

Increasing children's self-regulation in the prevention of traditional and cyber-bullying: what do children think?

D1.1.5: Guidelines, concepts, prototypes and tools for supporting a bottom-up, do-it-yourself process of inclusion and practitioners

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Abstract

Part of the EMSOC project (User Empowerment in a Social Media Culture), that investigates the influence of social media on the (dis)empowerment of vulnerable individuals and groups, has focussed on 'child empowerment' in the context of bullying. The goal of this research was to explore new ways to increase children's self-regulation in the prevention of traditional and cyber-bullying, resulting in a set of recommendations. As such, empowering the class as a 'social group' is believed to revert exclusion due to bullying.

In a first step of this research, experts and teachers were involved in the identification of the preconditions for improving children's self-regulation in combatting bullying and resulted in suggestions for how to create such preconditions. Since these preconditions were based on the opinions of adults only, children were actively involved as 'design partners' in the following phase of the research.

This deliverable first briefly presents the roadmap for a bottom-up oriented approach to prevent bullying based on insights from experts and teachers. Next, the involvement of children as 'design partners' is described and their ideas and values on how to improve the social class climate to prevent bullying are discussed. Finally, a set of recommendations is presented that should be taken into account when designing 'tools' to increase children's self-regulation in the prevention of bullying. These recommendations are especially useful for school staff and interaction designers.

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1. Introduction

The goal of the EMSOC project, funded by IWT, is to critically assess the belief that the user is being empowered in a social media culture. The research is structured according to three main areas of interest in society where user (dis)empowerment is taking place related to social computing, namely, inclusion, literacy and privacy. An interdisciplinary team from Vrije Universiteit Brussel, Universiteit Gent and KU Leuven has collaborated since the end of 2010 to provide fundamental and evidence-based answers to the challenging assumptions and principles of the EMSOC research project. The aim of one of the work packages, the inclusion work package, of which the research described in this report is part, thereby is to understand the relation between social media and people, focussing on bottom-up strategies to actively involve vulnerable individuals and groups to increase their empowerment (Dupont et al, 2011).

Within the inclusion work package, the focus of the Centre for User Experience Research (CUO, iMinds, KU Leuven) has been on 'child empowerment' in the context of bullying. Parallel to the rise of online and mobile media, cyberbullying has become a well-known phenomenon, expanding and intensifying bullying behaviour beyond its traditional physical borders. Our goal has been to increase self-regulation among 9- to 10-year olds in combatting both traditional forms of bullying and cyberbullying. By empowering the class as a 'social group' we aimed to revert exclusion due to bullying. Increasing children's self-regulation in tackling bullying does not mean the teacher has only a minor role to play. In contrast, we aimed for a central and facilitating role for the teacher, guiding the children throughout the process. This is in line with Dupont's (2012) notion of 'guided bottom-up': providing top-down support and tools to enable (vulnerable) people to take positive action to improve their situation.

Although different anti-bullying programs have been developed over the past decades (e.g. 'No Blame' [Robinson, & Maines, 2008], 'Shared Concern' [Pikas, 2002], 'KiVa' [Kärnä et al, 2011; Salmivalli et al, 2011], etc.), the unique contribution of our work lies in our ambition to increase self-regulation among children. Moreover, whereas most methods tend to focus on either traditional or cyberbullying, we were especially interested in cases of bullying where online and offline worlds collide. Since traditional and cyberbullying are strongly connected to the context of the school and in particular the classroom (Vandebosch et al, 2012) the focus of this research therefore was on the class as a 'social group'. The choice for 9- to 10-year-olds was furthermore motivated by the fact that children of this age are not yet frequent users of social media, offering interesting possibilities for prevention (Livingstone, 2011). Children may use their newly gained skills in self-regulation and pro-social behaviour in the online world as well once they start using social network sites more regularly.

As a first step, together with experts and teachers, we have identified a set of preconditions to increase children's self-regulation in combatting bullying and we collected suggestions for how these preconditions can be created (Van Mechelen et al, 2013). Since these preconditions were based on the opinions of adults only, we actively involved children in the next phase of our research. In particular, we were interested in how children would approach this challenge and increase their self-regulation, because empowering the class as a 'social group' may revert exclusion due to bullying and increase children's inclusion on this 'micro-level'.

In this deliverable, we will first briefly explain traditional and cyberbullying and the preconditions identified by teachers and experts. Afterwards, we will describe how we involved children in our research and finally, we will report their ideas and values concerning 'child empowerment' in the context of bullying and we will end with a set of recommendations. These recommendations should be taken into account when designing 'tools' to increase children's self-regulation in the prevention of bullying and are useful for both interaction designers and school staff.

1.1 From traditional to cyberbullying and back

Defined as "*a systematic abuse of power in interpersonal relations*", bullying is still a widespread problem in schools throughout the world (Smith, 1999). Across Europe, 19 per cent of 9- to 16-year-olds report having been bullied and 12 per cent report having bullied someone else (Livingstone et al, 2011). When it comes to online or cyberbullying, 6 per cent report having been victimised online and 3 per cent confess to having bullied others online (Livingstone et al, 2009). With the rise of online and mobile media, even more children and youngsters are now involved in bullying (Vandebosch et al, 2006). In addition, the problem has also intensified, because it becomes hard for victims to escape their bullies. Besides being victimised offline, such as in and around school, these children may be increasingly victimised online as well, at any time and place (Broothaerts, 2010; Vandebosch et al, 2006).

Research on bullying used to focus primarily on the relation between perpetrator(s) and victim. Olweus (1993) for example, described bullying as a repeated, imbalanced (with regard to power) and negative act that occurs between a bully and a victim. Nevertheless it has been emphasized that bullying is above all a group process in which bystanders have an unmistakable role in the persistence of the bullying behaviour and on the adjustment of the victims (Cohen et al, 2006; Kyriakides & Creemers, 2012). Victims and bullies are embedded in subgroups where their peers support them. These subgroups can often be found in existing social contexts such as the school and more particular the classroom. Group processes are therefore important to explain and understand bullying behaviour, both offline en online (Huitsing & Veenstra, 2012).

Many anti-bullying programs have been developed over the past decades, both for prevention and for intervention, and currently there are a wide variety of practices being employed in

schools (Rigby & Griffiths, 2011). Punitive or disciplinary approaches, in which perpetrators get punished in order to solve the problem, are increasingly discredited. Although such measures may appear to stop the bullying behaviour initially, they often result in the bullying getting worse and going underground. Also, they do not change the behaviours and attitudes of those involved in bullying (Rigby & Griffiths, 2011). By contrast, other methods such as the Support Group Method formerly known as the No Blame Method (Robinson & Maines, 2008), the Method of Shared Concern (Pikas, 2012) and the KiVa anti-bullying program (Kärnä et al, 2011; Salmivalli et al, 2011) can bring about more profound and enduring change. These methods do not seek to impose a solution but, to a certain degree, try to empower children involved in bullying to negotiate a solution. Moreover, these methods acknowledge that bullying is a group process in which responsibility for the bullying behaviour may be diffuse (Demko, 1996; Rigby, 2005).

Although some methods empower children to a certain degree (e.g. Support Group Method and KiVa), we want to go a step further. Our aim is to increase children's self-regulation in reactive strategies when bullying occurs and in proactive strategies to prevent bullying all together. Whereas most methods focus on either traditional or cyberbullying, we are especially interested in how they are interrelated and manifest themselves in existing social contexts such as the class. Moreover, we want to explore how teachers can empower children to combat bullying and what tools are needed for that purpose. To give children, experts and teachers a voice in our research, we adopted a 'participatory design' approach. In the next section, we will elaborate on this overarching research methodology.

1.2 Participatory design

1.2.1 Definition and history

Participatory Design is often defined as *"a set of theories, practices and studies related to end-users as full participants in activities leading to software and hardware computer products and computer-based activities"* (Greenbaum et al, 1991; Schuler et al, 1993). Future users are at the core of the methodology: in Participatory Design these 'users' are considered co-designers of their technology and of the practices that may be reified in that technology (Bjerknes et al, 1987). Participatory designers, in turn, are seen as 'facilitators' who try to empower users in making design decisions together (Spinuzzi, 2005). What distinguishes participatory design from related approaches such as user-centered design is that the latter supposes only that the research and design work is done on behalf of the users: in participatory design, this work must be done 'with' the users from beginning to end (Iivari, 2004; Spinuzzi, 2004).

The field is extraordinarily diverse and this diversity has not lent itself to a single theory or paradigm of study or approach to practices (Muller, 2002). Participatory Design originated in

Scandinavia in the 1970s and 80s. This early Scandinavian work was motivated by a Marxist commitment to democratically empower workers and foster democracy in the workplace. Early work took the form of experiments conducted by university researchers in alliances with organised labour. Subsequent work supplemented the foundational democratic motivation with a need for combining complex knowledge for realistic design problems (Spinuzzi, 2005).

Many researchers and practitioners in Participatory Design are still motivated in part by a belief in the value of democracy, a value that can be seen in the strengthening of disempowered groups, in the improvement of internal processes and in the combination of diverse knowledge to make better services and products (Muller, 2002). On the other hand, Participatory Design has also achieved a status as a useful 'commercial tool' in some sort of 'corporate mainstreaming' (Iversen, 2010). Such a pragmatic approach to Participatory Design is concerned with developing better products and increasing revenue by involving those you design for. Involving potential users is believed to yield better insights, which could not be yielded if they were not part of the process.

A more authentic Participatory Design vision goes beyond letting potential users participate throughout the design process with the sole aim of making better products. Under this less pragmatic conception, it is not the use of participatory methods that makes particular work as being Participatory Design. Instead it is about when, how and why these methods are used that renders the approach as being participatory. Foremost, Participatory Design is about negotiating values, that is, something a person or a group of persons consider(s) important in life (Rokeach, 1973). In this sense, people whose activities and experiences will ultimately be affected most directly by a design outcome should have a substantive say in what that outcome is (Iversen, 2010).

1.2.2 Generative techniques: co-design and mapping

Generative techniques such as 'co-design' and 'mapping' are often used in Participatory Design. The basic principle behind co-design is to let people make designerly artefacts and invite them to tell a story about what they have made. These stories are then used to inform and inspire the design process (Sleeswijk Visser, 2005). By using techniques such as co-design, the target users of the product have a more critical role to play than in a more traditional human-centred design process driven by an expert mindset (Sulmon et al, 2013).

Sanders (2009) defines co-design as a specific instance of co-creation, referring to all kinds of collective creativity with users and other stakeholders as it is applied across the whole span of a design process. The act of 'making' in co-design has been found to make it easier for participants to reflect upon and express their knowledge, feelings and dreams than when talking without any concrete reference materials (see figure 1). The topics at hand often refer to subjective experiences that are hard to uncover as these may not readily be expressed in words (i.e., what people

‘say’), or cannot be observed (i.e., what people ‘do’) as it might, for instance, be about latent needs. Co-design then, by having people express their thoughts, feelings and ideas through the act of making artefacts might provide the researcher with more revealing insights (Sanders, 2002).

Levels of Knowledge

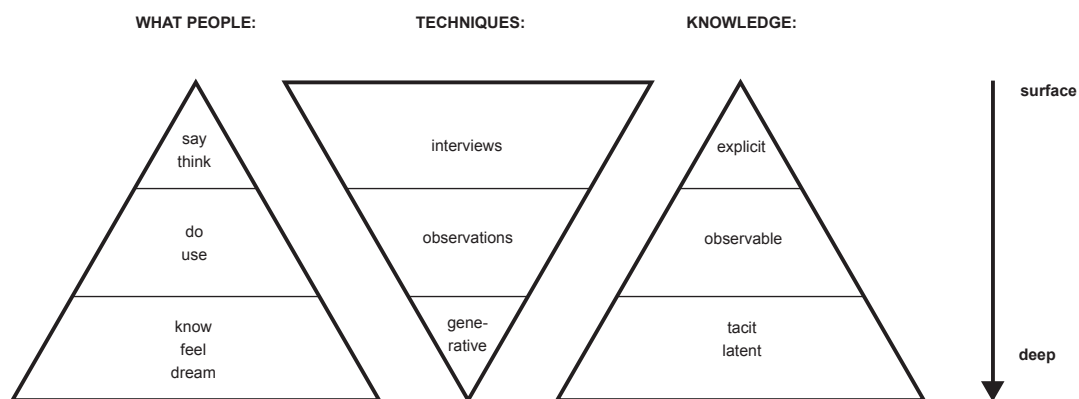


Figure 1: Levels of Knowledge (Sanders, 2002)

Mapping is a generative technique to visually outline ideas and the relations among them. It is a useful technique to enhance communication between participants with different backgrounds, but is also considered a useful tool for ideation. The common and original practice of mapping is the scaled portrayal of geographical features, that is, cartography. In the contemporary sense of data visualization, it includes metaphorical extensions of geographical map conventions to other kinds of data, as well as innovative ways of visualizing data not clearly related to the geographical archetype. Whatever the data might be, the goal of mapping is to create graphic representations of data and using spatial relationships within the graphic to represent relations within this data.

A useful mapping tool for participatory cartography and conversation that enables participants to create a map together is ‘MAP-it’. Map-it consists of a large mapping background and an open and extendible set of icons that allows participants to make their thoughts explicit in a visual way, in the form of a map. The visual character of MAP-it allows participants from different backgrounds to discuss projects on equal grounds (Dreessen et al, 2011) and therefore fits within the broader Participatory Design approach used for this project.

For the EMSOC project, we used different generative techniques to gain further insight in how to increase children’s self-regulation in combatting (cyber)bullying. We invited experts and

teachers for a series of MAP-it sessions to identify preconditions for this bottom-up oriented approach. The mapping procedure and results have been described extensively in a previous deliverable (Van Mechelen et al, 2013), but the ‘roadmap’ based on these results has not yet been presented. The roadmap metaphorically indicates roads, dangers and opportunities for a bottom-up strategy towards bullying. The preconditions embedded in the roadmap were exclusively based on the opinions of adults and therefore we actively involved children in the next phase of our research. In a series of co-design sessions we enabled children to voice their opinion on how to increase self-regulation in the context of bullying. In what follows, we will first present the roadmap based on insights from experts and teachers and afterwards we will elaborate on the co-design sessions with children.

1.3 Roadmap for a bottom-up oriented strategy towards (cyber)bullying

1.3.1 Prevention pyramid

For an extensive description of the preconditions identified by teachers and experts we refer to a previous deliverable (Van Mechelen et al, 2013). Here, our starting point is the ‘prevention pyramid’ (see figure 2) and how we used this model to structure the opinions of experts and teachers into a roadmap. This roadmap will be used for guidance throughout the project. The prevention pyramid is an existing theoretical framework that aims to structure prevention in schools on different levels ranging from the broad societal context to prevention measures targeting very specific problems (Deklerck & Overveld, 2011).

What happens at the first level, the broad societal context, is hard to grasp for schools since this level includes all kinds of extracurricular activities. Although the school might not be able to interfere at this level, what happens at this level may have an enormous impact on children’s attitudes and behaviours. The second level, the social school climate, is about children’s general wellbeing and the importance of a positive atmosphere in school. The next level, general prevention, is about making children emotionally literate by enhancing empathy, developing social skills and increasing resilience. Only in the next two levels, specific prevention and intervention, bullying comes into play explicitly.

To structure prevention and intervention along these different levels, schools need an overarching approach and the school staff should work together to execute this ‘whole school policy’. In what follows, we will use the prevention pyramid to structure the opinions voiced by experts and teachers, starting with their understanding of a ‘whole school policy’ regarding (cyber)bullying.

