

HINKO

Led by the government, driven by schools.
Transforming knowledge into action.



Design for Government 2020

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Preface

Welcome to the Design for Government report of the Hinko project, a summary of our 14 weeks journey in which our research insight and proposal are laid out. On the following pages, you will read about the unique design process we went through and the proposal that came out of this. This journey would not have been possible without expert and stakeholder participation. Therefore we would like to thank all the people and organizations that have been involved in the project for their input, ideas and feedback.

Design for Government is a unique studio course in Aalto university in which student groups work on a (design) brief created by one of the Finnish Ministries. This year, there were two briefs, both dealing with climate in their own way: Just transition from oil heating and boosting climate education.

Our project was executed within the boosting climate education brief. Our team is composed of Zhengshuang, Rinna, Jelske, and Noah. The four of us come from four different countries and are part of two different master programs at Aalto University: Creative Sustainability and Collaborative and Industrial Design. The diverse cultural and professional backgrounds of our team members have been one of the factors that allowed us to run this project in

a unique way and to find alternative angles to the stakeholders' brief.

Soon after the beginning of the project, the outbreak of Covid-19 and the following quarantine forced us to reconsider our project plan since we were dealing with an unprecedented level of uncertainty. This provided us with countless challenges, but also with opportunities to learn and adapt. Indeed, in these weeks, everyone had to go through an immediate transformation from offline to online. While it gave us the chance to interview stakeholders that would have probably been too busy in normal circumstances, it also expected us to run the whole project relying fully on digital tools, allowing us to experience both the benefits and disbenefits of it.

By developing our proposal we contribute to solving an acute and pressing issue, while at the same time it allowed us to learn new skills. DfG was an intense and memorable experience and we are grateful to have been able to participate in it.



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1 Introduction

With the growing threat of climate change, a global response and transition is urgently required. The Finnish government acknowledges this threat and has placed it as the first of 7 strategic themes in the current governmental program.

“According to the Intergovernmental Panel on Climate Change, any increase in the temperature beyond 1.5 degrees Celsius will significantly accelerate the extinction of species, render more and more areas of the world uninhabitable and pose substantial risks for food production, access to water and the functioning of the ecosystem. An upheaval in the basic conditions for life for hundreds of millions of people would lead to social and political instability, conflicts and forced migration. We only have a few years left to reverse the trend in global emission levels permanently.” [1]

Finland has been one of the most ambitious countries worldwide following the Paris Agreement on climate change, aiming to reach carbon neutrality by 2035 and carbon negativity soon after that. Within those 15 years, an essential transformation of almost every aspect of Finnish society is required: economical systems and relations need to be rethought, technologies need to be developed and their impact constantly assessed, and current values and behaviors have to be called into question. The task may seem daunting, but there are ways to facilitate and accelerate this transition. One important path is education. Education gives facts, teaches skills, encourages behaviours and instills values that are necessary to build a more sustainable future. Raising a generation of climate conscious citizens that are aware of their responsibility in shaping our societies can support Finland's transition towards a carbon neutral society.

To spark reflection on this topic one of this year's Design for Government (DfG) brief

was focusing on “**Boosting Climate Education**”. It was committed by the Finnish Ministry of Environment, the Finnish Ministry of Education and Culture, the Finnish National Agency of Education as well as the ORSI research project / consortium.

This brief became even more urgent and topical in the wake of youth-led climate strikes starting in 2019. Many young people are unsatisfied with the slow speed of transition towards carbon-neutral society and the current status of climate education appears inadequate from their point of view. So, boosting climate education has push from the organisational side and pull from the youth side.

Definition of important terms:

-**Active citizenship:** Citizens that engage in a broad range of activities to consciously participate in democratic processes and shape society.

-**Conscious consumer:** Conscious consumer considers the environmental impact of her personal actions and seeks to minimize it.

-**Climate education:** Teaching both climate knowledge and active citizenship to raise people capable of smart and effective climate action at all levels of society.

2

Research method



Participants discussing in kick-off workshop, photo by Jelske van de Ven

2.1 Kick-off Workshop

During the second week of the 2020 DfG class, we had the opportunity to kick-off this project with a stakeholder workshop gathering participants from the Ministry of Environment, the ORSI project and SYKLI Environmental School of Finland, amongst others. The half-day workshop was jointly planned and executed by the three teams working on the climate education brief.

The workshop consisted of three stages, all of which had their own purpose. In the first stage of the workshop, people were asked what they understood climate education to be. This was to help us to get a broad perspective on what climate education currently is in Finland. The second stage was about mapping opportunities that can help make climate education better and challenges that are in the way of integrating climate education in class. In the last stage, participants were asked to map relevant stakeholders around the previously mentioned opportunities and challenges.

These stakeholders were categorized as allies or skeptics, underlying possible dynamics and helping us to build our stakeholder map.

2.2 Desktop research

Building on the workshop's insights, we expanded our knowledge through desktop research. This initial research helped us to develop our understanding of the Finnish educational system's structure, what forces are involved in changing it and who are the stakeholders. Mapping the stakeholders and identifying links between them prepared us to organise interviews in the next stage.

The education system in Finland constitutes a complex web of entities and actors, some

which are governmental, some not. Education from early education (before school age) to upper secondary and vocational education (generally 15-18 years) falls within the jurisdiction of the National Agency of Education (OPH), while the Ministry of Education and Culture oversees all education. The national curriculum forms the backbone of education throughout the country, but municipalities, schools and teachers have liberty to organise the teaching and choose the teaching materials best suited for their particular circumstances. Teaching materials such as school books are produced by non-governmental actors, following the guidelines of the national curriculum. In addition to the organisational actors, students are of course the users of the educational system, and their peers and families have an indirect effect in the educational system as well.

We also researched best climate education practices in Finland and discovered the municipality of Ii in northern Finland. In Ii, climate issues are centered in municipal decision making and in education as well.

