- Introductie van het thema over afvalscheiden
- Eerste idee maken
- Het ontwerp maken
- Een prototype maken
- Presenteren

3. Het moeilijkste van deze Designathon vond ik ...

.....
.....
.....
.....

4. Het belangrijkste dat ik heb geleerd van deze Designathon is ...

.....
.....
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