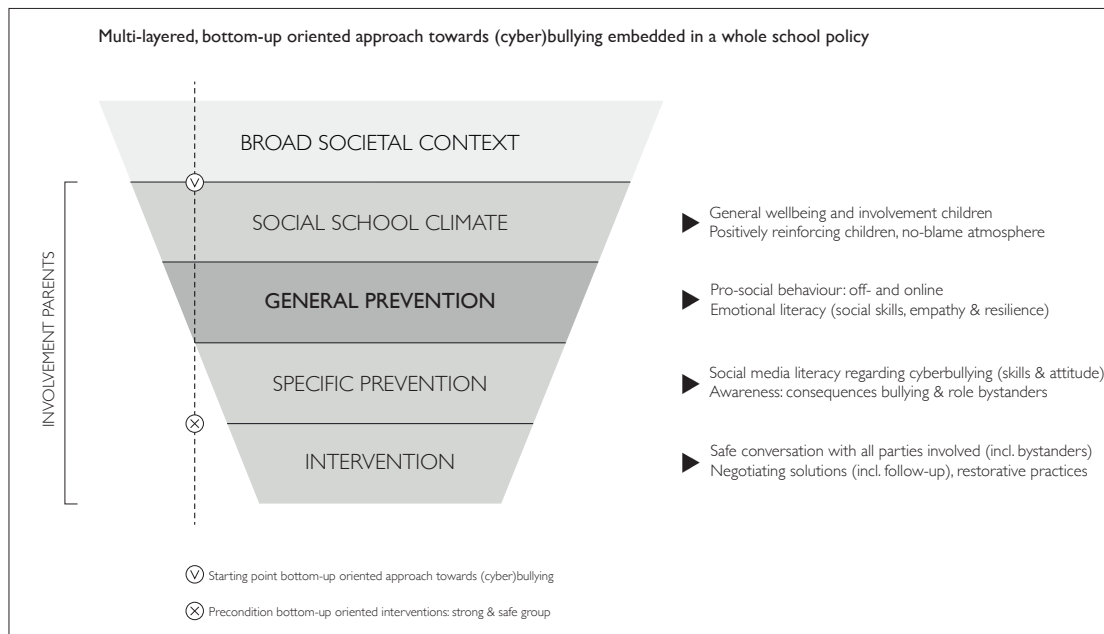


Figure 2: Roadmap for a bottom-up oriented strategy towards (cyber)bullying

Whole school policy

A multi-layered approach towards bullying (cf. prevention pyramid), should be embedded in a ‘whole school policy’ targeting individual, class and school levels. Facilitating children to become more self-regulatory should become a school’s second nature, reaching far beyond the problem of bullying alone. This may ask for a radical shift in the school culture, because a ‘whole school policy’ should not remain a collection of ideas and guidelines on paper: it has to be implemented and become daily practice. The school team needs to realize that there is no such thing as a one-size-fits-all approach to combat bullying. The measures and tools to support the team should therefore be ‘flexible’ and ‘open’, so they can easily be adapted to specific circumstances.

The experts and teachers furthermore pointed out that increasing children’s self-regulation is above all a ‘general prevention’ strategy that can only be implemented in a safe and strong group. In other words, an acute bullying problem can never be the starting point for a teacher’s first attempt to increase self-regulation among children.

Social school climate

During the mapping sessions, teachers and experts emphasized to not only reduce bullying once it has taken hold, but also to prevent it in the first place. According to the participants, increasing children’s self-regulation in combatting (cyber)bullying is above all a prevention strategy. A positive social school climate is an important precondition for such a bottom-up oriented approach, because it contributes to the quality of the other levels of the prevention pyramid. Teachers and school staff have to join forces to create a ‘no-blame’ atmosphere in which children feel positively

reinforced. This includes stimulating children's involvement in school and increasing general wellbeing.

Several suggestions were made as to how to achieve a positive school and class climate. According to the participants, many children nowadays increasingly lack the ability to play together. Special toys and carefully redesigned playgrounds could stimulate children to engage in collaborative play. Fostering play could furthermore be an efficient way to combat boredom. Other suggestions included organizing a 'friendship week' and presenting a nuanced and realistic image of social media instead of only focusing on potential risks such as cyberbullying, harmful content and the lack of online privacy. Besides these risks, social media offer interesting opportunities to practice social skills and to keep in touch with friends and family. In sum, according to the experts and teachers, prevention at the 'social school climate' level is all about strengthening children's wellbeing and involvement in a rather informal way.

General prevention

The next level of the prevention pyramid concerns 'general prevention' measures to develop children's emotionally literacy. The participants stressed that sufficient attention should be devoted to developing social skills, both off- and online and from an early age onwards. Furthermore, efforts should be taken to strengthen children's resilience and to increase their empathy towards others. Several methods were suggested for this purpose. 'The Talent Indicator' facilitates informal peer learning by making each child's talents more visible in the classroom. 'Anonymous Pamper Friends' is a tool to strengthen positive relations and social cohesion. Each child has to pamper another child anonymously that was assigned to him or her randomly. A successful strategy for not revealing your targeted class member is to pamper other children as well, resulting in stronger interpersonal relationships and a positive class atmosphere.

Finally, the participants suggested to involve children in social projects outside the school to develop empathy towards others and build social cohesion within the group. One such project could be to help disadvantaged or socially vulnerable people. According to the group of experts, these and other interventions will have a positive effect on children's emotional literacy, resulting in pro-social behaviour off- and online.

Specific prevention

The fourth level is about 'specific prevention' and targeting well-defined problems such as bullying, truancy and online risks. Examples of specific prevention measures are role-playing games to teach children how to react to bullying behaviour either as bystander or victim and teaching children how to use the Internet and social media wisely. The latter includes the ability to manage privacy settings adequately and knowing what to do when something goes wrong online. The participants referred to both examples as empowerment on a 'practical level'. Furthermore, children should come to understand the public character of social media and the lack of online

privacy. They should have a critical approach towards the possible consequences of sharing personal information online. An idea that popped up a few times is 'peer sensitizing'. Children with more than average IT skills could teach others about the risks of social media, whereas children with good social skills could have a leading role in monitoring the class atmosphere.

Finally, the participants pointed out that schools should continuously update their curriculum concerning risks associated with social media and other online services. Schools have to keep up with accelerating technological developments to keep children engaged and to arm them with the necessary skills. Furthermore, the whole school staff should excel in 'digital literacy' to effectively pass on practical knowledge and a critical attitude towards social media. Lastly, schools should avoid focusing exclusively on risks, but should present a nuanced picture of social media. Otherwise, children may quickly lose interest.

Intervention

Individual intervention

If bullying occurs despite the efforts undertaken for prevention, a detailed action plan should be available to intervene as quickly and adequately as possible. Teachers and school staff must however realize that there is no such thing as a one-size-fits-all approach. Each bullying situation should be dealt with without preconceptions. The group of experts and teachers therefore recommends a personalized and customized approach.

When intervening on the 'individual level', emphasis should be on the effects of bullying on the victim's feelings and emotions rather than on the ins and outs of what occurred. In a 'safe conversation' perpetrators should be invited to look at how their actions have affected the victim. They should come to acknowledge the severity of the situation and the consequences of their actions. Although there was some disagreement about how far one might take this 'no blame' approach (Robinson & Maines, 2008), participants agreed upon the idea not to impose a solution and to give perpetrators the opportunity to say what they are prepared to do to help. An approach in line with what we earlier called 'facilitated bottom-up' (Dupont et al, 2012). This Restorative practices should subsequently reconnect victim and perpetrator(s), at least if the victim feels ready for it. All parties involved, including parents, should be briefed from the very start about the situation and action plan.

Intervention at the group level

Since bullying is usually a group process (Cohen et al, 2006; Huisting & Veenstra, 2012; Kyriakides & Creemers, 2012), bystanders are key figures in solving bullying problems. The participants argued that, after 'safe conversations' with both victim and perpetrator(s), the class group should eventually be involved to reorient group dynamics and to bring about more profound and enduring change (e.g. through class discussions). In line with the anti-bullying program KiVa (Kärnä et al, 2011; Salmivalli et al, 2011), bystanders should come to realize that they can make a

difference by defending the victim. Since there are always less talkative children in a group, an anonymous questionnaire could be used as a starting point for class discussions. During these discussions, children should think about how to improve the situation, resulting in a set of 'class rules'. Finally, through follow-up sessions, the changes in-group dynamics and class atmosphere should be monitored according to the participants. This way, teachers can get a better image of what is going on beneath the surface and intervene immediately when things get worse again. The group of experts and teachers pointed out that 'symmetrical trust' between teacher and children is a major asset to detect tensions before they turn into conflicts.

2. Co-design with children

In the following paragraphs we will explain the rationale for involving children as design partners in this research and we will elaborate on the different steps of the co-design procedure used for that purpose. Afterwards, we will shed light on how we analysed the co-design outcomes (i.e. the co-design artefacts and their verbal explanations) by using a multimodality approach borrowed from social semiotics.

2.1 Rationale

As stated earlier, our aim is to strengthen children's self-regulation in both traditional and cyber-bullying and to initiate discussions on practical solutions. An important lesson learned from the MAP-it sessions with teachers and experts is the necessity of a safe and strong class group as a starting point. Increasing children's self-regulation in the context of bullying is above all a prevention strategy that should be embedded in a multi-layered 'whole school policy'. Based on these findings we reformulated our initial research question:

- Initial research question: "How can primary school teachers facilitate children to become more self-regulatory as a class group in coping with bullying behaviour, both in prevention and intervention? What digital tools would be useful in this context?"
- New research question: "How can primary school teachers engage children in pro-social behaviour, off- and online, to strengthen social cohesion in their class group and prevent (cyber)bullying behaviour? What digital tools would be useful in this context?"

The preconditions for a bottom-up oriented approach and the suggestions for how they can be created were based exclusively on the opinions of adults. In the next phase of our research, we enabled children aged 9 to 10 to voice their opinions on how to increase self-regulation in the context of bullying. More specifically, we wanted to know more about their ideas and values on how to improve the class atmosphere as a way to prevent bullying. In this section, we will describe the co-design procedure and the method used for analysis and afterwards we will discuss the results of the co-design sessions.

2.2 Method

Within the Child Computer Interaction (CCI) community, different methods for designing technology for children have emerged over the last decade (Obrist, 2011), many of which encourage children to participate in the design process e.g. KidReporter (Bekker et al, 2003), Mission from Mars (Dindler et al, 2005), Mixing Ideas (Guha et al, 2004), Bluebells (Kelly et al, 2006), Layered Elaboration (Walsh et al, 2010), Cultural Probes for Children (Wyeth & Diercke, 2006), etc.

These methods are often based on a belief that children have their own special experiences and viewpoints that support the technology design process in a complementary way to adults' expertise.

Most of these methods involve children in dyads or groups, rather than individually. However, group dynamic processes may impact children's development of creative solutions. Within the area of CCI, authors have only recently started to acknowledge the importance of facilitating group dynamics in co-design with children, e.g. (Vaajakallio et al, 2010). Focusing on group dynamics is believed to have a positive impact on children's motivation as well as on the development of creative solutions (Cross et al, 1995). Nevertheless, the concept 'group dynamics' remains generally poorly defined within the field, and little solutions to overcome challenging group dynamics have been suggested. In earlier work, we have made a categorization of challenging group dynamics in co-design with children and we suggested solutions to remediate these dynamics into positive forces (Van Mechelen et al, 2014a).

Without going into more detail about these challenges and possible solutions, for our co-design procedure we combined principles from 'Cooperative Learning' with two existing participatory design approaches: 'Cooperative Inquiry' (Druin, 1999; Guha et al, 2004; Guha et al, 2013) and the 'Contextmapping' procedure as described by (Sleeswijk Visser, 2005). The goal of Cooperative Inquiry is to support intergenerational design teams in understanding what children as technology users do now, what they might do tomorrow and what they envision for the future (Druin, 2002). Contextmapping on the other hand is a systematic approach to elicit contextual information of product use. Generative techniques are often used in Contextmapping. The basic principle thereby is to let people make designerly artefacts and tell a story about what they have made (Sanders, 2000; Sleeswijk Visser, 2005).

Cooperative Learning, another cornerstone of our co-design procedure, is used to refer to a broad range of teaching strategies that share the provision of opportunities for students to work together in small, face-to-face groups (Slavin, 1995). The idea of Cooperative Learning methods is that the teacher creates a context in which students have equal status and equal opportunities for success (Krol-Pot, 2005). Some principles we borrowed from cooperative learning are structuring 'individual accountability' in co-design teams and ending each session with 'group processing' to evaluate how well the group is functioning. In what follows, we will explain the different steps of the co-design procedure in more detail.

2.2.1 General Procedure

In total, 49 primary school children aged 9 to 10 were involved in two co-design sessions. These sessions took place in two schools in Flanders, Belgium. The sessions resulted in 11 co-design artefacts created by an equal number of groups of 4 to 5 children. One researcher was involved in

each co-design session facilitating two to three groups of children at the same time without actively participating in the design process. The different steps were:

Preparations and Introduction

Design challenge and storyline

As a first step, we selected two primary schools in and around Leuven. We discussed our plans with the principal, care coordinator and fourth grade teacher of each school. We briefly explained the insights from the mapping sessions and how our initial research question has shifted based on the insights of experts and teachers. Together with the director, care coordinator and fourth grade teacher we reformulated our research question into a design challenge that children would easily understand. Instead of using concepts such as ‘pro-social behaviour’ and ‘social cohesion’ we used the term ‘class atmosphere’, which is a term the children were familiar with. The design challenge was: “How can we improve the class atmosphere in a class where children don’t get along very well?”. We used a fictitious story of a class with a negative atmosphere as a starting point. This was done because, on the one hand, we wanted children to become fully immersed in the problem, but on the other hand we wanted to keep sufficient distance as not to make it too personal for those children who have been victimised recently.

The story was used to prompt children to reflect on the design challenge and the values at stake. It tells a partly fictional story about a schoolteacher, miss Anneleen. The 23 9-10-year-old boys and girls in her class are having a difficult time. The children don’t get along very well and the atmosphere in the class is below zero. A lot of detailed examples were included in the narrative, such as: “Some children always play together during breaks, while excluding others who would really like to join them.” The teacher tried many things to change the atmosphere for the better, but without success. Therefore, she contacted her brother, a researcher at the university, and asked him for help. Since the brother did not know what to do either, he decided to ask children in other schools to help him solve the problem of the bad atmosphere. Together with these children and some colleagues he wants to invent ‘tools’ to be used in class to enhance the atmosphere and team spirit. With this story, our aim was to provide children with a clear end goal and to establish a common ground where researchers and children could meet on.

Ethical symmetry: the CHECK tool

The next step was to prepare an informed consent document for the children’s parents. Since we not only wanted to inform parents but also children, we used the complementary CHECK tool. CHECK consists of two checklists (i.e. CHECK 1 and 2), designed to help CCI researchers to critically consider their values when involving children in design projects, and to examine how best to explain participatory design activities to children to aid informed consent (Read et al, 2013). CHECK consists of two checklists. CHECK 1 focuses on examining values by asking six questions to be answered prior to any design activity. The questions challenge the designer or researcher to

consider the appropriateness of both the technical solution and the involvement of children. The aim is to become more explicit about the values that drive the work, pushing designers and researchers to the extremes of honesty (Read et al, 2013).

CHECk 2 aims to examine the value of participation to the child design partners. Child design partners should be informed about what they will be doing during the design activities, how their contributions will be disseminated and, although difficult, who has credit for the ideas they come up with during these design activities. The main goal of CHECk 2 is achieving ethical symmetry, that is, full consent from the children instead of only consent by adults (Christensen & Prout, 2002). By answering the questions, designers and researchers can make sure children can understand their research. We used the answers as a starting point during our introduction to the children. For our answers for CHECk 1 and 2 and how we used these answers to achieve ethical symmetry with children, we refer to Van Mechelen et al (2014b).

Introduction to the children

When we met the children for the first time in their classroom, we did not tell the story in a one-way fashion. Rather, we combined it with an interactive introduction about us, being researchers and what that means. We asked the children what they think it is that researchers do and why. Next, we introduced the problem of miss Anneleen and we asked the children about their opinions. We then revealed the purpose of our visit, being asked by miss Anneleen to help her solving the problem of the bad atmosphere in her class and that we needed their help. Some children were a bit sceptical in the beginning and wondered if the story was real. However, because of the many details and the story's realism, the children got excited right away.

Next, we used the answers of CHECk 2 to negotiate and inform participation. We asked questions such as "What should we do if our ideas actually solve the problems in Anneleen's class?" and "What if we earn money with an invention based on our ideas?". These questions evoked interesting debates, for example between a boy wanting to buy a PlayStation for class use and a girl proposing to use the money to help children in other schools: "I think, that uh, we should use the money to help children in other schools as well, and so, that the class atmosphere can improve their as well, in all schools in Belgium."

While making these suggestions, children's values were implicitly expressed. Some of the children's opinions notably changed during the discussions with their peers and the researchers. When we finally proposed to use the money, if we would make any money at all, for additional research on the topic they simultaneously yelled "Yes!". In other words, an overall consensus was reached. Instead of being passive listeners, the children behaved as active participants from the very start. Due to this process, feelings of problem ownership emerged and children gradually uncovered and identified their values. Values were documented by writing down children's reactions and by making a report immediately afterwards.