In addition to traditional school books, we found out that a variety of online materials

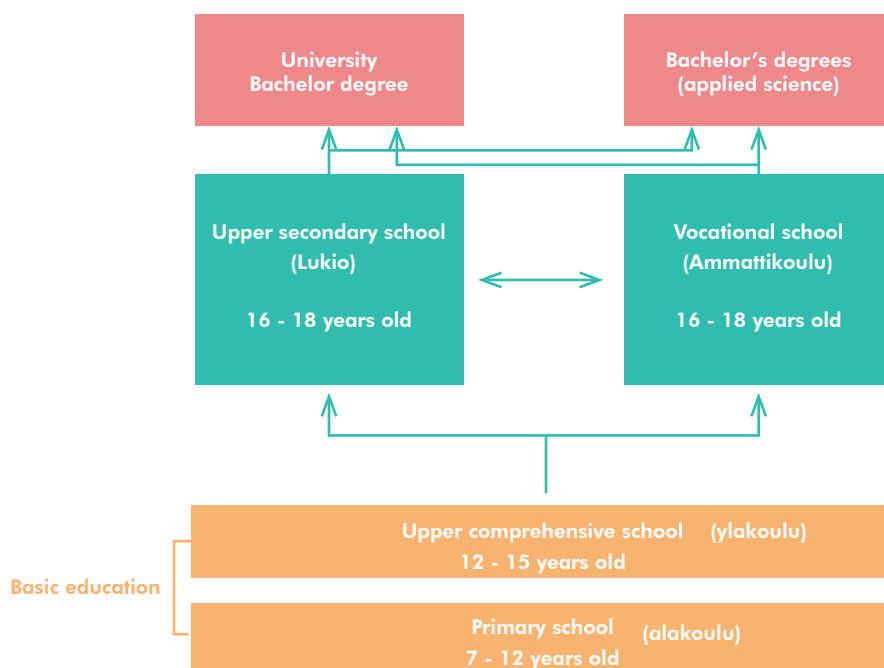
about climate issues is available to teachers.

Open Ilmasto-opas is aimed at subject teachers. It has fact materials and class planning suggestions related to climate change for all subjects taught in Finnish compulsory education. Open Ilmasto-opas is created and developed by Pinja Sipari, one of the best-known climate educators in Finland.

Luokanopen ilmasto-opas is similar to Open ilmasto-opas, but aimed at class teachers, meaning teachers of younger pupils that teach several subjects and stay with their class most of the day. It is created by Anna Muotka and Aino Kinni from the University of Lapland.

Mappa.fi is a material bank about environmental and nature-related materials for teachers, including some climate change materials. It is created by Suomen luonto- ja ympäristökoulujen liitto ry, the association of Finnish nature and environment schools.

While the majority of the desktop research was done in the first weeks to sketch a basic picture of the context, the research continued all along the project according to what topics came up organically, such as the role of empathy in climate issues or understanding multidimensional learning.



2.3 Interviews

Based on our desktop research and the kick-off workshop, we scheduled interviews with key stakeholders to gather additional information on the topic and the challenges surrounding it. Due to the Covid-19 restrictions, face-to-face interviews were off-limits and we had to abandon our initial idea of visiting Ii to get hands-on experience about successfully integrated climate education. All interviews except for the initial interview with Pinja Sipari were conducted online, mostly using Zoom.

This was an initial inconvenience, but on the other side, the lockdown demanded everyone to experience remote online working and thus increased the likelihood of someone being available for an online interview. Also our team's work was done online, using digital sharing and collaboration tools such as Miro (digital whiteboard) and Google drive.

The following two images are screenshots taken during two of our interviews. They show our creative use of the digital platforms during the interviews. In the first image we used sketches to explain our current understanding of the context and asked the participant to reflect on this representation. In the second image we are using Miro to 'life-mapped' the curriculum structure based on the input we got during the interview. In this way we could check if

we had understood the process correctly, but it also allowed the expert to refer back to something that is otherwise challenging to explain.

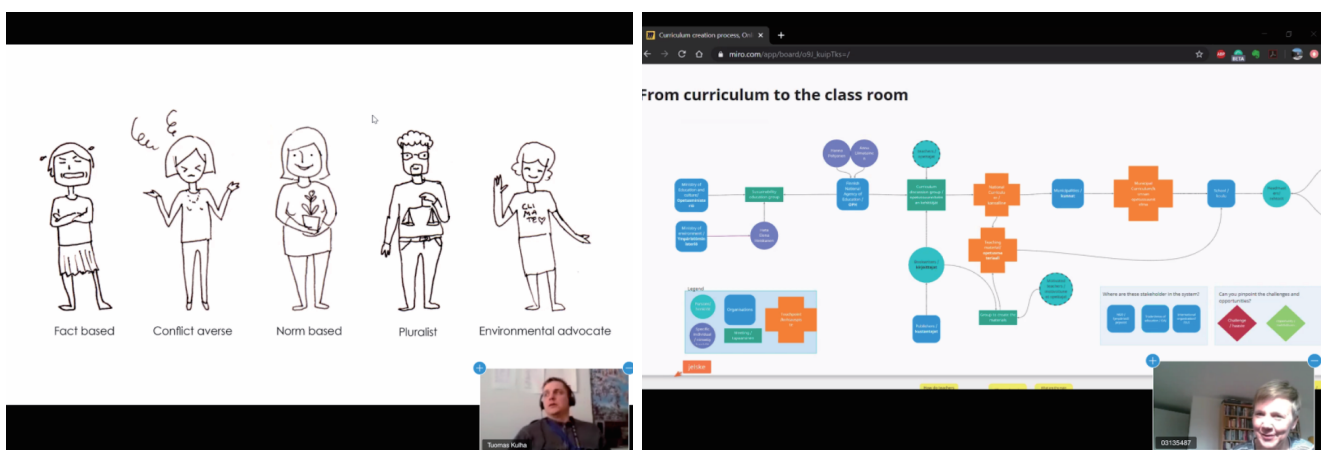
Many interviews were organised jointly with other education teams, as collaboration was an ongoing component of the course. Even after the kick-off workshop, we kept on exchanging knowledge and information.

We conducted 13 research interviews over the course of 14 weeks, each between one and two hours long.

The interviews can be clustered in three groups:

- 1) The governmental perspective of different governmental entities; the ministry of Environment, the ministry of Justice, the National Agency of education (OPH).
- 2) The school level on practical issues of integrating climate education; headmasters, teachers and students.
- 3) Other key stakeholders; climate education experts, NGO's, school book writers and researchers.