Sensitizing

During our first encounter with the children we furthermore introduced a sensitizing package with four individual assignments. The goal of these assignments was to trigger children's reflection in a playful and creative way and to prepare them for the co-design sessions approximately two weeks later. The four assignments aimed to 'warm-up' our child-design partners to make it easier for them to access their experiences and express their ideas and values regarding the design challenge. For more detailed information on 'sensitizing' we refer to Sleeswijk Visser (2005). Although we introduced the sensitizing packages when we first met the children in their classroom, they had to work on the assignments at home. Each assignment was put in a sealed envelope and only when they handed in an assignment to their teacher they got the next one. By adding this element of surprise, we hoped to increase children's excitement so they would not wait till the very last moment to make the assignments. The teacher was responsible for collecting the assignments in sealed envelopes and handing out new assignments. Children had approximately 10 days to make all four assignments. At the end of our introduction, the children were allowed to open the first envelope and we briefly talked about what they had to do. In the first envelope they could also find a small gift: a set of six crayons. The four assignments were:

1. Self-portrait: make a self-portrait and draw three things or persons around your portrait that are very important to you. Next, clarify 'why' each of these things or persons is so important to you. You can therefore use the post-its in the envelope.
2. Playing together: think off a recent case in which someone could not play with you. Write down as many reasons as possible 'why' that was the case. Next, do the exact opposite and write down reasons why someone could play with you recently.
3. Class atmosphere: make a drawing of a class with a very bad atmosphere, a class you definitely not want to be in. Next, write three reasons on post-its why you believe the atmosphere is bad and attach them to your drawing.
4. Journalist: make an appointment with one of your grand parents or someone with a similar age. As a journalist, you will ask different questions: (1) "How was school when you had my age?" and (2) "When was the atmosphere good or bad in your class?". The third question is free to choose. Make a short summary for each answer.

First Co-design Session

Group formation and allocating roles

The goal of the first co-design session was to create cohesive teams and, for each group, to define a 'point of view'. During this session, each co-design group formulated two specific problems based on the story and the design challenge. In the second session they would then 'invent' something to solve these problems. We asked the teacher to form gender-mixed groups of four to five children that would work together during both co-design sessions. Literature has shown this to

be the most optimal group size (Heary et al, 2002). Also, many authors suggest that heterogeneous groups are more capable of coming up with diverse ideas (Franz, 2012; Sawyer, 2008). Therefore, with the help of the teacher, these groups were formed heterogeneously, based on criteria such as intelligence, communication skills, gender and creative abilities.

We chose not to involve the whole class group at once but to divide the class in a fore- and afternoon group, each composed of three co-design groups. This way, it would be easier for the researcher to facilitate the children throughout the co-design process.

After the group formation, the researcher had a conversation with the children. He asked if they remembered why he needed their help and how they liked the assignments they had to make at home. He then explained the purpose of the first co-design session and reminded the children of the end-goal, that is, to invent something to improve the atmosphere in miss Anneleen's class. The researcher reiterated the story, but now with additional details based on an analysis of the second 'sensitizing' assignment: drawing a class with a bad atmosphere. Before the session, we clustered the different reasons for a bad class atmosphere the children had thought of. We then made a selection of the most common reasons related to 'social interactions' (e.g. children who always want to be the best, laughing at children and excluding others, etc.) and used these to enrich our initial story of miss Anneleen's class.

Next, the researcher discussed the co-design rules. Although children had a lot of freedom during the sessions, we wanted them to collaborate as a team in which each child had an equal chance to contribute. To make sure children would not forget about these rules and to increase individual accountability within the team, each group member was assigned a different role that made him or her responsible for a specific rule. The roles were visualised with a badge the children had to wear during the co-design session. The 'material guard' was responsible for the use of the materials and had to make sure each group member had something (e.g. scissors, glue, etc.) to work with. The 'silence captain' had to assure the children were quiet when the researcher would explain the next step. The responsibility of the 'inspiration general' was to assure that each child had an equal chance to contribute and that nobody would impose his or her ideas. The fourth and last role was that of the 'time keeper', who had to prevent the co-design team from running out of time. Group formation and allocating roles took about 20 minutes.

Introductory activities: logo design and empathy exercise

The next step was an introductory design activity: each co-design team had to think of name and design a logo. For this activity, we asked each group member to pay special attention to his or her role. Teams were free to choose how to approach this task, but time was limited to 20 minutes. When each co-design team had completed the task, they presented their group name and logo to the other groups and each group briefly reflected on the collaboration process and the use of the roles.

For the following step the researcher handed out the results of the fourth 'sensitizing' assignment in which children had to interview one of their grandparents about their school life when they had their age. Groups were given another 20 minutes to discuss these results. We wanted them to reflect upon their grandparents' school life and how school life has changed since them. Our hope was that through this empathy exercise children would approach the design challenge in new and unexpected ways. After these introductory activities, the co-design teams were ready for the next step: problem definition.

Problem definition and discussion

The researcher handed out cards with the story describing the situation in miss Anneleen's class, including examples of how the atmosphere was negatively influenced. These concrete situations were based on the results of the third sensitizing assignment: drawing a class with a bad atmosphere. The design challenge (i.e., improving the class atmosphere) was deliberately kept broad, because we wanted each co-design group to refine the design challenge based on their interpretation of the story. This way, our hopes were to increase problem ownership and children's involvement throughout the co-design sessions.

The co-design teams were asked to make a collage on a big sheet of paper that would illustrate the bad class atmosphere. The researcher handed out materials for each team: scissors, glue, markers, all sorts of pictograms, coloured paper, etc. Again, the children were prompted to think about their specific role during the collaboration process, either as material guard, silence captain, time keeper or inspiration general. The teams had 30 minutes to make the collage and illustrate as many situations as possible that negatively influenced the class atmosphere in the story. When each team had finished their collage, the researcher explained the next step. They now had to pick six situations they had just visualized and discuss 'why' each of these situations negatively influenced the class atmosphere. When a consensus was reached, they wrote their arguments on post-its and attached them to their collage. For this step they had about 10 minutes. Subsequently, out of these six problematic situations, they had to pick two. During the next session they would then have to 'invent' something to solve these problems. To select two problematic situations, each team member had two votes by means of little stickers (i.e., sticky dot voting). The problems with most votes would be the starting point for the next co-design session. Sticky dot voting took another ten minutes.

Finally, each team briefly presented their collage to the other groups and both the researcher and children could ask questions. With their and their parent's permission, these presentations were all recorded on video for further analysis.

Group processing

At the end of the co-design session we gave each team ten more minutes to evaluate the collaboration process. Group processing has several purposes: it allows the co-design team to improve

its work together continuously over time, it focuses attention on group member's contributions in order to increase individual accountability and it streamlines the co-design process. According to Johnson et al (1998; 2005) groups need specific time to discuss how well they are achieving their goals and maintaining effective working relationships among members, or put differently: "children do not learn from experiences they do not reflect on".

The researcher asked the co-design teams to list at least three actions that helped the group to be successful and list one action that could be added to make the group even more successful during the next co-design session. Finally, the researcher briefly explained the next steps for the second co-design session that was scheduled approximately one week from then.

Second co-design session

Ideation and selection

The goal of the second co-design session was for each team to design a prototype of a tool to improve the class atmosphere. Although we did not explicitly mention 'bullying', the underlying idea was that we would use their suggestions on how to improve the class atmosphere to prevent (cyber)bullying. To refresh children's memory, the researcher handed out the collages the children had made during the first session. The teams were then asked to reallocate the roles and to think carefully about which role was best suited for whom. Just as in the previous co-design session, these roles were the 'material guard', the 'inspiration general', the 'silence captain' and the 'time keeper'. They had about 15 minutes to refresh their memories and reallocate the different roles. The researcher then moved on to the next step: ideation.

Whereas the teams had focused on 'problem definition' during the first session, they were now about to enter the 'solution space'. During ideation they would first think of different ideas to solve the problematic situations they had selected (i.e., divergence or creating choices) and afterwards they would select two ideas for further elaboration (i.e., convergence or selecting choices). The researcher first introduced children to the concept of 'brainstorming'. Inspired by Osborn's original brainstorm rules (Osborn, 1957; Sutton & Hargadon, 1996; Thoring, 2010) he explained that brainstorming is finding as many ideas as quickly as possible, without thinking about the quality of the ideas. Furthermore, he explained that it is important to build on the ideas of others in your team and that you encourage 'wild' ideas.

After some classical warm-up exercises, the teams started brainstorming solutions. They used a special brainstorm technique: the superhero brainstorm. When thinking about the problem statements, they had to imagine that they were a specific Superhero and how that superhero would solve the problem. This approach was chosen to make it easier for the children to come up with creative solutions to the problem. Before the children started brainstorming, the researcher reminded them about their 'roles' and the special responsibilities that came with it, so as to streamline the collaboration process. The teams were to write each idea they thought of on a

separate Post-It note and put it in the middle of the table for other group members to see it. To brainstorm ideas for both problems, the co-design teams had about 15 minutes.

Next, the teams had to group all similar ideas together and to select two ideas for further elaboration by means of 'sticky dot voting'. Each child had two votes for the selection process: a red sticker was worth two points and a green sticker one point. The children had 15 minutes to re-read and group similar ideas and to vote for the ideas they found most promising. As a team, they then had another five minutes to count all votes and to make the final decision on which ideas to work on further.

Elaboration through making

In the next stage, the teams elaborated on the selected ideas in a hands-on way designing tools that would solve the problematic situations and thus improve the class atmosphere. The researcher explained that they could combine the ideas they had selected into 'one big idea', just as you could mix two colours into one new colour. For prototyping, each 'material guard' received a 'bag of stuff' with all kinds of materials the team could use (e.g. scissors, cardboard, glue, aluminium dishes, ropes, coloured paper, etc.). Again, the researcher reminded the children to take responsibility and to perform their role. For the 'material guard', this meant distributing the materials so each team member had something to work with. The 'inspiration general', on the other hand, had to ensure that each team member had an equal chance to contribute and nobody would impose his or her ideas. The 'silence captain' had to remind his or her team members not to become too loud, whereas the 'time keeper' had to keep an eye on the time throughout the process.

To ensure teams would collaborate and discuss their approach, we limited some of the materials. For instance, we only gave one pair of scissors and one glue stick per team, so they had to think carefully about who did what. Apart from that, the teams were free to choose how to approach the task. The teams had about 40 minutes to make the prototypes based on their initial ideas.

Peer jury and wrap-up

For the next step, the co-design teams had 5 minutes to prepare a presentation about their designs. They could either explain how their tool would improve the class atmosphere or organize a small performance. Presentations took about 5 minutes per team and another 5 to 10 minutes for questions and 'peer jurying'. When one team was presenting, the other teams functioned as a jury. After the presentation they could ask critical questions and voice their opinions about the design. Finally, each jury member filled in a form. Questions included: "What do you like about the team's invention to improve the class atmosphere?", "Why do you like it?", "If there is one thing that you would change, what would be it?" and "Why would you change it?".

Presentations and questions were all recorded on video for further analysis. After each group had presented their design, the researcher asked the teams to once more evaluate the group process.

At this point, we were especially interested in how the children experienced the use of the roles and the responsibilities that came with it. Finally, a short wrap-up followed in which we talked briefly about the next phase of our research and how we would use their designs as a source of inspiration and information.

2.2.2 Multimodal analysis

The co-design sessions resulted in various outcomes. For the analyses we used a multimodal approach borrowed from social semiotics (Jewitt, 2013; Kress, 2010). For each co-design team, we analysed:

1. The collage of two problematic class situations defined by the children (e.g. children excluding each other from playing games, bullying, etc.) during the first co-design session;
2. Verbal descriptions on post-its of how a super hero would solve these problems (e.g. Spiderman capturing 'bad' children in a web). From these solutions, the children picked two for further elaboration;
3. The artefact designed by the children during the second co-design session that embodies the super heroes' solutions chosen in 2;
4. Transcripts of verbal presentations of the artefact at the end of the second co-design session.

Tangible artefacts and their verbal explanations are different 'modes' with different affordances: each has specific characteristics that allow for communicating specific information. For instance, while speech is more suitable for narratives, material objects facilitate communication of moods, emotion, etc. Integrating both modes into an analysis of co-design outcomes (e.g. the artefacts created by participants and the stories they tell about these artefacts) therefore offer a more holistic analysis of various information types (Buckingham, 2009). Visual and material objects can, however, be interpreted in different ways, and it can be difficult to make interpretations that are valid within the context of a participatory design process. Here, we used a comparative analysis between the original ideas and the results, which enabled us to trace how ideas emerged and evolved throughout the participatory design process. By analysing the process from initial ideas to results, the researchers were able to interpret the ideas in the co-design artefacts in the light of their origins in the super hero solutions (2) and the description of class situations (1). Tracing this evolution was crucial in the analysis, as it allowed the researchers to 'ground' their analyses of artefacts (3) and presentations (4) and, as such, add validity to the interpretations.

Besides grounding the analyses in the evolution from original ideas to co-design outcomes, we used a hermeneutic approach (Schön, 1984) in order to strengthen the validity of the interpretations: we checked the analysis of the artefact against the verbal transcription, and vice versa.

Considering the material artefact and the verbal transcripts as different forms of the same idea, it is the coherence between text and artefact that validates the analysis. This hermeneutic approach was applied in a 'close reading', which is an analytic method originating in the humanities that examines formal and thematic elements in texts and artefacts (Bardzell, 2011). It consisted of two main steps:

1. Two researchers independently identified recurring themes and underlying values through a detailed analysis of the data. This step comprised several activities:
 - Tracing the evolution from the children's problem definition (1) and original ideas (2) to the eventual results (3 & 4).
 - A low-level analysis of functionality and attributes of co-design artefacts (3) and verbal presentations (4). Special attention was given to elements highlighted (stressed) in and across modes.
 - A high-level analysis of recurring themes by identifying the discourses (i.e., children's view on social reality) that underlie the artefacts and presentations (3 & 4).
 - A meta-analysis of values underpinning tangible (3) and textual outcomes (4); these are seldom explicitly expressed (Halloran et al, 2009).
2. Both researchers collaboratively refined recurring themes and underlying values to arrive at a common understanding of the data. This was an iterative process of going back and forth between the different steps. Finally, we invited four experts to discuss the results of the co-design sessions and to compare the results with the roadmap based on the MAP-it sessions with experts and teachers. These discussions helped to us to better structure the results and link them back to the theoretical framework of the 'prevention pyramid'.

3. Results and discussion

In this section, we describe the results of our analyses of both the ‘verbal’ and ‘tangible’ co-design outcomes. We will first present the results of each co-design team of 4 to 5 children aged 9 to 10 and only then will we compare the results across teams to come to a better, more coherent understanding of children’s view on how to improve the class atmosphere to prevent bullying.

3.1 Results per co-design team

Per co-design team, we will first have a closer look at the evolution from initial ideas to artefact. These initial ideas were the result of a brainstorm exercise in which each team had thought of solutions for two specific problems that may, according to the children, result in a bad class atmosphere. Afterwards we will analyse the artefacts designed by each team to cope with the problems they had selected. Our aim thereby is to not only capture each co-design team’s ideas on a functional or attribute level, but to deduce their underlying values as well.

3.1.1 Team 1: Speedy Tijgers

From initial ideas to artefact

The Speedy Tijgers translated the design challenge (i.e., how can a bad class atmosphere be turned into a positive one) into two concrete problems: (1) not paying attention in class and (2) excluding other children to, for example, play together. Before the creation of the artefact, the team had various initial ideas to solve the problematic situations they had selected. The co-design team started out with a slight overweight of disciplinary, negative ideas compared to preventive, positive ideas (11 versus 9). From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the 1st problem, not paying attention in class, the team selected a positive, preventive idea as most promising: “superhero Rox gives fresh vegetables”. For the 2nd problem, excluding others, they chose a negative, disciplinary idea: “if children exclude one another, superhero Rox will put the children in a car and drive away superfast to punish them”.

With these ideas in mind, the team invented the ‘Rox Box’ (see figure 3), a decorated paper bag containing different objects. Depending on children’s behaviour, they can either choose a reward or punishment, but except for one object, the ‘Wiggle Machine’, all objects focus on rewarding good rather than punishing bad behaviour. Rewards include: the ‘Rox Flying Machine’, ‘Rox Badges’, ‘Rox Cards’, ‘Rox Napkins’, ‘Rox Vegetables’ (a giant carrot and a tomato with Rox label), a ‘Rox Drinking Straw Machine’, smiling ‘Rox Figures’ (Xavier, Rick and Olivia) drawn on cups and two small ‘Rox Houses’ to play with.

In the evolution from initial ideas to artefact, it was telling that the negative, punishing component almost completely disappeared in favour of rewarding good behaviour, both in the material artefacts as in the children’s verbal explanation. This evolution from initial ideas to material artefact indicates an important shift from negative, disciplinary ideas to positive ones.



Figure 3: the Rox Box containing all kinds of rewards and one punishment

From attributes to underlying themes and values

All objects in the ‘Rox Box’ are labelled with a Rox logo, which stylistically connects them despite their wide variety. As mentioned earlier, the objects can be divided in two main groups: rewards and punishments. The latter contains only one object, the ‘Wiggling Machine’. Children who negatively influence the class atmosphere by not paying attention or excluding others to play together, have to sit in the machine for a certain amount of time. The teacher decides on the duration, but the initiative for the punishment has to come from the child itself. Remarkable is the machine’s functional and clean appearance compared with the much more colourful and decorative (e.g. use of smileys) rewards.

The rewards can be divided in different subgroups: ‘collectables’ (i.e., Rox badges, cards and napkins), ‘food and drinks’ (i.e., Rox vegetables and the drinking straw machine), ‘play’ (i.e., Rox figures and houses) and ‘action’ (i.e., Rox flying machine). This wide range of choice and diversity could be interpreted as a lack of overall design vision, but the use of the Rox logo on each object and the Rox Box in which all objects are included suggests otherwise. After the team presented

the Rox Box, the peer jury was unanimously positive about the amount of choice to reward 'good' behaviour. No questions were raised, however, about the clear distinction between 'bad' and 'good' behaviour and the lack of attention for those children that might be somewhere in the middle between these opposites. Bystanders (e.g. when bullying occurs) or the class as a group have no significant role to play in the teams' vision on how to improve the class atmosphere.

Furthermore, none of the objects in the Rox Box has agency: either you collect the objects, play with them or use them for a particular 'action' (e.g. flying and wiggling machine), but the objects do not act in themselves. Although children can choose their reward or punishment at any time, the teacher maintains a regulatory function. He or she decides upon the duration of use whereas the children choose when to start using a particular object, be it a reward or punishment. Besides the teacher also 'Rox' has some kind of regulatory function. If children do not listen to their teacher and behave badly, they will disappoint Rox and since Rox is a figure children look up to, such behaviour is to be avoided. This normative stance is somewhat ambiguous, since it is not clear whether Rox will be present as a person and if so, how and when Rox would interact with the children.

In sum, the co-design team hints upon a mix of top-down and bottom-up regulation with a focus on rewarding good rather than punishing bad behaviour. Since the punishment aspect is understated in both verbal and visual modes, the values embedded in the Rox Box are 'soft authority' and 'positivity'.

3.1.2 Team 2: Samenwerkers

From initial ideas to artefact

The team 'Samenwerkers' translated the design challenge in two concrete problems: (1) 'laughing at others' and (2) 'sad faces in class'. Before the creation of the artefact, the team had various ideas to solve the problematic situations they had selected. Instead of laughing at others, the team reasoned, children should respect each other and sad faces should be turned into happy ones. The team started out with a clear overweight of preventive, positive compared to disciplinary, negative ideas (8 versus 3). From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the 1st problem, laughing at others, the team selected a positive, preventive idea as most promising: "Batman guarantees it will not happen often". For the 2nd problem, sad faces in class, they also chose a preventive, positive idea: "hypnotizing the teacher so she will tell funny jokes".

With these ideas in mind, the team invented the 'Hypnotise Machine' (see figure 4), an industrial looking robust object with much attention for functional details (e.g. a handle, an arrow to indicate the direction of rotation, etc.). Victims can use the Hypnotise Machine to hypnotise bullies, not as a punishment per se, but to make them forget that they are bullies so they will not laugh at

them again. Sad children, on the other hand, can use the machine to hypnotise themselves as way to become happy.

In the evolution from initial ideas to artefact, the focus on prevention and positivity was maintained but the role of the ‘adult’, in this case superhero Batman, shifted. The regulatory role of adults in the initial ideas (e.g. Batman preventing children laughing at others and a hypnotised teacher telling jokes) disappeared in favour of a more central role for children. This evolution of initial ideas to their material and verbal elaboration points toward a significant shift from top-down towards bottom-up regulation.



Figure 4: a hypnotize machine to be used by victims

From attributes to underlying themes and values

As mentioned before, the co-design team put a lot of effort in functional details in favour of decorative ones, such as a robust handle and an arrow indicating the rotation direction. Although the team acknowledged that some improvements could be made (e.g. in usability), they actually believed their invention would work and did several demonstrations. When a bully victim or a sad child wants to use the Hypnotise Machine, he or she simply takes the handle and starts rotating the tube and the aluminium disk attached to it. On the disk they drew a black spiral. By pointing this disk, while rotating it, towards someone’s gaze, that person will become hypnotised in a matter of seconds. Both in the artefact itself as in the verbal explanation, the team emphasized the functional character of their invention, the fact that it actually works, and how to use it in

different contexts (e.g. being laughed at or being sad). Instead of developing different objects or one object with multiple functionalities, the team cleverly integrated a solution for both problems into one function: enabling children to hypnotise others. This integration reflects an urge for simplicity.

The Hypnotise Machine has no agency, but rather 'empowers' sad children or children being laughed at to do something about their situation. Self-regulation is key, but the teacher will intervene when a bully does not allow a victim to hypnotize him or her. The machine furthermore focuses on bullies and victims but not on bystanders or the class group as a whole, although it was mentioned once that a random classmate could use the machine to hypnotize a sad child to make him or her happy again. Importantly, the Hypnotise Machine does not punish children; its main goal is to make children forget why they are sad or why they laugh at others. This 'motivated' or 'directed' forgetting enables children to start with a clean sheet without the social process of prevention and intervention. As a 'deus ex machina', the Hypnotize Machine resolves the problems magically and immediately to improve the class atmosphere.

In sum, the co-design team was keen on the idea of self-regulation and empowerment, but some top-down regulation may be needed when things tend to go wrong (e.g. a bully not wanting to be hypnotised). Other values that are implicitly expressed in the artefact and its verbal explanation are 'positivity' and the ability to forget and 'move forward' rather than reliving the past and looking for someone to blame (cf. 'no-blame' approach).

3.1.3 Team 3: Elti

From initial ideas to artefact

The Elti team translated the design challenge in two specific problems: (1) bullying and (2) bragging, that is, always wanting to be the best. Instead of bullying each other, the team thought that children should become friends and play together, and instead of bragging children should give each other compliments. Before the creation of the artefact, they had various initial ideas to solve the problematic situations they had selected and to improve the class atmosphere. The co-design team started out with a comparable number of disciplinary, negative ideas compared to preventive, positive ideas (8 versus 7).

From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For their 1st problem, bullying, the team selected a disciplinary, negative idea as most promising: "using muscle power to lift the mean child off the ground". For the 2nd problem, bragging and always wanting to be the best, they chose an idea to prevent others from bragging when you are around: "the victim should become very strong". With these ideas in mind, the team invented two artefacts that should be used together: a lovely looking figure with a red heart on its chest and a text balloon saying 'look into the house',

and a little house provided with instructions and filled with cards with tips for good behaviour (see figure 5). Bullies or those who brag are supposed to take a tip and change their behaviour accordingly. The figure reminds the children when to look in the house for a tip and rings a bell when children need to be quiet.

In the evolution from initial ideas to artefact, the balance between preventive, positive ideas and disciplinary, negative ideas somewhat shifted, since the eventual artefacts no longer focus on punishing bullies or those who brag, but on remediating 'bad' behaviour by means of normative tips and a figure symbolizing 'soft' rather than 'severe' authority.



Figure 5: a human-like figure and a miniature house with tips for good behaviour

From attributes to underlying themes and values

A clear distinction is made between good and bad behaviour, but the team's focus is on behaviour that negatively influences the class atmosphere, such as bullying and bragging. Victims are empowered to a certain degree, because they can ask perpetrators or a classmate to take a tip and to change their behaviour accordingly. Apart from that, victims do not have a significant role to play, as is the case for bystanders and the class group as a whole. Perpetrators, bullies and braggers, are not punished for their 'bad' behaviour but are supposed to change their future behaviour. The message in the text balloon attached to the figure's head reminds bad children where they can find tips: they have to look in the miniature house by lifting the rooftop. No one tells them when to take a card with a tip; they are free to do so whenever they feel it may be

useful. However, when they take a tip, the teacher knows which tip they have chosen randomly and will monitor if they do what the tip asks them. All tips or 'commandments' are quite normative. Examples are "do your best to be kind to others", "give compliments", "help each other when someone gets bullied", "don't bully", "don't exclude others", "make more friends", "listen to each other", "when the time is right tell jokes", etc.

Although it remains unclear whether the figure has agency or a rather passive role, it has other functions apart from reminding children where they can find tips for good behaviour. By ringing a bell, children know when they are supposed to be quiet, and sad children will become happy by looking at the figure's lovely appearance (lively colours, a big red heart on its chest, the word 'peace', etc.). The latter reflects a need for object-oriented contemplation and tools that are visually and emotionally appealing to children, whereas the former indicates the need for a 'soft authority' to complement children's self-regulatory practices. The team furthermore hints upon the importance of 'motivated' or 'directed' forgetting. The miniature house has a chimney on its roof with smoke coming out of it. This smoke symbolizes 'bad thoughts' children may have and need to let go if they do not want to become sic. Children can get rid of these thoughts through object-oriented contemplation (i.e., looking at the lovely figure), indicating a rather passive role for victims.

In sum, the co-design team focuses on remediating bad behaviour in a kind of naïve and idealistic way: perpetrators are supposed to take a tip but they do not have to. 'Freedom of choice' and 'self-regulation' are key values, but these need to be complemented with values as 'soft authority'. Finally, values as 'no-blame', 'directed forgetting' and 'object-oriented contemplation' are implicitly expressed as well in the team's artefacts and verbal explanation.

3.1.4 Team 4: Vivalalalas

From initial ideas to artefact

The co-design team 'Vivalalalas' translated the design challenge in two concrete problems: (1) not being kind to one another and (2) forming cliques and excluding others. To improve the class atmosphere, the team assumes everybody should be kind to one another and children should play together instead of forming cliques. Before the creation of the artefact, the team had various initial ideas to solve the problematic situations and improve the class atmosphere. The team started out with a clear overweight of positive, preventive ideas compared to negative, disciplinary and neutral ideas (9 versus 4 and 3).

From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the 1st problem, not being kind to one another, the team selected a positive, preventive idea as most promising: "organizing a party to bring children together". For the 2nd problem, forming cliques and excluding others, they chose a

positive, preventive idea as well: “playing a game together”. With these ideas in mind, the team invented a funny, goofy looking robot called ‘Sprietje’ (see figure 6). The robot has a backpack filled with tips for games that children can play together. The robot is also a DJ, holding a drum in one hand and a drumstick in the other. Furthermore, Sprietje eats all ‘bad ideas’ (e.g. a game for two) to prevent children from excluding one another. When a conflict nevertheless occurs he first listens and negotiates a solution and then counters the situation by telling a good joke. In the evolution from initial ideas to artefact, it was telling that the negative, disciplinary ideas completely disappeared in favour of positive, preventive ideas.



Figure 6: DJ robot Sprietje who has a backpack full of games and organizes class parties

From attributes to underlying themes and values

The co-design team associated several functionalities to their human-shaped robot Sprietje, such as ‘eating bad ideas’, ‘organizing a class party’, ‘tips for games to play together’, ‘listening and negotiating a solution’ and ‘telling a good joke’. Beyond these specific functionalities, the robot represents some kind of authority, influencing the children’s behaviour. Sprietje does not look sterile, but has some kind of personality that was implicitly described in the participants’ presentation (e.g. “he tells very good jokes”), and more explicitly visualized in the artefact itself. The robot looks somewhat rebellious (e.g. haircut, two sharp teeth, etc.), but also funny and friendly. As a DJ, he creates a fun atmosphere by making music with his drum, and he “eats all bad ideas” so children will not exclude one another. No punishing component was added, neither in the visual appearance of the robot, nor in the children’s presentation. Although Sprietje listens and negotiates a solution when something goes wrong, he targets the class team as a whole instead of focusing on perpetrators and victims alone.

Sprietje acts independently from the teacher as some kind of third person. It is a robot with agency and human-like characteristics (e.g. listening and negotiating a solution), not just a toy or a piece of technology that children can use whenever they feel the need to. Sprietje’s main goal is to create a fun atmosphere and make sure children play together. He therefore has a backpack full of tips for games. If children come up with a good idea themselves (i.e., games you can play with more than two people), Sprietje will collect the idea in his backpack. ‘Bad ideas’ (i.e., games you play alone or with two), on the other hand, are ‘eaten’ so children will not get the chance to execute the idea and thus to exclude others from playing with them. Remarkably, none of the games the children propose (e.g. flagpole, playing marbles, etc.) are in any way ‘digital’ or ‘educational’.

Another theme present in the children’s artefact and verbal explanation is ‘motivated’ or ‘directed’ forgetting. When a conflict occurs despite Sprietje’s efforts for prevention, he listens and negotiates a solution, but after a while he will tell a good joke to counter the situation and to make children forget what has been going on, enabling them to move forward without looking for someone to blame. These observations suggest that disciplinary punishment is not central to the children’s understanding of a tool to prevent and combat (cyber)bullying in a class context.

In sum, the co-design team expressed the need to focus on the class group as a whole in a ‘no-blame’ atmosphere. Positivity, fun and humour are the team’s key values. Prevention rather than intervention is their preferred strategy, but if conflicts nevertheless occur, ‘broad observation’ and ‘listening without judgement’ should be complemented with ‘distraction’ (cf. motivated or directed forgetting) to enable children to move on and play together. Although the robot, represents some kind of authority, it is by no means a disciplinary but rather a ‘soft authority’ acting as a neutral, third person.

3.1.5 Team 5: Appel

From initial ideas to artefact

The Appel team translated the design challenge in the following problems: (1) forming cliques and (2) bullying and bragging. To improve the class atmosphere, the team wanted children to play together instead of forming cliques and instead of bullying and bragging, they should brag about each other. Before the creation of the artefact, the team had various initial ideas to solve the problematic situations and improve the class atmosphere. The team started out with a clear overweight of positive, preventive ideas compared to negative, disciplinary and neutral ideas (7 versus 2 and 1). From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the 1st problem, forming cliques and thereby excluding others, the team selected a positive, preventive idea as most promising: “superhero Hulk plays with the children to avoid cliques being formed”. For the 2nd problem, bullying and bragging, they chose a positive, preventive idea as well: “talking a lot to each other”.

With these ideas in mind, the team invented funny looking robot with a red cape and a sweater with green dots (see figure 7). The robot does not look sterile, but has a friendly expression (e.g. a big smile) and human-like characteristics (e.g. a good listener). He listens very carefully to what children have to say and encourages them to communicate more with each other as to avoid problems. The robot furthermore gives tips for games that children can play together to avoid clique formation. In the evolution from initial ideas to artefact, the positive, preventive ideas were maintained but hardly developed throughout the making process. It seemed like the children had not thought profoundly about the details of their proposed solution.

From attributes to underlying themes and values

The team devoted a lot of attention to the robot’s visual appearance by adding a lot of decorative details, indicating that tools to enhance the class atmosphere should be visually and emotionally appealing. This attention for the robot’s look and feel apparently came at a cost since the initially chosen ideas were not developed profoundly and not much energy was put into adding different functionalities to the robot. In fact, without the children’s explanation it is almost impossible to detect the robot’s function. The robot has a big smile, referring to its friendly approach towards children, either in a preventive or curative context. The robot is a good listener and does not judge easily when children misbehave or conflicts occur.