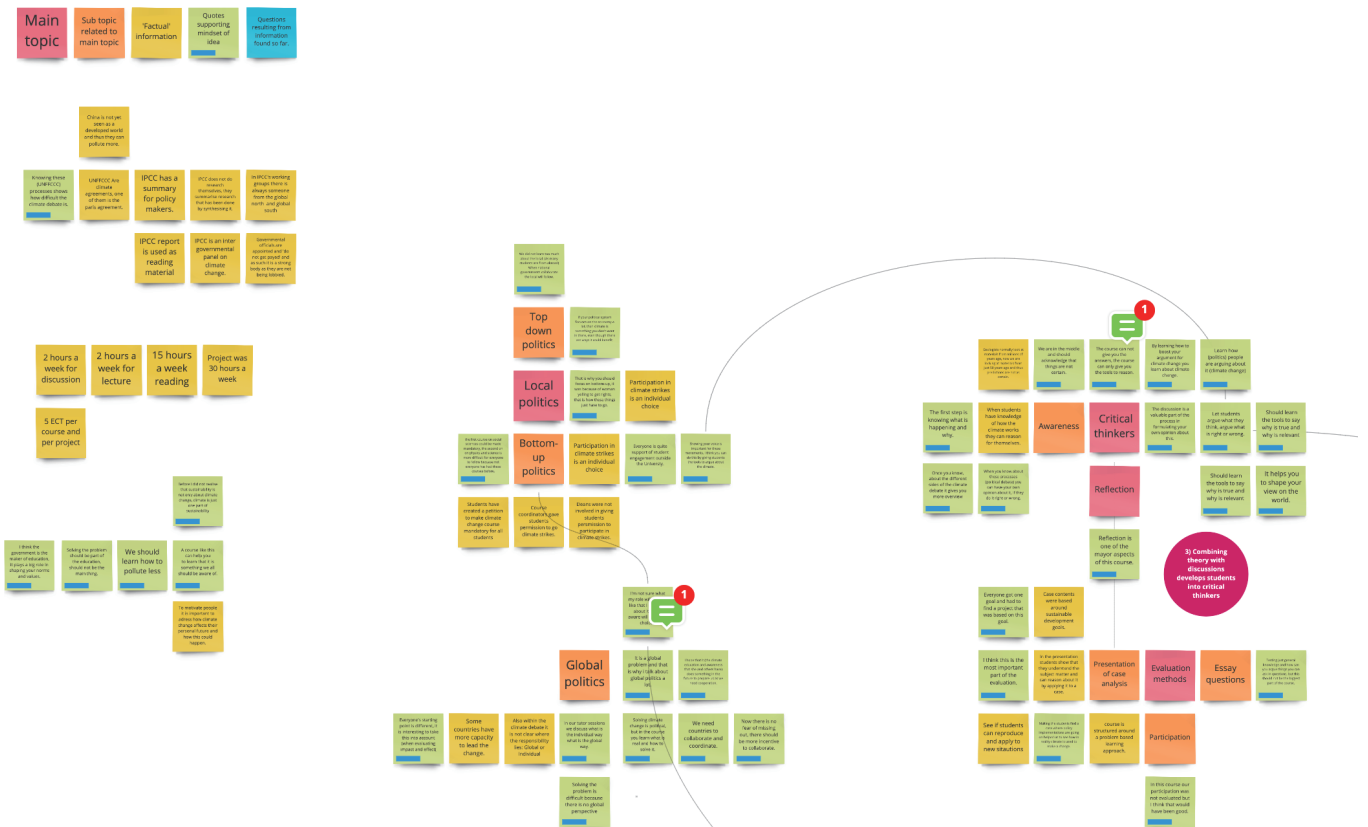
By gathering this diverse set of perspectives, we aimed to gain a systemic perspective of the educational system in Finland. Interviews were instrumental in understanding the challenges climate education faced on different levels.



Screenshot of Zoom interview

2.4 Affinity mapping

Interviews need to be sifted through to find useful information and these nuggets of information need to be linked together to form meaningful connections. Affinity mapping is a process of making sense of a large and varied body of data, such as interviews. By identifying common topics one can find information patterns. Collectively these topics make up the affinity diagram, a schematic overview with all the data clustered per theme. We used this affinity mapping method to analyse the interviews and so discover common themes and previously hidden possibilities to boost climate education.