This approach is in line with the idea of ‘broad observation’ that popped up a few times during the mapping sessions with experts and teachers. Broad observation means listening to all parties involved (e.g. bully, victim, parents and bystanders) in a conflict without preconceptions. The friendly-looking robot has agency and acts independently from the children and their teacher as a neutral third person. Although the robot clearly has an authoritarian function, it is by no means

disciplinary and always friendly. When problems between children arise, the robot will first listen (i.e., broad observation) and only afterwards enhance communication between children. Talking to each other may not only solve the conflict, it may prevent problems as well in the future. After improving communication between children involved in a conflict, the robot will tell a good joke to counter the situation. Instead of discussing the ins and outs of what happened in too much detail, children should move on and forget about the situation.



figure 8: a robot that can listen very well and knows a lot of games

This is inline with earlier discussed concepts of ‘directed forgetting’ and ‘no blame’. Directed forgetting is accomplished by means of ‘distraction’, that is, by telling a good joke which makes the children laugh. The resemblance with the no blame approach can be seen in the robot’s positive approach towards children and the fact that the robot does not aim at punishing perpetrators or

reinforcing victims. Instead, the robot's main goal is to create a positive class atmosphere to prevent problems in the first place. In addition to enhancing communication, the robot knows a lot of games that children can play together instead of forming cliques and excluding one another. The robot furthermore stimulates children to invent games themselves, but what kind of games the children had in mind is not clear since no examples were given. Again, most of the team's attention was devoted to the robot's visual appearance and not to the ideas that were chosen for further elaboration.

In sum, the co-design team expressed the need for more and better 'communication' between children both when problems occur and as a tool for prevention. When problems nevertheless occur, 'broad listening', 'no blame', and distraction through 'humour' are the team's key values. Furthermore, according to the team, tips for 'collaborative play' are key to avoid children from excluding one another. The team proposes a visually and emotionally appealing robot with human-like characteristics. As a 'soft authority' acting independently from the teacher, the robot aims at creating a positive class atmosphere that reconnects children.

3.1.6 Team 6: Breinbrekers

From initial ideas to artefact

The team called Breinbrekers translated the design challenge in the following problems: (1) excluding others and being selfish, and (2) yelling to each other and talking at the same time. To improve the class atmosphere, this team decided, children should be kind and play together, and they should listen more carefully to each other. Before the creation of the artefact, the team had various initial ideas to solve the problematic situations and improve the class atmosphere. The team started out with a slight overweight of positive, preventive ideas compared to negative, disciplinary ideas (10 versus 7).

From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the first problem, excluding others and being selfish, the team selected a positive, preventive idea as most promising: "inventing games". For the second problem, yelling and talking at the same time, they chose a rather negative, disciplinary idea: "a traffic light to monitor each child's behaviour". With these ideas in mind, the co-design team invented a severe looking robot with a big traffic light on its chest (see figure 8). The robot is filled with games such as puzzles, a drum and a race circuit for ants. The robot's head functions as a mailbox in which children can post a letter for their teacher to express how they feel. This letter may in turn initiate a conversation with their teacher. In the evolution from initial ideas to artefact, the balance between disciplinary and preventive ideas was initially maintained, but during the 'elaboration through making' phase the children devoted most of their attention to designing games and less to the actual robot.



Figure 8: a robot with a traffic light on its chest to monitor children's behaviour and different games

From attributes to underlying themes and values

The rather severe-looking robot that the team created had a clearly regulating, authoritative function that was visualized in a traffic light on the robot's body. Each child is represented on the traffic light with a card with his or her name on it. When a child misbehaves, it moves from green towards orange and, when it keeps on misbehaving it will end up in the red zone, which implies some kind of punishment. Children can also move beyond red in which case the child's parents will be informed about their son or daughter's unwanted behaviour. The robot, with the traffic light on its chest, should be placed centrally in the classroom so that each child can see how the others are doing. In contrast to this transparent and public monitoring, children can post a private letter to their teacher to express how they feel in the class group. The mailbox is positioned in the robot's head and is available at any time. At children's request, a conversation with their teacher may be initiated after posting a letter to talk about their feelings and, if necessary, to improve their situation. Although not explicitly mentioned by the children, the mailbox may be a useful tool for teachers to detect tensions between children at an early stage. During the mapping sessions, some teachers hinted upon tools that could help them to detect problems sooner. The mailbox functionality added to the robot may enable teachers to have a better look at what is going on beneath the surface of the class group.

Although the team's artefact targets the class group as a whole, a strict distinction is made between good and bad behaviour. Whereas bad behaviour results in moving towards the red zone on the traffic light, well-behaved children may play one of the games hidden in the robot such as puzzles, a drum and a race circuit for ants. Play is used as a strategy to prevent children from excluding one another and conduct selfish behaviour (first problem). The teacher decides who can play a game, where and for how long, but that usually means during breaks at the playground. Whereas the teacher clearly has an authoritative and disciplinary role, the robot does not have agency and is in fact nothing more than an empty box.

Although the authoritative, severe component was present in the visual appearance of the robot and mentioned in the children's presentation, the punishing aspect was not elaborated in the material artefact. The robot may look severe and cool, but only the nice-looking rewards (e.g. a puzzle with a sunset in bright colours) were highlighted in the material outcomes. This suggests that disciplinary punishment was not central to this team's understanding of tools to improve the class atmosphere.

In sum, we may conclude that the Breinbrekers team's central values are 'transparency' in monitoring children's behaviour and punishing bad-behaved children, enabling children to have a 'safe conversation' with their teacher about how they feel in the class team, fostering 'play' as a prevention and reward strategy and the teacher as a 'soft authority' since the team devoted most of their attention to developing games instead of punishments.

3.1.7 Team 7: ARCK

From initial ideas to artefact

The ARCK team translated the design challenge in two concrete problems: (1) children who are not cooperative and (2) children who are almost never happy. For the class atmosphere to improve, the team felt that children should cooperate and be happy. Before the creation of the artefact, they had various initial ideas to solve the problematic situations and improve the class atmosphere. The team started out with a clear overweight of positive, preventive ideas compared to negative, disciplinary and neutral ideas (9 versus 1 and 2). From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the first problem, children who are not being cooperative, the team selected a positive, preventive idea as most promising: "Alibaba (i.e., their made-up superhero) plays games with the children between classes". For the second problem, children who are almost never happy, they chose a positive, preventive idea as well: "Alibaba makes the children laugh".

With these ideas in mind, the team invented a human-like figure with a friendly appearance called Alibaba (see figure 9). The figure looks like a magician, wearing a hat and a bow. Alibaba

has wings, but the purpose of these wings remained unclear. Alibaba furthermore has a ‘magic box’ with all kinds of games and he makes the children laugh in the morning to set the right atmosphere for the rest of the day. In the evolution from initial ideas to artefact, both positive ideas were further developed: Alibaba has a friendly, magician-like appearance, wings were added and the function of ‘play’ was extended.



Figure 9: magician Alibaba who can fly and a magic game box

From attributes to underlying themes and values

The human-like figure Alibaba looks a bit funny because of his big smile and the hat and bow he is wearing. Alibaba has two main characteristics derived from the ideas chosen for further elaboration: he makes children laugh and he has a box full of games for children. For the co-design team who invented Alibaba, it was important that he makes children laugh in the morning to set

the right atmosphere for the rest of the day. Alibaba does so by conjuring something funny out of his hat. Besides humour, play is another key ingredient. Although conceived differently during ideation, throughout the making process 'play' has become some kind of universal antidote: learning through play was believed to not only improve cooperation between children, playing games during breaks was furthermore considered ideal for relaxation. According to the children, the 'magic game box' contains different games, either for entertainment or learning, but no actual games were developed during the 'elaboration through making' phase. This is somewhat surprising, since the importance of 'play' was stressed in the children's verbal explanation of the material artefact. One possible explanation is that a lot of attention was devoted to developing the magician Alibaba and the magic box. In the material elaboration the importance of 'play' (e.g. bow, hat, funny appearance, etc.) was somewhat suppressed by the 'humour' component, but in combination with the children's verbal explanations we may conclude that both are equally important.

Alibaba is an independent actor, it is an artefact with agency that acts as a neutral 3rd person in the class group. He does not mediate interactions or dynamics between children, but he focuses on the class group as a whole and if something goes wrong, he distracts the children involved in the problematic situation (e.g. yelling against each other or not listening) with humour. This implies that not too much attention should be given to the ins and outs of what happened. When children are not cooperative, he furthermore replaces boring lessons with learning games, so as to engage all children in the learning activity. According to the team ARCK, all these actions will improve the class atmosphere significantly.

In sum, the co-design team expressed the need for 'humour' and 'play' in the classroom. Humour should set the right atmosphere at the day and distracts children when tensions are rising. Play serves a double purpose as well: increasing 'engagement' and 'collaboration' in learning activities and 'relaxation' during breaks. Disciplinary punishment was not central to the children's understanding of how to improve the class atmosphere. To improve the class atmosphere, general 'prevention' measures should be taken by a 'soft', 'friendly' and 'humorous' authority.

3.1.8 Team 8: Donuts

From initial ideas to artefact

The Donuts team translated the design challenge in two specific problems: (1) children who are not kind to one another and (2) children who do not laugh often. For the class atmosphere to improve, this team thought children should be kind to one another and laugh all the time. Before the creation of the artefact, they had various initial ideas to solve the problematic situations and improve the class atmosphere. The team started out with a clear overweight of positive, preventive ideas compared to negative, disciplinary and neutral ideas (13 versus 0 and 1). From the pool of

ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the first problem, not being kind to one another, the team selected a positive, preventive idea as most promising: “climbing to the moon, taking love potion, going back down and giving children who are not kind some of the potion”. For the second problem, children who do not laugh often, they chose a positive, preventive idea as well: “making braids in superhero X-man’s beard”.

With these ideas in mind, the team invented a robot with a big, smiling face and wings (see figure 10). A lot of functional details were added during the ‘elaboration through making’ phase to enable the robot to find and suck up the love potion at the moon and give it to the children once returned. Remarkably, the idea of making braids in the superhero’s beard was not executed in the artefact. Apparently the team forgot about this idea while making the robot.



Figure 10: a robot that can fly to the moon to bring back magic love potion

From attributes to underlying themes and values

The robot's capability to fly to the moon and bring back love potion for unkind children was explained in much detail during the children's verbal explanation of the artefact. Their focus on the robot's functional qualities was also highlighted in the robot's visual appearance. Whereas the robot's head has only one goal and that is to make children laugh, the robot's body looks much more 'industrial' and serves another purpose: flying to the moon to find and suck up love potion and administering the potion to children who are not kind to one another. Functional details include a big arrow to indicate whether the robot is going up (i.e., flying to the moon) or going down, an X sign referring to superhero X-man, two shiny wings, an ingenious system to suck up and administer love potion attached to the robot's arms and a big, double exhaust throwing flames when the robot is flying. During their presentation, the team demonstrated how the robot works.

Before the making process, the team had the intention to give the robot a beard with braids to make it look funny, but they forgot to execute that idea. They, however, kept the idea of a robot making children laugh just by looking at it. Whereas the robot's body was provided with a lot of 'functional' details, the robot's head got a lot of 'decorative' details such as red ears, a funny haircut and a big smile. This suggests that tools to improve the class atmosphere should be visually and emotionally appealing. This interpretation of the material artefact was strengthened by the team's verbal explanation. The children explained that the robot does not have to do anything funny, it will make you laugh just by looking at it.

The robot, an artefact with agency, acts independently from the teacher and children. No clear distinction is made between victims and perpetrators. The focus is on the individual within the class team an individual child decides when he or she wants to look at the robot to make him or her laugh and the robot decides when a particular child needs love potion, but the robot does not mediate team dynamics or relations between children. Making children laugh through its funny appearance and administering love potion to those who are not kind, is above all a 'general prevention' strategy. However, in case of the love potion, this process is somewhat decontextualized since children do not seem to have an active role.

In sum, the Donuts team proposed tools (i.e., a robot) with 'agency' to improve the class atmosphere. 'General prevention' is their preferred strategy and no clear distinction is made between victims and perpetrators. The focus is on the 'individual' within the class group, but a child's role is rather 'passive' and 'decontextualized'. The robot acts as a 'soft authority' deciding who needs love potion and who does not, but without disciplinary motives. As a 'deus ex machina', the robot makes children kind to one another. The only active role for children is in deciding whether they want to look at the robot or not to make them laugh. The importance of the robot's 'funny appearance' was stressed in both artefact and verbal explanation.

3.1.9 Team 9: 5 musketers

From initial ideas to artefact

The team who called themselves ‘5 musketers’ translated the design challenge in two concrete problems: (1) children who exclude one another and (2) children who are laughing at others. For the class atmosphere to improve, the team believed that children should play together and show respect for one another. Before the creation of the artefact, they had various initial ideas to solve the problematic situations and improve the class atmosphere. The co-design team started out with a clear overweight of negative, disciplinary ideas compared to positive, preventive ideas (3 versus 1). From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the first problem, excluding one another, the team selected a negative, disciplinary idea as most promising: “superhero Spiderman will give them an electric shock so they become friends”. For the second problem, laughing at others, they chose a negative, disciplinary idea as well: “flying towards the children who are laughing at others and telling them to stop”.

With these ideas in mind, the co-design team invented a golden cannon with pointy sticks attached to its barrel (see figure 11). Depending on which problem the children are facing, they can use different bullets. Clear instructions on how to use the cannon are written on an instruction panel. In the evolution from initial ideas to artefact, the negative, disciplinary nature is still present in the artefact, but particular aspects of both ideas have been mixed into one solution. The team combined the idea of an electric shock that changes someone’s behaviour and the idea of victims taking a stance against their perpetrators.

From attributes to underlying themes and values

The aggressive look and feel of the cannon is striking. The barrel, the pointy sticks, the gun sight and the lack of decorative details all contribute to the perception that the artefact’s only purpose is to punish children who misbehave (i.e., those who exclude or laugh at others). What furthermore catches the eye is the amount of functional detail, both in the material artefact and the children’s verbal explanation. Clear instructions are written on one side of the cannon and the children invested a lot of time in demonstrating how the cannon actually works. When a child of another team noticed that the cannon does not look beautiful, the team instantly replied that it does not matter if their invention is beautiful as long as it solves the problems and improves the class atmosphere. Again, this highlights the cannon’s functional character: it has to work and that is all what matters.

Although the children’s artefact looks aggressive, punishment is not the goal. The cannon aims to empower victims by enabling them to take a stance against their bullies. Children who are being excluded or laughed at, can use the cannon to shoot down their perpetrators. Depending on the

problem they are facing, they choose an appropriate bullet and once the bullet hits its target, it will release an electric shock. This shock will change the unwanted behaviour for the better and, as if it were magic, victim and perpetrator will become friends. Despite the paradox of using violence to achieve peace, the ultimate goal for victim and perpetrator is to forget what happened and move on. Victim and perpetrator should not switch roles, because that would only lead to further escalation.



Figure 11: a canon with two kinds of electric bullets to be used by victims

In sum, the aggressive-looking canon aims to empower victims by enabling them to take a stance against their perpetrators. Bystanders and authorities have no say in this process. The goal is not to punish victims, but to reconnect victim and perpetrator. Empowerment, directed or motivated forgetting, no-blame and reconnection are the team's key values that were implicitly expressed in the material artefact and its verbal explanation.

3.1.10 Team 10: Ukis

From initial ideas to artefact

The Ukis team translated the design challenge in two problems: (1) children who brag and (2) children who fight and beat one another. Before the creation of the artefact, they had various initial ideas to solve the problematic situations and improve the class atmosphere. The team started

out with an overweight of neutral ideas compared to negative, disciplinary and positive, preventive ideas (7 versus 5 and 3; some of the negative ideas are borderline cases). From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the first problem, children who brag, the team selected a positive, preventive idea as most promising: “showing that bragging is not good”. For the second problem, children who fight and beat one another, they chose a positive, preventive idea as well: “saving someone”.

With these ideas in mind, the team invented a human-like figure: a wizard with the name Uki (see figure 12). Although Uki looks cheerful and a lot of effort was put in decorative details such as a pointed hat with a star, a magic wand and a green cape, the wizard has a supervisory and disciplinary role. During breaks, wizard Uki takes off and flies over the playground to watch children play. Those children who do not behave as expected (e.g. bragging and fighting) will be transformed into a frog. In the evolution from initial ideas to artefact, both positive, preventive ideas apparently disappeared in favour of a negative, disciplinary approach, but, as we will see, Uki’s goal is not to punish perpetrators but to empower victims in a playful way.

From attributes to underlying themes and values

This team’s artefact has a lot of human-like features (e.g. facial expression, arms, name, etc.). Each detail was appointed in the verbal explanation of the artefact, many of which had a clear purpose beyond decoration: the magic wand is used to transform bad children into frogs, the arrows indicate whether Uki is ready for take off and with the star on its pointy hat Uki observes children during breaks.

Wizard Uki has a supervisory role: nothing goes unnoticed because of the star on his head. This may indicate a need for more supervision on the playground. While observing the children, Uki makes a clear distinction between good and bad behaviour. Perpetrators are in the centre of his attention, whereas victims and bystanders seem to be neglected. Uki’s cheerful visual appearance somewhat contrasts with his authoritative and disciplinary role. However, at the end of their presentation, the team explained that Uki is not an actual wizard but a toy. Uki has no agency but aims to empower victims in a playful manner. Victims use the toy to initiate restorative practices with their perpetrators. Through a role-playing game in which the wizard transforms the perpetrator into a frog, the perpetrator comes to realize the effects of his or her behaviour on the victim’s feelings. The spell can only be broken if the perpetrator changes his or her behaviour for the better. Although the game is centred on ‘punishment’, the eventual goal is to reconnect victim and perpetrator. In this new light, the apparent paradox between Uki’s cheerful appearance and his disciplinary, authoritative role no longer holds true. Victims initiate a role-playing game with Uki to take a stance against their perpetrators in a playful and friendly way.

In sum, the team proposes an anthropomorphic figure, a wizard, with different functionalities to supervise and influence the children’s behaviour. The figure, being a toy, has no agency and is

especially useful for victims. Although the role-playing game seems to be centred on punishment, 'empowerment', 'fun' and 'restoration' are the team's key values. These values were implicitly expressed in the material artefact and the team's verbal explanation. Whether the artefact can actually lift off to observe children's behaviour or whether this function is part of the role-playing game initiated by victims, remains unclear. 'Supervision', however, seems to be another key value in the team's understanding of how to improve the class atmosphere and strengthen social cohesion.



Figure 12: a wizard that victims can use to initiate a role-playing game with perpetrators

3.1.11 Team 11: Elcogavi

From initial ideas to artefact

The Elcogavi team translated the design challenge in two concrete problems: (1) fighting and (2) children who are being bullied. Before the creation of the artefact, they had various initial ideas to solve the problematic situations and improve the class atmosphere. The co-design team started out with a slight overweight of positive, preventive ideas compared to negative, disciplinary and neutral ones (3 versus 2 and 1). From the pool of ideas they had come up with during brainstorming, the team members collaboratively selected two ideas for further elaboration. For the first problem, children who fight, the team selected a positive, preventive idea as most promising: “enabling children to fly away from the fighter”. For the 2nd problem, children who are being bullied, they chose a negative, disciplinary idea: “superhero Spiderman climbs up the school walls and when someone is being bullied, he tells the bullies that he will catch them in a spider web”. With these ideas in mind, the team invented a collection of four objects with different purposes (see figure 13): a cannon to shoot down perpetrators, a mill indicating when children should be quiet and pay attention, a cup with rolled-up flags with normative messages and a diorama to reward those who do not bully or fight. In the evolution from initial ideas to artefact, it was telling that the initially chosen ideas were not used in the material elaboration although the balance between negative, disciplinary and positive, preventive ideas was maintained. Three artefacts have a disciplinary function (the cannon, the mill and the cup with normative messages), and two are used to reward children who do not bully or fight (the diorama and the cup with normative messages).

From attributes to underlying themes and values

There seemed to be no substantive connection between the cannon, the cup with normative messages, the silence mill and the diorama. The team had not thought profoundly about how to integrate the artefacts and an overall design vision was clearly missing, both in the material elaboration and the verbal explanation. The collaboration within this team had been problematic from the very beginning (e.g. team members imposing their ideas, not sharing materials, etc.) and after a while the team decided to make different objects so as to please each team member. During the presentation, each team member presented the object he or she had created. Despite the difficulties in the collaboration process, the objects reveal how they believe the class atmosphere should be improved.

Two out of four objects have a rather functional character (i.e., the cannon and the silence mill) whereas the other two have much more decorative details (i.e., the diorama and the cup with normative messages). The cup with flags is decorated with smiley’s and the flags are rolled up carefully and fastened with strings. When a child picks a rolled-up flag, he has to remove the string and unwind the flag to read the message. Depending on whether the child is to be

rewarded for good or corrected for bad behaviour, he or she has to choose a flag at the corresponding side of the cup. All flags contain normative messages praising good or rebuking bad behaviour. Examples are: “Have you been bad? Do your best!” and “Well done, you rock!”. Remarkably, the desired behaviour is not mentioned on any of these flags.

This distinction between ‘good’ and ‘bad’ behaviour is also represented in the diorama. Only ‘good’ children, those who do not fight or bully, are allowed to look into the box. In the box they can see a carefully constructed scene with, among other things, a girl with long blond hair. A lot of effort was put into making the scene look visually and emotionally appealing. The diorama is a temporary reward system that can be used by one child at a time.

Whereas the diorama is used as a reward system, the cannon is used to punish children who fight or bully. The cannon is a deterrent, a treat for those who misbehave or intent to do so and thus not only a means for intervention but in a way also for prevention. The cannon’s aggressive look and feel was expressed verbally as well: when the bullet hits a child in the face, he or she will have learned his or her lesson. It is however unclear who fires the cannon when someone misbehaves (e.g. the teacher or the victim). Only one object targets the class team as a whole: the silence mill. The mill, placed centrally in the classroom, has a signalling function and shows children when to be quiet and pay attention. We assume the teacher is in control of the mill as a ‘soft’ authority.



Figure 13: four objects each with a different purpose

In sum, the co-design team proposes four objects, each with a different purpose. Three out of four objects make a clear distinction between bad and good behaviour but neglect victims, and one object targets the class group as a whole. Whereas rewarding objects have more decorative details and are visually more appealing, the punishing objects are rather functional and less decorated. The team's understanding of how to improve the class atmosphere is atypical compared to the other teams: punishment bad and rewarding good behaviour is central to their understanding of how to improve the class atmosphere. However, due to a lack of integration between the different objects, we cannot deduce values that apply to the whole group.

3.2 Results across co-design teams

In this section, we will compare the results across co-design teams to come to a better, more coherent understanding of children's view on how to improve the class atmosphere to prevent (cyber)bullying. First we will have a closer look at the role of the artefacts (i.e., whether or not they have agency), teachers (i.e., whether or not they have supervisory and regulatory role) and victims (i.e., whether or not they are empowered in some way) in children's solutions. Afterwards we will analyse the results across teams at a more abstract level by focusing on the underlying discourse and values of each team (e.g. disciplinary approach, focused on general prevention, a multi-layered approach, etc.). Finally, we will link the results of the co-design sessions with children back to the roadmap based on insights from experts and teachers.

3.2.1 Soft authority and victim empowerment

Anthropomorphism

The artefacts created by 11 co-design groups of 4 to 5 children aged 9 to 10 can be divided in two main categories. The first category consists of anthropomorphic figures, and the second category is made out of tools that children can use in and around the classroom. Within the first category, groups 3, 7 and 10 created artefacts with human-shaped figures, and groups 4, 5, 6 and 8 all created 'robots'.

These co-design groups associated all kinds of functionality to their figures, ranging from ringing a bell when things threaten to go wrong (group 3), to a DJ robot for a class party (group 4). Beyond these specific functionalities, these anthropomorphic figures all represented some type of authority, influencing the children's behaviour. Generally, the robots did not look sterile, but had some kind of personality that was implicitly described in the participants' presentations (e.g. "he tells very good jokes"), and more explicitly visualized in the artefacts. While all robots had some kind of regulatory function, most robots looked funny or friendly in some way. For instance, group 3 made a kind-looking figure with a big red heart. The DJ robot made by group 4 creates a

fun atmosphere, and will “eat all bad ideas”, the magician ‘Alibaba’ created by group 7 wears a funny hat and bow and “makes children laugh in the morning”, whereas group 8 made a robot that will make you happy just by looking at it.

Only group 6 created a rather severe-looking robot, with a clearly regulating, authoritative function, visualized in a traffic light on his body. However, while the severe component was present in the visual appearance of the robot and mentioned in the children’s presentation, it was not present in the further material elaboration. Whereas the robot did contain games to reward well-behaved children, the punishing aspect was not elaborated: the artefact only highlighted the rewards.

This observation suggests that, for groups within this category of anthropomorphic figures, disciplinary punishment was not central to the children’s understanding of a tool to improve the class atmosphere as a means to combat (cyber)bullying. While many artefacts took the shape of an authoritative figure, the translation from the textual to the tangible mode (i.e., transduction) added an important nuance. The objects showed that the authority is always friendly, focused on rewarding rather than on punishment.

Agency and teacher roles

Within the category of anthropomorphic figures, two further categories can be distinguished: artefacts with agency or the ability to act independently in the world (groups 3, 4, 5, 7 and 8) and artefacts without agency (groups 6 and 10) (see figure 14: dimension A). For instance, the lovely-looking figure of group 3 reminds children to look into the miniature house for a tip for good behaviour, the DJ robot made by group 4 initiates a class party when he believes the time is right, the robot with green dots and a red cape (group 5) enhances communication between children when he feels the need to, the human-like figure ‘Alibaba’ (group 7) conjures something out of his hat to create an informal atmosphere and the robot created by group 8 decides independently from the teacher who needs magic love potion.

Only two anthropomorphic figures did not have agency: the severe-looking robot (group 6) and wizard ‘Uki’ (group 10). The teacher operates the robot, including monitoring children’s behaviour with the traffic light, reading letters posted in the robot’s mailbox, deciding on punishments for children who end up in the red zone and regulating the use of the games. Wizard ‘Uki’, a human-like figure made by group 10, is a toy used by victims to initiate a role-playing game with perpetrators. The goal of the role-playing game is for victims and perpetrators to become friends, but the artefact is just a tool towards that goal and cannot act independently.

Although the majority of groups made anthropomorphic figures, another category consists of tools and objects without anthropomorphic characteristics. This category includes a box full of rewards (group 1), a hypnosis machine (group 2), a cannon with electric bullets (group 9) and a collection of 4 objects with either a signalling, disciplinary or rewarding function (group 11). Whereas most of the robots and human-shaped figures regulate children’s behaviour

autonomously, none of the tools have agency. In most cases, the teacher regulates the use of these artefacts (see figure 14: dimension B). Either the teacher decides on the duration of use (e.g. rewards group 1), keeps an eye on things when victims take a stance against their perpetrators (e.g. hypnotize machine group 2) or operates the tool (e.g. silence mill group 11). Only group 9 invented an aggressive looking cannon that children can use without permission or interference from their teacher.

To conclude, artefacts with agency act as some kind of neutral, third person making the teacher obsolete when it comes to improving the class atmosphere. However, a more explicit role is reserved for teachers to regulate the use of artefacts without agency, both for prevention and intervention purposes.

Victim empowerment

The goal of half of the artefacts without agency (3 out of 6 groups), including two anthropomorphic figures that cannot act autonomously, is to empower victims in one way or another. This is in contrast to the artefacts with agency, where only one object out of five aims to empower victims (group 3) (see figure 14: dimension C). Empowerment of victims is conceived in different ways. For instance, group 2 developed a machine that victims can use to hypnotize their bullies so as to change their hostile behaviour, group 9 made a cannon with electric bullets that victims can use to shoot down perpetrators so they 'magically' become friends, and group 10 made a human-like figure, a wizard called 'Uki', that victims can use to initiate a role-playing game with their bullies. In the category of artefacts with agency, only group 3 made an artefact that empowers victim. When victims ask to, perpetrators have to take a normative tip out of a miniature house and change their behaviour accordingly.

One third of the co-design groups (4 out of 11) designed artefacts that victims can use to take a stance against their perpetrators. Except for one group, they all maintained a supervisory role for teachers. Teachers "watch from a distance" and intervene when things do not work out as expected (e.g. a perpetrator not wanting to be hypnotized by his or her victim). For those co-design groups aimed at empowering victims, not the tools are granted with agency, but the agency shifts towards the victim and, to a lesser extent, the teacher.

In conclusion, artefacts with agency are either robots or human-shaped figures, but not the other way around. These artefacts act autonomously as some kind of neutral, third person without teacher regulation or interference from children. For co-design groups whose artefacts can be placed in this category, empowering victims has a rather subordinate role in their understanding of how to improve the class atmosphere to prevent and combat (cyber)bullying. However, disciplinary punishment is not central to the groups' understanding of how to improve the class atmosphere. The authority embodied in the anthropomorphic figures is always friendly, focused on rewarding rather than on punishment.

Artefacts without agency or the ability to act autonomously are either tools (e.g. hypnosis machine, silence mill, cannon, etc.), objects (e.g. tangible rewards, normative messages written on small flags, etc.) or, although a minority, anthropomorphic figures. These artefacts usually reserve a more prominent role for teachers, either to regulate use or to operate the tools. Moreover, for co-design groups that made an artefact that can be placed within this category, empowering victims is much more common. Empowerment is achieved by enabling victims to take a stance against their perpetrators and remediate the hostile behaviour themselves. In most cases, the teacher has a supervisory and supportive role, meaning that co-design groups within this category hint upon a mix of top-down and bottom-up regulation.

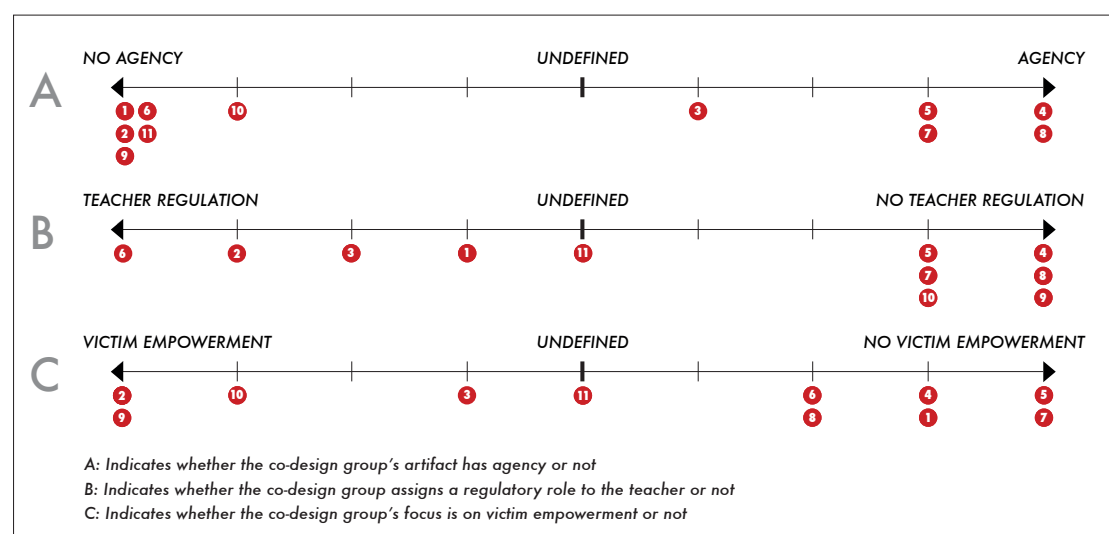


Figure 14: level of agency, teacher regulation and victim empowerment of each artefact

3.2.2 Towards a multi-layered approach

Whereas the previous section focused on the role of the artefact, teacher and victim in each co-design team's solution to improve the class atmosphere, here we will analyse the results across groups on a more abstract level. We will have a closer look at the underlying discourse of each team and whether their focus is on prevention, intervention or both.

Prevention opposed to intervention

Although the children were asked to invent objects that would improve the classroom atmosphere as a means to prevent (cyber)bullying, the majority of groups (8 out of 11) also looked into how to intervene when something nevertheless goes wrong (see figure 15: dimension D). The remaining three co-design groups focused exclusively on intervention (groups 2 and 9) or prevention (group 8).

Within the category of co-design groups that focused on intervention, group 2 made a hypnosis machine to empower victims to take a stance against their bullies, whereas group 9 created a

cannon with electric bullets that victims can use to alter their perpetrator's behaviour. Both groups proposed an instant solution to the problem, without devoting time to the ins and outs of what exactly occurred between victim and perpetrator. Instead, the tools make children forget about the problematic situation (cf. directed forgetting) so they can take a fresh start and move on as friends. The solutions are in a sense 'magical', because both artefacts resolve bullying behaviour as a 'deus ex machina' without fostering dialogue and mutual understanding between victim and perpetrator (see figure 15: dimension F). Moreover, bystanders or the class group have no role to play in the intervention process.