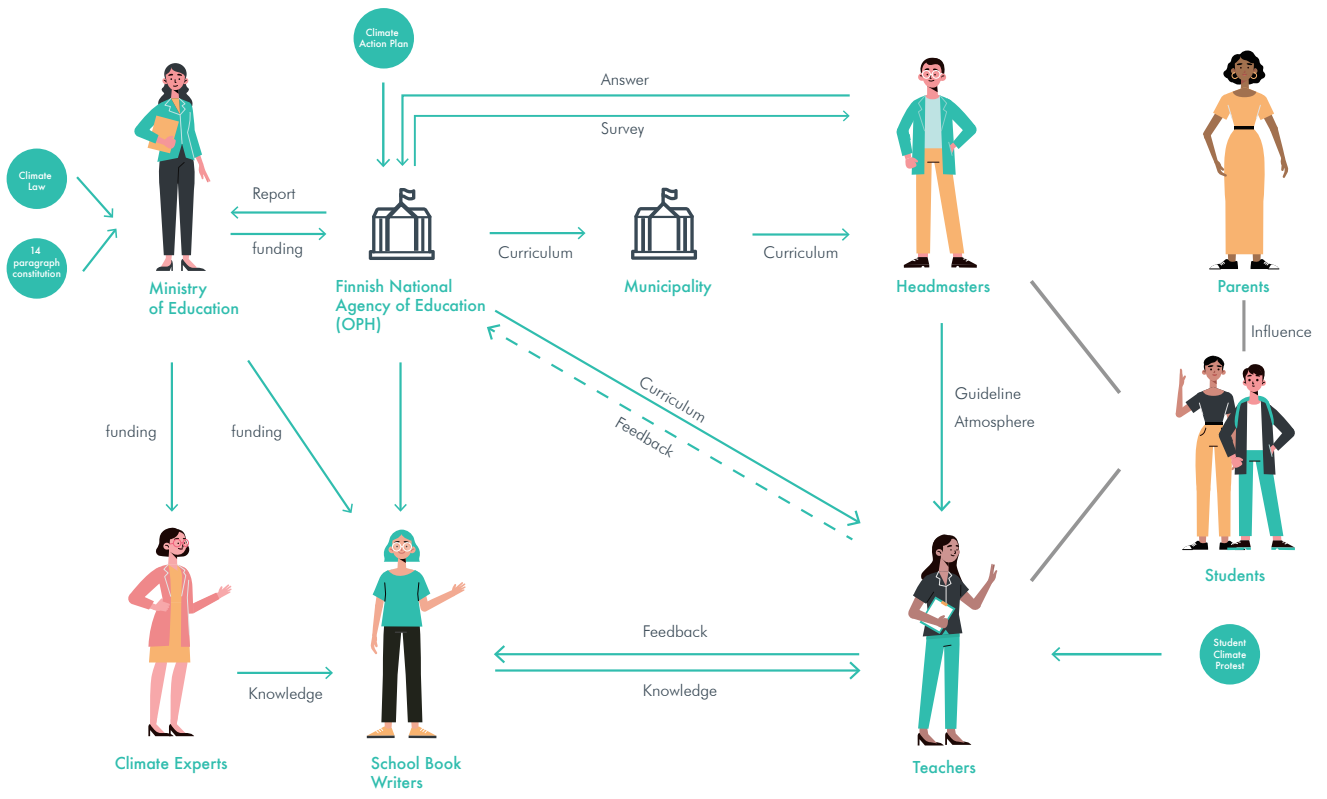


Screenshot of affinity mapping in Miro

3

Research findings

3.1 Stakeholder map & Insight mapping



Stakeholder map

Stakeholder map presents the key stakeholders in the Finnish education system. The national curriculum is the main tool of the Ministry of education and culture and the National Agency of Education (OPH) to express the intents of the government in education, in our case the intent to integrate climate issues into education. Just last year, The national agency of education began the Climate Action Plan[2], to improve integration of climate education to Finnish education from pre-school to secondary education. The process to integrate climate issues in the curricula of vocational education is still continuing and will continue for several years, since there are over 150 separate curricula for different vocational fields.

Other policy documents such as the

Climate Law and the revised 14th article of the Finnish constitution [3] influence climate education objectives. While the Climate law expects that every citizen is informed about climate change, the 14th article of the Finnish constitution states that “The public authorities shall promote the opportunities for the individual to participate in societal activity and to influence the decisions that concern him or her.”

“Obligation through the Climate law is that people have to get informed on climate change.”
 -- Ministry employee

“There have always been some kind of policy programs on democracy but since the revision of the constitution it was stipulated that it's the duty of the administration to

enhance people's participation"
-- Ministry employee

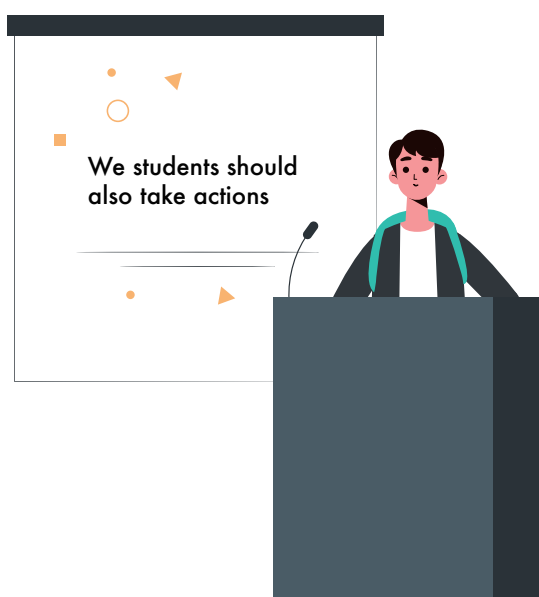
Municipalities create their own localised curriculum and decide on how education funding is shared and used. Headmasters allocate time and resources for example on in-teacher training, and at a less tangible but influential level, their interest and motivation in climate education is reflected through the whole school. Book writers work within the framework of the national curriculum, both they decide how much attention is given to particular topics. Climate researchers are in best cases consulted when creating teaching materials, but not always. Students receive mixed messages about the importance of climate issues in school and outside of it.

At the moment, climate education the students receive is of uneven quality and the amount differs a lot, it is scattered and inconsistent. Much of the climate education successes, be it school focus or creating high-quality materials, depends on the exceptional work of high motivated individuals. Currently, there isn't a solid framework to support these "climate education champions", neither to spread their best practices around.

3.2 Ministry

In our research the Ministerial employees involved as brief writers expressed the desire that quality climate education is provided to all students in Finland. Education is compulsory until the completion of upper comprehensive school level. Students are between 13 and 15 during upper comprehensive education, an age where they typically have interest in society and are able to discuss complex topics like climate change. Therefore, developing a program for upper comprehensive schools seems to be the most effective way to raise a new generation of climate-conscious citizens.

However, throughout our interviews, we found conflicting views among stakeholders on the objectives that climate education should aim for. For the ministry, it should be taken further than just teaching conscious consumerism to active citizenship, encouraging and educating every citizen to act for what they stand for. This desire hasn't yet reached book writers and thus, the current materials mainly focus on conscious consumerism, making only few references to active citizenship.



Climate Active citizenship is engaging in a broad range of activities to consciously participate in democratic processes and shape society.

Related to this active citizenship goal, we discovered the similarities climate education is sharing with the ministry of Justice democracy program. While they both face similar issues in integrating their respective topics, such as the need to train in-service teachers, they share the common objective of educating students about the role of democracy and the opportunities they have to shape society.

Furthermore, the ministries mentioned their lack of ground information. Only receiving a few schools' feedback on the topic, they may be unaware of what interventions would be the most needed and where the budget should be allocated to, to be most impactful.

"We are missing the feedback loop [...], that is one issue we need to improve."
-- Ministry employee



3.3 Teachers

From the teachers' perspective, there are many obstacles to bring climate education to the classroom.

First, most in-service teachers haven't been trained to approach and integrate climate related topics. This leads to many of them feeling insecure about the topic and being reluctant to teach it in class. While this is changing for newly trained teachers as they receive university education including climate change more systematically. Systematically, the training available for in-service teachers is voluntary and mostly attracts motivated teachers. From a headmaster we learned that the teachers in his school get three 'teacher training days' each year. Teachers decide themselves in conversation with their headmaster how to use this time.

In-service training is offered by some universities and other specialised organizations such as the Teachers Climate Change Forum or Climate.now. They all aim to equip in-service teachers with knowledge, confidence and the right network to approach the topic. However, it will take a long time before all teachers have received in-depth climate education

"Teachers tell me they are worried about climate anxiety and they want tools and ways to deal with emotions."

- Climate Educator

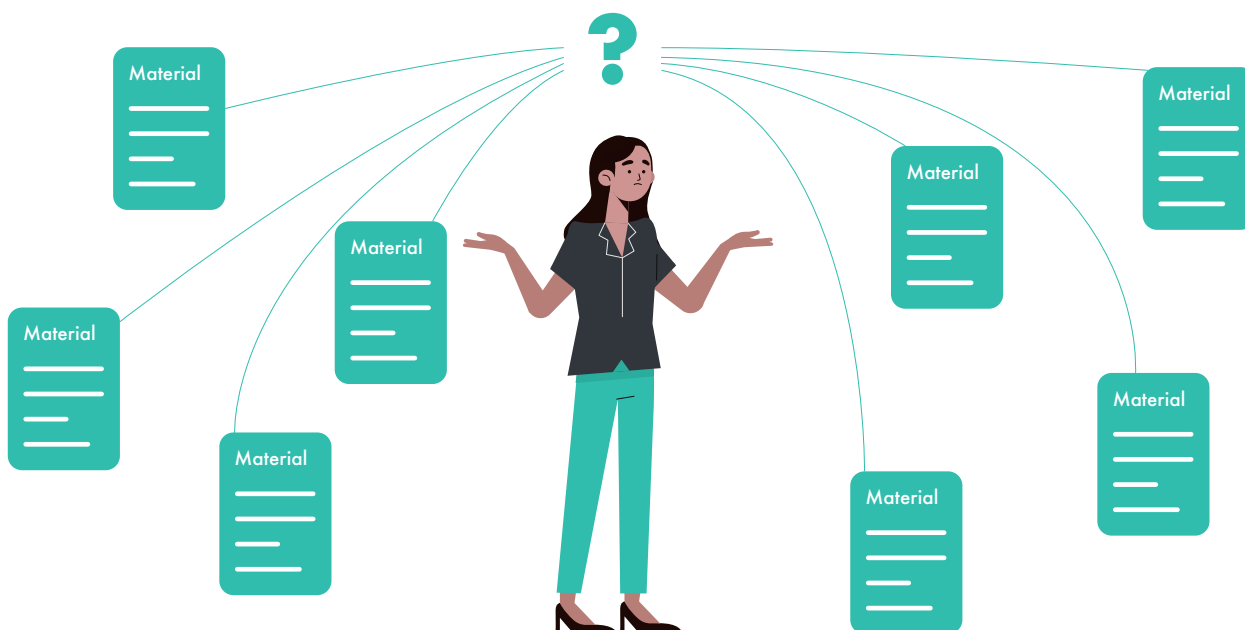
and that they approach climate change more confidently. Also, as training institutes and universities are located in the biggest cities, access to training is not equal all over Finland. For schools further removed from these places, training is not as accessible, creating geographical differences.

Second, the Finnish educational system relies on two core concepts that turned out to be relevant to the climate education topic: Teachers' autonomy and equality of education.

Teachers (and municipalities) have a high degree of autonomy in deciding how and in what order they teach the subjects and topics outlined in the national curriculum. Not even the Ministry of Education can straight-out force teachers to teach in a certain way. In addition, traditionally municipalities have a high degree of autonomy in organising their obligations such as education. Climate education is to some extent embedded in the national curriculum, to be adopted in all Finnish schools, but it is very much up to the municipality, the schools headmaster and the teacher's personal interpretation how much importance is placed on it. On the other hand, equality in primary

education is another important concept. Finnish Agency of Education (OPH) monitors continuously that the level and quality of teaching is equally high across geographical regions and school levels. Thus, all climate education boosting solutions need to take into account that it must not create geographical inequalities in education but be flexible enough to suit different circumstances. Teachers should be considered as skilled, autonomous professionals, not education robots.

A third key findings on the teachers' relation to climate education is the importance of having a multidisciplinary colleague network. Being a teacher can be quite a solitary job, as you may be alone in front of the class most of the time. Short discussions with colleagues offer crucial opportunities for teachers to relieve stress, share knowledge and build on each other's experiences. Therefore, having a multidisciplinary colleague network grows their confidence when faced with questions in class that cross their subject field's knowledge, knowing who they can transfer it to. Consequently, this group of teachers does not shy away from mentioning climate change-related topics in class.



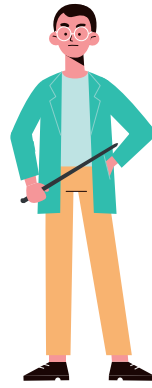
Teachers have problems in selecting material



Norm-based



Conflict averse



Fact-based



Pluralist



Environmental advocate

5 Teacher Types, from Essi-Aarnio Linnanvuori

Lastly, while a lot of quality online materials exist, finding the right ones and judging if they are trustworthy is sometimes problematic. Often teachers are short on time and can't spend hours searching and fact-checking materials that may be contradicting the curriculum itself. There's no official stamp on online materials to say they are of good quality and in line with the curriculum. Teachers receive advice from peers about what to use, but if there is not knowledge about these in the network, it depends all on the individual time of the teacher to search.

"Free online materials don't go through rigorous research – but Open Ilmasto-opas is very good!" -- Book writer and climate education researcher

Research conducted by Essi Aarnio-Linnanvuori [4] has shown that teachers' attitudes and approaches differ when dealing with climate education. She has identified five types of teachers that differ based on their reaction. "Norm-based" teachers follow the curriculum to the letter, and if climate education is not explicitly mentioned, they

do not include it in their teaching. "Fact-based" teachers steer away from anything resembling value judgements and the "Conflict averse" teacher group feels extremely uncomfortable with bringing up controversial topics in class. On the other hand teacher groups such as "Environmental advocates" are comfortable with sharing their passion for saving the planet and "Pluralist" teachers find it important to expose their students to a wide variety of viewpoints making it easier to bring up climate education. All these different types of teachers will need different forms of support to help them teach climate education. For some this will be assistance in crossing emotional barriers while for others it is about gaining confidence or getting factual information. All of them need moral support and a safe space to discuss the challenges of climate education.