The co-design group that focused exclusively on prevention (group 8) invented a robot that feeds unkind children with a magic love potion. Moreover, the robot makes sad children just by looking at its funny face. The robot's functionalities serve one main purpose: preventing conflicts that may damage the class atmosphere. Although the robot targets the whole class group, the process is somewhat decontextualized because no information was given on how the robot detects unkind behaviour that may result in conflicts.

General prevention and individual intervention

The majority of groups (8 out of 11) proposed artefacts that combine functionalities for prevention and intervention purposes. These artefacts have functionalities to, for example, create a fun class atmosphere to prevent bullying, combined with functionalities to intervene when something nevertheless goes wrong. However, not every artefact within this category has an equal focus on both prevention and intervention. When placing the groups on a continuum from prevention to intervention, we can distinguish two further categories (see figure 15: dimension D): artefacts leaning more closely towards intervention (groups 3, 10 and 11) and another group being closer to prevention (groups 1, 4, 5, 6 and 7).

The first category includes a lovely-looking figure with a signalling and remediating function (group 3), a wizard called 'Uki' that can be used for restorative practices and to supervise children during breaks, and a collection of four objects of which one has a signalling function and the remaining three focus either on rewarding good or punishing bad behaviour (group 11). Whereas the latter co-design group proposed a reward and punishment system, the artefacts designed by groups 3 and 10 facilitate restorative practices. For instance, victims can ask perpetrators to choose a card with a tip to change their behaviour towards the victim (group 3) and by means of a role-playing game perpetrators come to see the effects of their bullying behaviour (group 10). Both artefacts are focused on the individual (i.e., victims and perpetrators), complemented with secondary functionalities targeting the whole class group (see figure 15: dimension E) such as ringing a bell when children need to pay attention (group 3) and flying above the playground to supervise children (group 10). Finally, within this category leaning towards intervention, two artefacts contain normative messages for children, either written on cards (group 3) or on small flags (group 11).

The second category contains artefacts that combine functionalities for prevention and intervention but lean towards prevention. This category can be further divided in two sub-categories. The first subcategory includes punishing and reward systems, but with a heavy focus on rewarding good behaviour to prevent children from becoming bullies (groups 1 and 6). The second subcategory includes robots or human-shaped figures with agency oriented towards the whole group to create a fun and collaborative class atmosphere either through play and/or humour (groups 4, 5 and 7). Rather than facilitating a long process of restorative practices, the robots listen to what both victim and perpetrator have to say and then attempt to defuse the situation.

'Sprietje', a DJ robot (group 4) listens to all parties involved when something goes wrong, but only for a short amount of time. After a while, the robot tells something funny to make it easier for both victim and perpetrator to put the situation into perspective and move on. The robot's main goal, however, is to create and maintain a fun class atmosphere rather than intervening when things go wrong. Another robot with a red cape and green dots (group 5) is a very good listener who attempts to enhance communication between children, either to prevent or to solve problems in the class group. Just as the previous robot, he will tell a good joke instead of facilitating a "never-ending discussion" about the ins and outs of what exactly occurred between victim and perpetrator. Group 7 designed a magician, 'Alibaba', who sets the right atmosphere at the start of the day and who does something funny when things tend to go wrong. The anthropomorphic figure Alibaba does not even listen to those involved in an incipient conflict, but immediately attempts to defuse the situation. For all three artefacts within this subcategory, humour and play are key ingredients.

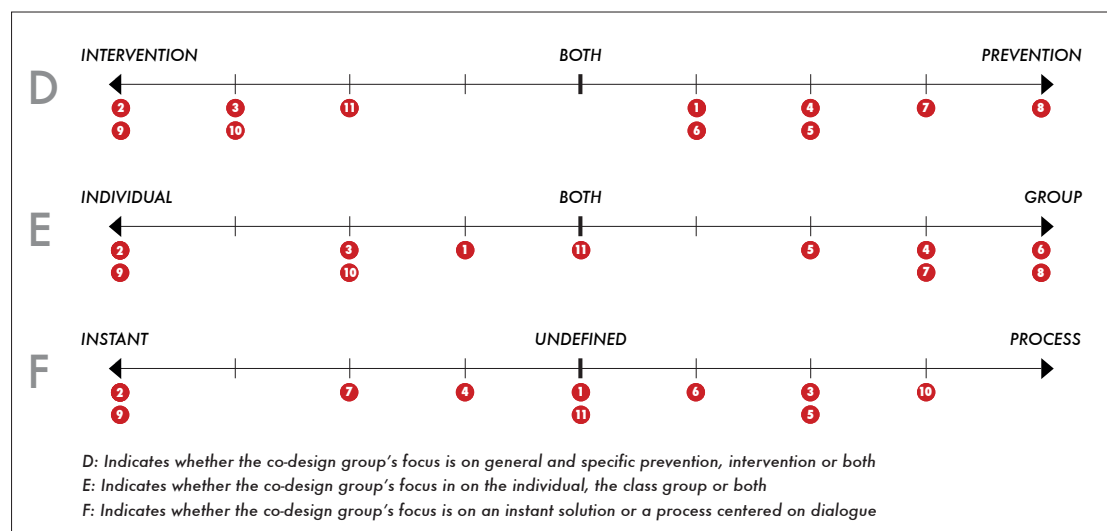


Figure 15: the underlying discourse and orientation of each artefact

In sum, most artefacts designed by the children have functionalities to prevent and solve problems within the class group, meaning that for children this age 'intervention' and 'prevention' are intertwined and are not seen in isolation. Moreover, most of the co-design groups proposed a multi-layered approach targeting the individual and group level. The role of bystanders during intervention is however limited in children's understanding of how to improve the class atmosphere.

A remarkable finding is that only a small amount of the co-design groups proposed restorative practices that facilitate dialogue between children. Whereas a 'safe conversation' with a teacher or an artefact embodying a soft authority is central to most groups' understanding of how to intervene when something goes wrong, 'distraction' through humour or play and 'directed forgetting' are preferred strategies for mediation. Instead of facilitating dialogue between victim and perpetrator to arrive at a common understanding, most co-design groups proposed a 'quick solution' without spending too much attention to the ins and outs of what happened (see figure 15: dimension F). Most groups concentrated on resolving tensions through strategies that avoid punishment (e.g. through humour or play). For those groups who developed a punishment and reward system to improve the class atmosphere, the punishment aspect was understated and the focus was on rewarding.

3.2.3 Revisiting the prevention pyramid

In the next paragraphs, we will link the results of the co-design sessions with 9- to 10-year-olds back to the roadmap. We will first summarize the key points expressed by the group of experts and teachers regarding a bottom-up oriented approach towards (cyber)bullying and afterwards we will look for similarities and differences with children's perspective.

Experts and teachers' perspective

The group of teachers and experts repeatedly stressed the importance of a strong and safe class group to implement a bottom-up oriented approach towards (cyber)bullying. In their opinion, making children more self-regulatory should be a general prevention strategy. This level of the prevention pyramid includes all kinds of activities to enhance children's 'emotional literacy' that may result in pro-social behaviour towards others, both off- and online. These activities include, among others, training children's social skills, improving their resilience and increasing feelings of empathy. Moreover, a multi-layered approach was recommended targeting the different levels of the prevention pyramid, ranging from the social school climate to intervention on both the group and individual level. Such a multi-layered approach should be embedded in a whole-school policy in which values such as 'no-blame', 'positive reinforcement', 'mutual trust' and 'victim empowerment' are key.

When it comes to remediating acute problems, the group of experts and teachers recommended 'broad observation' and 'safe conversation' with all parties involved. Importantly, teachers and school staff should not impose a solution, but should give perpetrators the opportunity to come up with solutions themselves. Furthermore, perpetrators should come to so the severity of the situation and the effects of their actions on the victim's feelings. Not too much attention should be spent to the ins and outs of what happened between victim and perpetrator. This is in line with the 'no blame' approach mentioned earlier.

In most cases, it is not sufficient to only focus on the 'individual level' (i.e., on victims and perpetrators), because bystanders usually have an important role in the maintenance of the bullying or hostile behaviour. Involvement of the group may thus be necessary to reorient group dynamics and to establish more profound and enduring change. Such restorative practices may eventually lead to a strong and safe class group. Once arrived at that point, teachers can introduce practices to further increase children's self-regulation in combatting (cyber)bullying and maintaining a positive class atmosphere. Such general prevention measures are of uttermost importance, since the lower levels of the prevention pyramid contribute to quality of the top levels (i.e., specific prevention and intervention). Increasing children's self-regulation is thus an iterative process of going back and forth between the different levels of the prevention pyramid.

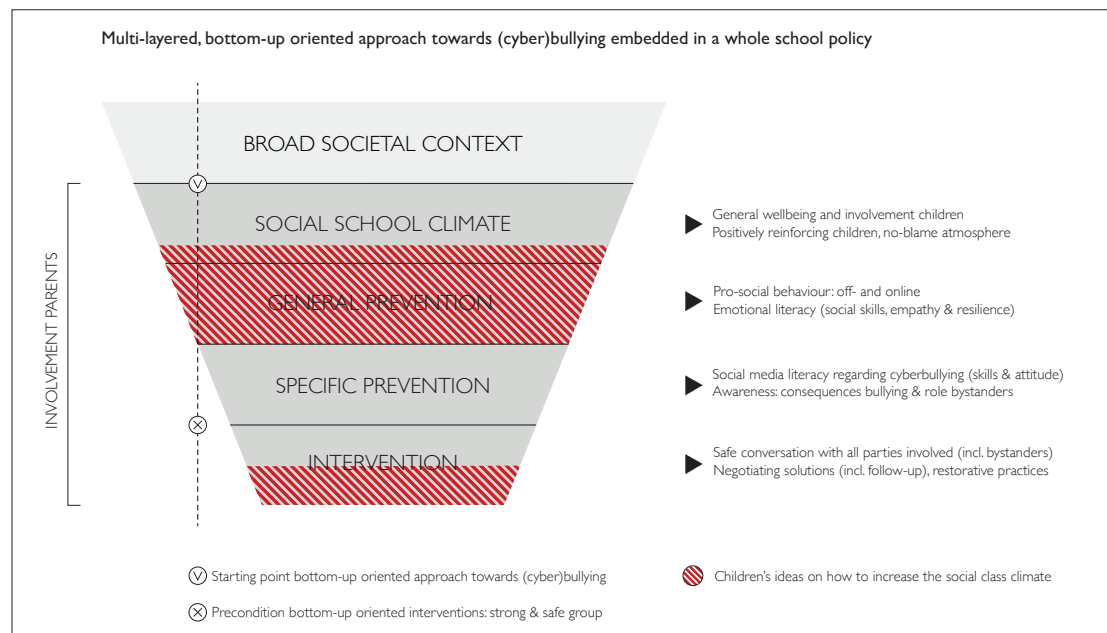


Figure 16: levels of the prevention pyramid covered by children during the co-design sessions

General prevention and individual intervention

Most of the co-design groups combined prevention and intervention into one multi-layered approach. Apparently, children that age do not easily distinguish between the different levels of the prevention pyramid and rather see them as one continuum. The recommendation from experts and teachers that 'general prevention' should be the starting point to increase children's self-regulation in combatting (cyber)bullying was reflected in the co-design outcomes of the majority of groups. A great amount of ideas and values deduced from children's material artefacts and verbal explanations could be categorized under general prevention (see figure 16). Examples include among others, creating a positive class atmosphere, combatting boredom and monitoring children's behaviour and feelings. Regarding general prevention, experts and teachers discussed similar topics during the mapping sessions.

The next level, specific prevention, was however underrepresented. Whereas two groups had tips for 'good' behaviour, these tips were not specific and therefore should be placed under general rather than specific prevention. One group aimed to improve communication between children, but apart from that group, children did not hint at skill acquisition (e.g. social skills) or raising awareness (e.g. about the role of bystanders in bullying).

This observation suggests that although most co-design groups proposed a multi-layered approach, they focus on general prevention combined with measures for individual intervention (i.e., focused on victims and perpetrators) (see figure 16). Although bullying is usually a group process, the teams neglected the role of bystanders in their solutions. Moreover, whereas the group of experts and teachers stressed that a multi-layered approach should be embedded in a 'whole school policy', the children did not take the broader school context into account.

Children also had also different ideas on how to reconnect victim and perpetrator. Whereas experts and teachers proposed a social process centred on dialogue, children favoured a quick and easy solution. After a short conversation with the teacher or another authority (e.g. anthropomorphic figures with agency), they prefer to diffuse the situation with humour or play. Another strategy was to make victim and perpetrator forget about the situation (cf. directed forgetting) so they can take a fresh start and move on. In general, however, their aim was not to enhance communication and facilitate dialogue between victim and perpetrator, indicating a rather passive approach.

No-blame discourse

Roughly speaking, the co-design groups could be divided in two groups: those who made an artefact with agency and those who made tools or objects without agency. Groups who developed an artefact with agency did not foresee an active role for teachers. Instead, the artefacts embodied some kind of authority influencing the children's behaviour. Although most of the artefacts with agency combined prevention and intervention into one multi-layered approach, their focus was on creating a positive atmosphere and prevention rather than on problem solving. In contrast,

most co-design groups who developed tools and objects without agency preserved a regulatory role for teachers. In addition, these groups had more suggestions for victim empowerment and often made a clear distinction between 'good' and 'bad' behaviour.

At first sight, the artefacts in both categories do not seem to fit within the 'no-blame' approach suggested by experts and teachers. According to this approach, it is important not to single out the bad children and punish them, but to take a constructive attitude by defusing tensions and reconnect victim and perpetrator. When having a closer look at the values that were implicitly expressed in the artefacts and their verbal explanations, children's viewpoints are however not that different. In general, both the artefacts with and without agency pointed towards an emphasis on values of soft authority and positivity in various ways. The artefacts with agency had a friendly type of authority, rather than a strict punishing one. Even the tools or objects centred on good and bad behaviour had a heavy focus on rewarding good behaviour, understating the punishment aspect. These emerging values of 'soft' authority, 'positivity' and 'top-down' combined with 'bottom-up' regulation fit nicely within a 'no-blame' discourse.

4. Conclusions

4.1 Inclusion on a micro-level

Within the inclusion work package of the EMSOC project, our focus has been on ‘child empowerment’ in the context of bullying. Our aim was to explore how we could increase self-regulation among 9- to 10-year-olds in combatting both traditional forms of bullying and cyberbullying. By empowering the class as a ‘social group’ our aim was to revert exclusion due to bullying and to increase children’s inclusion on this ‘micro-level’. The teacher would thereby take a facilitating and guiding role in line with Dupont’s notion of ‘guided-bottom-up’ (Dupont et al, 2012). Our choice for 9- to 10-year-olds was motivated by the fact that children this age are not yet frequent users of social media, offering interesting possibilities for prevention (Livingstone, 2011). Children may use their newly gained skills in self-regulation and pro-social behaviour in the online world as well once they start using social network sites more regularly.

As a first step, together with experts and teachers, we identified a set of preconditions to increase children’s self-regulation in combatting bullying and we collected suggestions for how these preconditions can be created (Van Mechelen et al, 2013). This explorative research with experts and teachers resulted in a roadmap for guidance throughout the project. Since the preconditions were based on the opinions of adults only, we actively involved children in the next phase of our research and explored how children would approach this challenge and increase their self-regulation. To actively involve experts, teachers and children in this research, we used generative techniques such as ‘mapping’ and ‘co-design’ that fit within the broader ‘participatory design’ approach at the core of this project.

4.2 Social class climate

In this deliverable, we first briefly discussed traditional and cyberbullying and the preconditions that were identified by teachers and experts. Afterwards, we described how we involved 9- to 10-year-olds in two Flemish schools in Belgium and we discussed the results of the co-design sessions. Finally, we compared the results of the group of experts and teachers with children to look for similarities and differences in their viewpoints on how to increase children’s self-regulation in the context of bullying. This comparison was somewhat complicated because our initial research question had shifted due to the preconditions identified by the group of experts and teachers. Our initial focus was on how primary school teachers could facilitate children to become more self-regulatory as a class group to cope with (cyber)bullying. One of the key findings of the mapping sessions with experts and teachers was that to increase children’s self-regulation you need a ‘strong’ and ‘safe’ class group as a starting point. A bottom-up oriented approach to cope with (cyber)bullying should thus be seen as a ‘general prevention’ strategy rather than as a way to intervene when something goes wrong. Based on these insights our initial research

question shifted to: “How can primary school teachers engage children in pro-social behaviour off- and online to strengthen social cohesion as to prevent (cyber)bullying?”.