3.4 Students

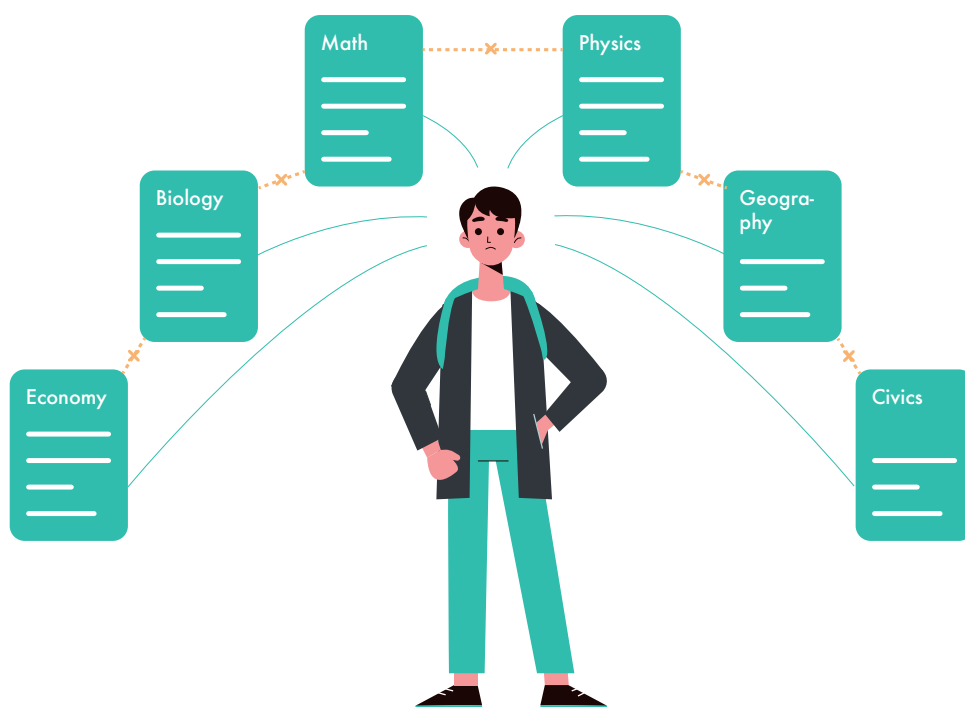
From the students' perspective, several problems have also been identified.

To begin with, climate education is usually not approached holistically across courses. Students struggle to connect different bits of information about climate change coming from these different courses into a meaningful whole and thus, to create a comprehensive understanding of the topic.

Next to this, the school environment is not always in line with what is taught and what a transformation to a carbon neutral society would require. Food and energy being key sectors in which the transformation will happen, the schools actions are not always aligned with what climate education aims for. The school building may waste energy and school lunches be made of high carbon emission ingredients. Additionally, the schools reaction to active citizenship in the form of a protest has not always been equal, as some encouraged their students while other teachers, confused and not knowing how to react, strictly forbid this.

These mixed messages undermine the message of climate education and confuse students.

Finally, differences exist among schools on the quality and emphasis of climate education, which impacts the students' learning. As introduced previously, the content of the curriculum has to go through a set of stakeholders before reaching classrooms: first municipalities that influence the local curriculum, headmasters that set school priorities and allocate time to it and finally teachers. Currently, climate education ends up being driven by motivated individuals within schools and municipalities, and thus, not every student has access to high-quality climate education. Additionally, based on what educational path is chosen, studies have different emphasis on climate education. Students in Lukio and vocational school are not equally educated on the topic, creating a knowledge gap and unequal abilities to act based on this knowledge.



3.5 Others

Additionally to all the previously mentioned stakeholders, insights on other highly relevant stakeholders came up. Throughout the research headmasters have been described as gatekeepers. While they are hard to reach out to and have an already very important workload, they play a crucial role in what is being taught in schools, allocating and drafting the budget.

In an interview with a climate education expert, we learned that there are about a dozen climate education experts working in different organisations across Finland. They may work as book writers, researchers, within NGOs but all share a common passion for advancing climate education and possess a lot of skills, knowledge and experience. Some already worked on concrete projects such as Pinja Sipari with the previously mentioned Open ilmasto-opas.

This is also where we discovered that the Ministry of Justice is creating a new program called the Democracy Program to improve active citizenship, as decreed by the constitution. This program shares many goals with climate education, and democracy education in general also faces many of the same obstacles as climate education. (see also section 3.1)

4

Ideation process

4.1 Design Challenges & Design Drivers

The change from research phase to solution developing phase can be a harrowing one, as it never feels like research is definitely done, and indeed it felt hard to decide that we had the necessary amount of information. The first step in the ideation process, after gathering information and formulating insights was narrowing them down to select an area of intervention and a certain scope.

To work effectively on creating climate education solutions, we needed to define what good climate education is. It's not only about one-time learning certain facts, though learning relevant facts is important. Climate issues are intertwined in all levels of society and behaviour. Empathy, a sense of justice and the circle of concern are emotional foundations to climate issues. Active citizenship emerged as an important point – though it is not unique to climate issues, it is an important component of it and links it to democracy education. Developing the confidence of the student to speak up and make their voice heard, in class and in wider context makes climate education useful. Climate education is also considered with helping students to reflect on knowledge received and found to formulate their opinion. In this way education can help students to become critical thinkers.

We reframed the brief according to our understanding of what were the critical points where we could make a difference.

Design drivers are short, almost slogan-like sentences presenting the project's goals and aims in a checklist manner. They embody the elements and values that according to our research a good climate education integration proposal needs to contain,

Design challenges are worded as questions

with an **actor**, **object** and **action components**. They create a framework of thinking to what the designed intervention has to accomplish. For example the design challenge for a chair would be “how to create something to sit on.” This does not specify if it should have four legs, three legs or indeed no legs at all. In this way a design challenge creates focus on what to achieve, but at the same time it leaves space to explore what is needed in the specific context to achieve the desired outcome.

Design challenges

We formulated three design challenges. They all take place at a different level in our system map.

1) How to **design cooperation** between the **Ministry of Environment and Justice** to **expand the reach and impact** of both **Climate Education** and the **Democracy Program**?

This intervention challenge takes place on an inter-ministerial level. It is about bringing a holistic perspective to policies and trying to bring relevant programs and ministries together from the start, instead of discovering in practice that there is an overlap and all systems and structures are already in place.

2) How to **create supporting structures** at/on every level that would **facilitate schools** in the **implementation of CE in schools**?

This challenge focuses on providing

practical support to schools in overcoming current obstacles for climate education. This support includes but is not limited to resources, emotional support, mentoring networks for sharing best practices and so on.

3) How could **the Ministries and schools create structures and practices in and outside of school that allow and foster students active citizenship?**

As environmental education is at the moment more focused on conscious consumerism, integrating active citizenship into education needs focus and resources. Best and most impactful ways to do this need to be discovered, researched and developed.

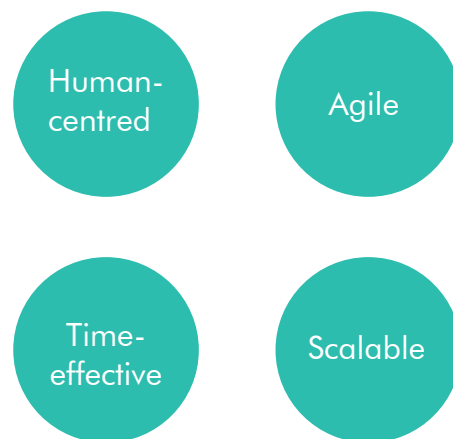
Design recipe

Instead of traditional design drivers we created a recipe of what we need as ingredients to reach impactful and holistic climate education.

- 1) Expand circle of concern/responsibility to encompass the whole world (ethical foundation)
 - 2) Learn to understand scientific method and judge scientific claims (scientific skills)
 - 3) Learn systems thinking and how things are connected (system-thinking skills)
 - 4) Learn to examine and formulate arguments in a debate (logical skills)
- ... but not be overwhelmed by all this... (emotional skills)
- 5) And activate oneself daily/regularly to act according to one's beliefs (execution skills) So that the student can participate meaningfully in social discussion (GOAL!) and be part of changing policies at the local, national, european, global levels.

Design drivers

Fast forwarding to the end of our process, we only realised what our design drivers were when we tried to formulate the strengths of our final proposal. Over the course of our ideation process we had been weighing different factors and ideas and deciding in favour of certain ideas because of their aspects. These 'favourable' aspects crystallised into something that one could call in hindsight our design drivers. Our intervention follows the four following characteristics being:



Design drivers

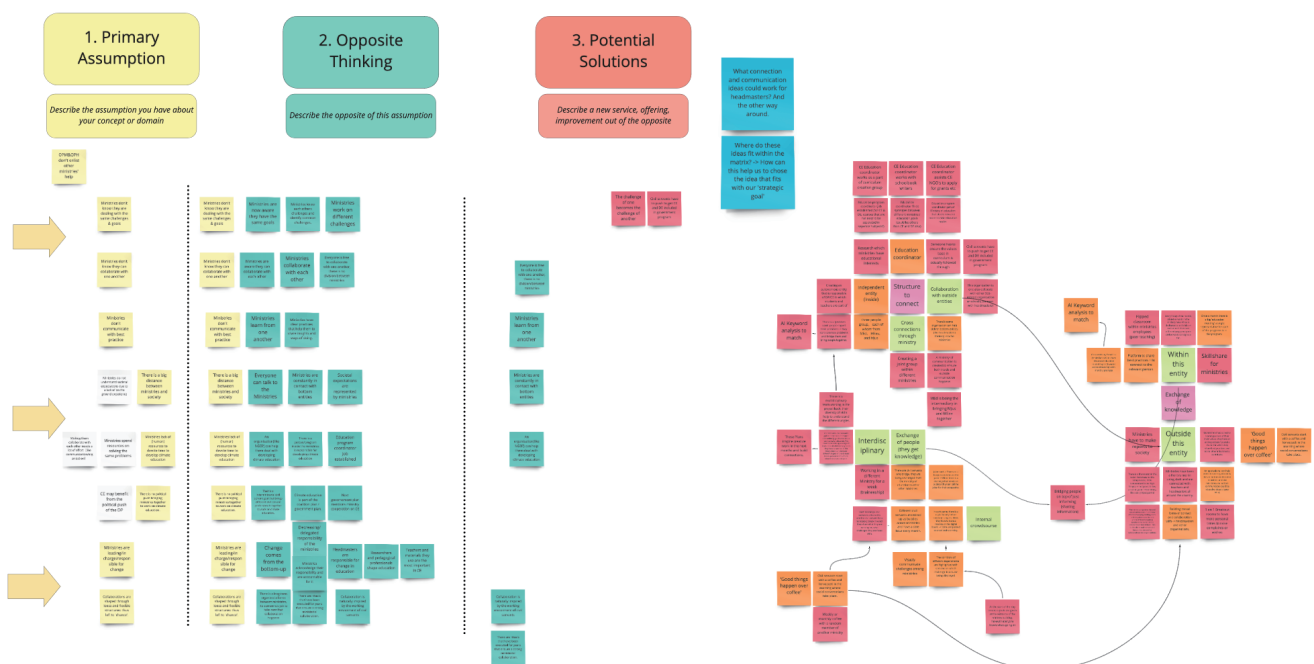
4.2 Ideation

The process of coming up with ideas is always somewhat chaotic, but there are methods to guide and channel the creative chaos. One of the brainstorm methods we used was ‘opposite thinking’. Here you write down current assumptions and flip them around. This liberated us from the constraints of the present situation and ideas emerged. We started generating potential solutions profusely.

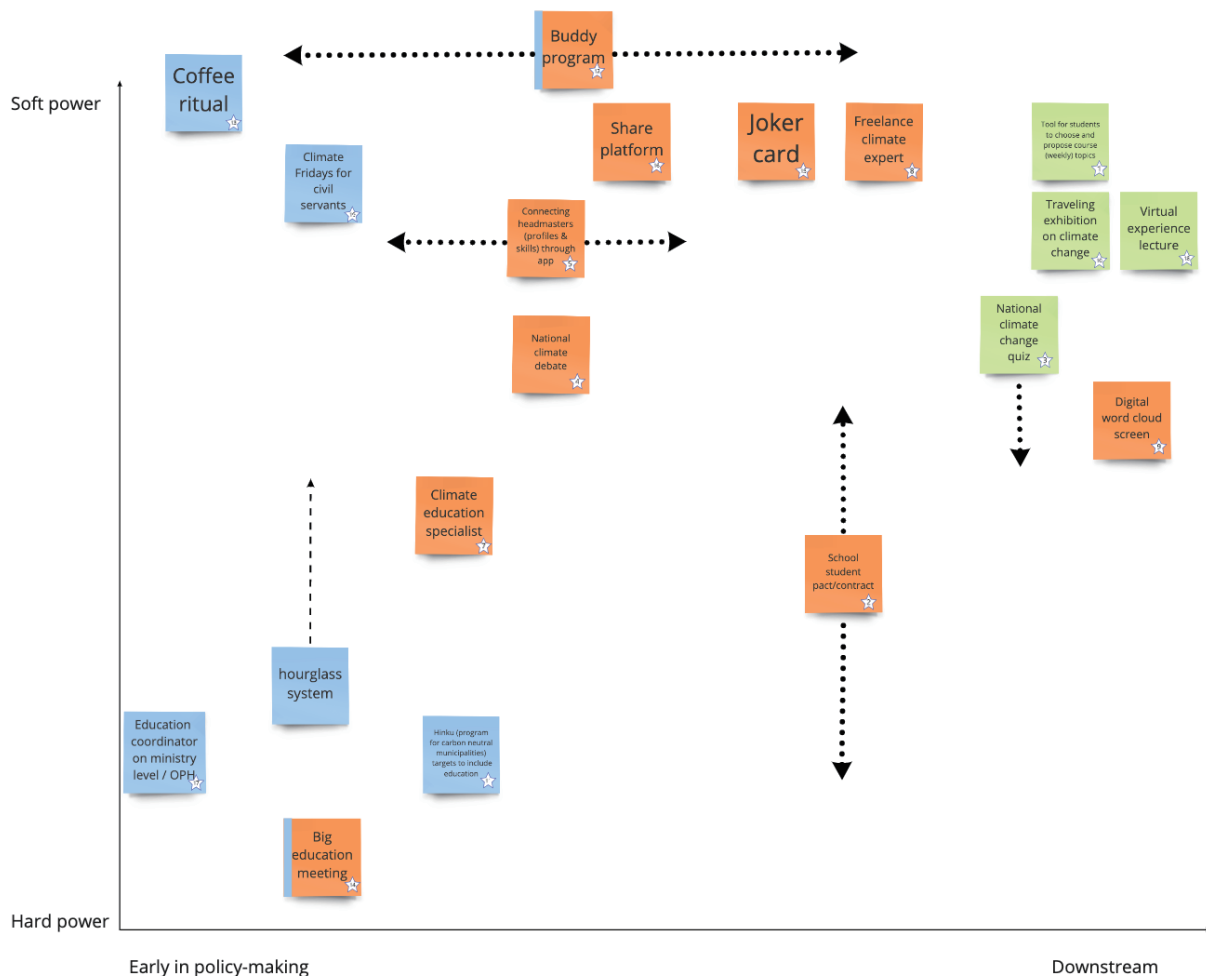
We brainstormed about solutions related to headmasters/school level, to relevant ministries and to teaching materials. This topic of teaching materials was eventually discarded, since we concluded from stakeholder perspectives that enough teaching material exists, the issue is getting it to the hands of teachers. The other two themes went through several rounds of ideation.