In the co-design sessions with children, we translated this research question into a ‘design challenge’ that was easier to understand for children and in line with their life world. We asked children how they would want to improve the class atmosphere and what tools they would design for that purpose. The starting point was a fictitious and bottom-up generated story about a class with a bad atmosphere. Each co-design team derived two specific problems from that story and developed a solution that would improve the class atmosphere. Although we deliberately chose not to mention ‘bullying’ because general prevention has a broader focus, most groups proposed a multi-layered approach combining prevention and intervention measures to improve the ‘social class climate’.

4.3 Recommendations and future work

To conclude this deliverable, we present a set of recommendations that should be taken into account when designing ‘tools’ to increase children’s self-regulation in the prevention of bullying. These recommendations are based on children’s ideas, values and concerns as expressed in the co-design artefacts and their verbal explanations. Together with the roadmap based on insights from experts and teachers, these recommendations provide school staff and designers with a well-grounded starting point. Also, this work forms the starting point for future research, aiming at more specific design requirements and concepts. As a follow-up of the EMSOC project, we aim to form research consortia with industry partners to develop a set of digital, tangible tools to foster children’s self-regulation in the prevention of bullying. In line with the participatory design approach at the core of this project, children, experts and teachers will remain key stakeholders, and contribute actively to the design of the toolkit.

The high-level recommendations are: “fostering cooperative play”, “providing positive distraction”, “supporting victim empowerment”, “combining top-down with bottom-up regulation”, “facilitating positive reinforcement”, “increasing supervision”, “focusing on the role of bystanders” and “supporting emotional literacy”. In the following paragraphs, each of these recommendations will be explained in more detail.

4.3.1 Fostering cooperative play

Tools to increase children’s self-regulation should foster ‘play’ in different ways. For prevention objectives, fostering play is an ideal way to combat boredom, whereas providing children with ‘cooperative games’ during breaks may build social cohesion and prevent children from excluding one another. Play can furthermore be useful to keep children involved during lessons, which may positively impact the class atmosphere as well. As a tool for intervention, role-playing games

may be useful to initiate restorative practices and to make perpetrators understand the consequences of their bullying or hostile behaviour on the victim's feelings.

4.3.2 Providing positive distraction

Somewhat related to play is the importance of humour to provide positive distraction for children. Tools to increase self-regulation should enable children to set the right, informal atmosphere from the start of the day onwards. Humour should furthermore be used to diffuse tensions and emerging conflicts between children so as to prevent further escalation. Children conceptualized the use of humour and positive distraction in different ways. Examples include a neutral, third person telling good jokes or doing something funny, some kind of DJ robot organizing a class party, and all kinds of objects available in the class room that make children laugh just by looking at it.

4.3.3 Supporting victim empowerment

Empowering victims is central in children's understanding of how to improve the class atmosphere. Victims should be empowered to take a stance against their perpetrators so they can take a fresh start and move on as friends. Whereas the group of experts and teachers suggested a process of restorative practices centred on dialogue and 'safe conversation', the children proposed 'instant' and often 'magical' solutions to reconnect victims and perpetrators (e.g. a hypnosis machine and a cannon with electric bullets). Tools to increase children's self-regulation in the context of bullying should pay special attention to empowering victims without spending too much time to the ins and outs of what happened between victim and perpetrator.

4.3.4 Combining top-down with bottom-up regulation

Tools to increase self-regulation should include a facilitating role for the teacher. Children expressed the need for 'bottom-up' actions, but with 'top-down' support and regulation. Enabling children to initiate positive actions may lead to a sense of responsibility and increased commitment towards the group, positively influencing the class atmosphere. The teacher should supervise these bottom-up initiatives and intervene when one child's freedom becomes another child's lack thereof. Thus, teachers need 'tools' as well to set boundaries within which children can move freely.

4.3.5 Facilitating positive reinforcement

Another key aspect in children's understanding of how to improve the class atmosphere is to positively reinforce good behaviour. Although some teams developed a reward and punishment system, their focus was on rewarding good rather than on punishing bad behaviour. This value

of 'positive reinforcement' fits within the 'no-blame' approach suggested by experts and teachers. According to this approach, it is important not to single out the bad children and punish them, but to take a constructive attitude by defusing tensions and reconnect victim and perpetrator. Tools to increase children's self-regulation should therefore actively encourage and stimulate pro-social behaviour among children.

4.3.6 Increasing supervision

Children proposed different ideas to increase 'supervision' both in and outside the classroom. Examples include a public monitoring system for children's behaviour, a wizard flying above the playground and some kind of robot eating children's 'bad ideas' so they would not exclude one another when playing games. Importantly, the focus of these ideas was not on intervention but on prevention because the objective was to diffuse tensions and to avoid further escalation. Tools to increase children's self-regulation should thus enable the class (and the teacher) to detect problems sooner and to reorient the negative group dynamics adequately.

4.3.7 Focusing on the role of bystanders

In children's understanding of how to intervene when a conflict occurs between two or more children, bystanders or the class group have no significant role to play. Only when the objective is to create a positive class climate (i.e., general prevention) the whole class group comes into play. This somewhat contrasts with the opinions of experts and teachers that bystanders are key figures in solving bullying behaviour. Tools to increase children's self-regulation should therefore raise awareness about the role of bystanders and what they can do to support victims. Moreover, these tools should support the class to intervene as a group when conflicts occur.

4.3.8 Supporting emotional literacy

The ideas for 'intervention' proposed by children usually require only 'passive action' on the part of the victim. For instance, a victim electrifies his or her perpetrator with a special cannon and, as a result, they 'magically' become friends. Such 'instant solutions' contrast with the 'restorative practices' suggested by the group of experts and teachers. They agree, however, on not spending too much time on the 'ins and outs' of what happened between victim and perpetrator. In sum, the tools should support children to become 'emotionally literate' (e.g. having adequate social skills and feelings of empathy towards others) needed to initiate restorative practices to reconnect victim and perpetrator.

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7. Dutch summary

Door de steile opgang van sociale en mobiele media is cyberpesten uitgegroeid tot een wijdverspreid fenomeen. Cyberpesten bracht niet alleen een verbreding, maar ook een verdieping of intensivering van de pestproblematiek met zich mee: meer kinderen en jongeren raken betrokken bij pestgedrag en voor slachtoffers is er vaak geen ontsnappen meer aan, omdat ze zowel offline als online worden gepest, dag in dag uit.

De voorbije decennia werden er heel wat anti-pestprogramma's ontwikkeld. De unieke bijdrage van het onderzoek beschreven in dit rapport bestaat erin dat onderzocht werd hoe leerkrachten kinderen kunnen faciliteren om meer 'zelfsturend' te worden in het aanpakken en voorkomen van pestgedrag en welke 'tools' daarvoor nodig zijn. De focus lag daarbij op zowel cyberpesten als op klassieke vormen van pesten, alsook op hun onderlinge relatie. Zelfregulatie bij kinderen vergroten wil niet zeggen dat de rol van de leerkracht moet worden geminimaliseerd. In tegendeel, de leerkracht krijgt een centrale en faciliterende rol toebedeeld en gidst de kinderen doorheen het proces. Belangrijk is dat de klas wordt benaderd als een sociale groep en dat het onderzoek zich richt op de exclusie van slachtoffers ten gevolge van pesten.

Als eerste stap in dit onderzoek werd een reeks voorwaarden geïdentificeerd waaraan een bottom-up georiënteerde aanpak van (cyber)pesten zou moeten voldoen. Daarvoor werden verschillende experts en leerkrachten uitgenodigd voor een reeks 'mapping'-sessies om ideeën en de relaties tussen ideeën op een visuele manier in kaart te brengen. Het gebruik van de techniek kadert binnen de 'participatory design'-aanpak die aan de basis ligt van dit onderzoek. Kenmerkend voor participatory design is dat gebruikers en andere belanghebbenden participeren in het ontwerpproces om te garanderen dat de resulterende ontwerpen afgestemd zijn op de manier waarom gebruikers het product daadwerkelijk zullen gebruiken in hun eigen leven (Schuler, 1993).

Een eerdere fase van dit onderzoek resulteerde in een 'roadmap' in welke de bevindingen van experts en leerkrachten worden gekoppeld aan een bestaand theoretisch model, de preventiepiramide, om het preventiebeleid op school te ondersteunen en te versterken. Volgens dit model moet preventie worden gestructureerd op verschillende niveaus, gaande van de brede, maatschappelijke context tot preventie maatregelen voor heel specifieke problemen. De roadmap werd gebruikt als leidraad doorheen het verdere onderzoek waarin ook kinderen actief betrokken werden met behulp van generatieve technieken zoals 'co-design'.

Tijdens de mapping-sessies met experts en leerkrachten werd herhaaldelijk benadrukt dat een bottom-up georiënteerde aanpak van (cyber)pesten enkel zinvol is als een algemene preventiestrategie. Dat wil zeggen dat men het zelfregulerend gedrag van kinderen moet ontwikkelen en trainen wanneer er zich géén acute problemen voordoen in de klas. Met andere woorden, een

veilige en sterke klasgroep is een basisvoorwaarde voor het introduceren van een bottom-up-georiënteerde aanpak van pestgedrag. Om die reden werd de oorspronkelijke vraagstelling van dit onderzoek aangepast. De focus onderzoek verschoof van het aanpakken van pestgedrag naar het stimuleren van een sociaal klasklimaat door in te zetten op pro-sociaal gedrag bij kinderen, zowel offline als online. Dit past binnen de algemene preventiestrategie die de experts en leerkrachten naar voor schoven als startpunt voor een bottom-up georiënteerde aanpak.

In een reeks 'co-design'-sessies met kinderen, waarin ze zelf oplossingen bedachten en ontwierpen, werd deze aangepaste onderzoeksvraag vertaald naar een 'design challenge' op maat van de kinderen. Op basis van een fictief verhaal van een klas met een slechte sfeer dachten kinderen van 9 en 10 jaar oud in twee Vlaamse basisscholen na over hoe zij de klasatmosfeer zouden verbeteren en wat ze daar voor nodig zouden hebben. De kinderen gingen vervolgens aan de slag in kleine groepjes, zogenaamde 'co-design teams', en maakten een prototype (bijv. een robot of een hypnosemachine) dat kinderen zouden kunnen gebruiken in de klas om de sfeer te verbeteren en de sociale cohesie van de groep te versterken. Hoewel tijdens de co-design-sessies niet werd gesproken over pestgedrag, was het opvallend dat de meeste teams een gelaagde aanpak voorstelden waarin zowel aandacht is voor algemene preventie (bijv. een DJ robot die een klasfeestje organiseert) als voor interventie (bijv. een rollenspel dat een slachtoffer kan gebruiken om de dader tot inkeer te brengen).

In de analyse van de resultaten van de co-design sessies met kinderen stonden zowel de materiële aspecten van het prototype (bijv. welke uitstraling heeft het, wat valt op, etc.) als de verbale uitleg van wat het ontwerp doet en met welk doel centraal. Met behulp van 'multimodality', een analysemethode afkomstig uit 'social semiotics' (Kress, 2010; Jewitt, 2013) werden de resultaten op een functioneel niveau geanalyseerd, maar ook op een hoger, abstracter niveau om het achterliggende discours van de kinderen en hun persoonlijke 'waarden' in kaart te brengen. Vervolgens werden deze resultaten teruggekoppeld aan de inzichten van experts en leerkrachten wat resulteerde in een reeks aanbevelingen voor een bottom-up georiënteerde, preventieve aanpak van pesten. Op basis van die aanbevelingen kunnen digitale en tastbare 'tools' ontwikkeld kunnen worden, die kinderen in staat stellen het klasklimaat en de sociale cohesie van de klasgroep te versterken. Op die manier vormen ze een belangrijk wapen in de preventie van pestgedrag in en rond de klas, zowel off- als online.

Tot slot geven we nog een beknopt overzicht van de algemene aanbevelingen voor een bottom-up-georiënteerde en preventieve aanpak van pesten, gebaseerd op de ideeën en waarden van kinderen:

1. Voorzie coöperatieve spelvormen die kinderen in verschillende contexten kunnen aanwenden. Voor preventiedoeleinden is 'spel' een handig middel om verveling tegen te

gaan, maar het kan ook als middel dienen om de interesse van kinderen te wekken tijdens de les en het kan als interventie-tool worden aangewend om de sociale dynamieken van de groep te heroriënteren en de dader te doen inzien wat het effect van zijn daden is op de gevoelens van het slachtoffer.

2. Voorzie positieve afleiding door middel van humor. Voor kinderen is het belangrijk dat bij aanvang van de dag de juiste sfeer wordt gecreëerd. Distractie door humor kan ook dienen om spanningen tussen kinderen ongedaan te maken en verdere escalatie te voorkomen. De toolkit moet inspelen op deze noden van kinderen.
3. Voorzie tools om slachtoffers te empoweren, zodat ze een vuist kunnen maken tegen hun daders. Opmerkelijk is dat kinderen veelal een 'instant oplossing' naar voren schuiven; ze willen zo snel mogelijk een nieuwe start kunnen nemen en, in een ideale situatie, vrienden worden met de dader. Er is geen behoefte om de details van wat er precies gebeurd is uit te klaren, maar anderzijds stellen de kinderen 'dialogo' evenmin naar voor als mogelijke oplossing. Aan deze lacune moet tegemoet gekomen worden. De toolkit moet dialoog tussen dader en slachtoffer faciliteren met de nodige aandacht voor de negatieve gevoelens die het pestgedrag teweeg brengen en hoe deze te remediëren.
4. Combineer 'top-down' met 'bottom-up' regulatie en voorzie daarbij een faciliterende rol voor de leerkracht. Kinderen willen zelf initiatieven kunnen nemen om het sociale klimaat te verbeteren en de sociale cohesie van de groep te versterken, maar de leerkracht moet steeds een oogje in het zeil houden en voorkomen dat de vrijheid van het ene kind de onvrijheid van het andere wordt. Dus zowel leerkrachten als kinderen hebben 'tools' nodig die helpen om grenzen te stellen waarbinnen kinderen zich 'vrij' kunnen bewegen.
5. Leg de nadruk op positieve bekrachtiging; beklemtoon wat kinderen goed doen veeleer dan wat ze fout doen. Dit kwam tot uiting in de 'straf en beloningssystemen' die sommige co-design-teams ontwikkelden en waarbij de klemtoon steevast lag op het belonen van gewenst gedrag dat de klassfeer ten goede komt. Dit gedachtengoed sluit nauw aan bij de 'no-blame' approach die ook experts en leerkrachten naar voren schoven. De toolkit moet kinderen aldus stimuleren tot pro-sociaal gedrag ten aanzien van elkaar, bijv. door het introduceren van spel- en beloningscomponenten.
6. Voorzie meer supervisie, zowel tijdens de les als tijdens de speeltijd. Kinderen uitten de behoefte aan een (publiek) monitoringsysteem en aan een vroege detectie van problemen door de leerkracht of een neutrale bemiddelaar. Zo ontwikkelde één team een toevenaar die boven de speelplaats vliegt en alles nauwlettend observeert en op een humoristische manier ingrijpt alvorens de problemen escaleren. Tools ter ondersteuning van meer supervisie moeten in de eerste plaats dus dienen ter preventie van problemen.

7. Maak kinderen bewust van de rol van de toeschouwers tijdens pest- of vijandig gedrag. Uit de prototypes die kinderen maakten bleek dat ze onvoldoende inschatten hoe ze als toeschouwers en als klasgroep kunnen ingrijpen om pestgedrag een halt toe te roepen. Enkel voor preventiedoelstellingen wordt de hele klasgroep in ogenschouw genomen (bijv. het organiseren van een klasfeestje door een DJ robot). De toolkit moet het bewustzijn hieromtrent vergroten bij kinderen en hen aanzetten tot positieve actie.
8. Zet in op de emotionele geletterdheid van kinderen. Dit is een basisvoorwaarde om kinderen meer zelfsturend te maken in het voorkomen van pestgedrag aldus de experts en leerkrachten, maar kinderen schatten het belang van de juiste sociale vaardigheden en het ontwikkelen van gevoelens van empathie ten opzichte van anderen onvoldoende in. In plaats van een sociaal proces gericht op dialoog tussen dader en slachtoffer stellen ze veelal een 'instant oplossing' voor. De tools moeten de emotionele geletterdheid van kinderen versterken, zodat herstelpraktijken tussen dader en slachtoffer gemakkelijker hun ingang vinden.