However, we discovered there was danger of “mission creep”, getting swept off our feet with various creative ideas and getting off-track in regard to the main goal,

climate education. Locating ourselves and our key ideas in a matrix of compulsory/voluntary and early/late intervention helped in maintaining focus. Since both municipal and teacher autonomy are highly valued in Finland, at least somewhat voluntary actions are probably met with more approval. On the other hand, intervening at a high level would ensure a consistent effect across the whole country. A regular “coffee ritual” in ministries (see top left corner in the visual), where people from different ministries could make unexpected connections to each other is an example of a soft nudge towards inter-ministerial collaboration, a combination of upstream and soft power. Suggestion to make Hinku (carbon neutral municipalities program) to include climate education targets is somewhere between upstream and downstream and fairly “hard”, as municipalities committed to Hinku program are obligated to fulfill the requirements.



Miro Online Whiteboard with virtual sticky notes - Opposite thinking method



Miro Online Whiteboard with virtual sticky notes - Mapping of our ideas

Using brainstorming, mind-mapping and ideation methods, two main strains of ideas emerged: solutions to increase focus and information flow about climate education within and to relevant ministries, and solutions to help headmasters and teachers to implement climate education in their schools. After much discussion and a few rounds of voting, two ideas crystallised:

1) Climate education coordinating office, either at ministry or municipal level. This responds to the problem that at the moment, climate education is no-one's main responsibility at these levels, and consequently, it remains un-integrated to education planning and implementing.

"No one of us focuses 100% on climate education, we all have a couple percent of our total work time for this." -- Ministry

employee

Coordinating office would participate in the curriculum creation process, relay information from school level to relevant ministries, gather and spread best practices, and provide access to credible climate education resources for teachers and students. As a high-level concept, we visualised the climate education system as an hourglass shape, where ministries and Finish Agency of Education (OPH) are the top part and a junction between, the climate education coordinator, ensures smooth information flow to schools and the other way round.

2) "Hinko" (Hiilineutraali koulu / carbon neutral school - figure 3), a school pact inspired by carbon-neutral municipalities project Hinku. By nudging schools to

engage in climate actions, this idea combines engaging students and preparing them for active citizenship and putting climate education in practice at school level.

At this point keeping up with two ideas to develop further took a lot of processing power, but since both seemed worthwhile to pursue, we did not make yet the decision between them.

4.3 Validation

We contacted several stakeholders we had interviewed in the research phase, and asked for their view on our ideas via email. Depending on the stakeholder's field of expertise, we sent just one or both ideas to be reviewed. The main goal was to discover which of the two ideas was seen to be more relevant and impactful by the experts. Additionally, we wanted to make sure our ideas did not have completely infeasible parts or missed crucial details.

Climate education coordinating office was considered by several stakeholders somewhat bureaucratic, although it was seen to have good points as well. *"In my opinion, the coordinating office sounds somewhat heavy and bureaucratic, and so does not answer to current needs"*, as one expert responded. Some responses noted the existing need to improve coordination between stakeholders: *"Strengthening coordination and so-called making accountability is much recommended."* But overall, Hinko received more excited responses and was seen to be more impactful of the two. *"Hinko could be a lifestyle for the school, in a similar manner as Liikkuva koulu (moving schools project) and Kiva koulu (No bullying school) have become."* After receiving feedback from seven stakeholders, we decided to shift our attention to Hinko.

With Anna Muotka, climate education researcher from the University of Lapland, we had a very insightful video call feedback session. After talking to her, we started seeing the two ideas were not that far away from each other and parts of them would complement each other. Hinko needed coordination and to make it successful, it would have to extend from school level to ministries. Moreover, running a project such as the Hinko school pact would generate information about the state of climate education in different regions of Finland and possible obstacles. If this information were to be gathered, it could be valuable for the Ministry of Education and Opetushallitus in developing climate education further.

A similar validation step was done after the final presentation as we sent out the final presentation video to stakeholders. This provided us with further detailed feedback of our proposal. Some of the comments will be discussed in the section 6.2 Limitations and further research.

5

Intervention proposal: Hinko

Our proposal is to develop a program that assists teachers in mastering climate education, that combines learning and doing for students, and that helps ministries and governmental agencies getting up-to-date information from the school level. This proposal is Hinko, a climate education module and network.

We suggest that the module focuses on upper comprehensive schools, with students between 13 and 15 years old. As was pointed out previously, different emphasis exists in the vocational and lukio's curriculum. Choosing this age level would ensure that all kids receive quality climate education and build their own position on the topic, regardless of their future educational path.

We find it important that the execution of Hinko is based on practice and context. Therefore, we have made the module as adaptable to schools as possible. For example the length of the module could vary between 2 and 3 months, depending on the size of the school. The action part of the module will however continue over the years.

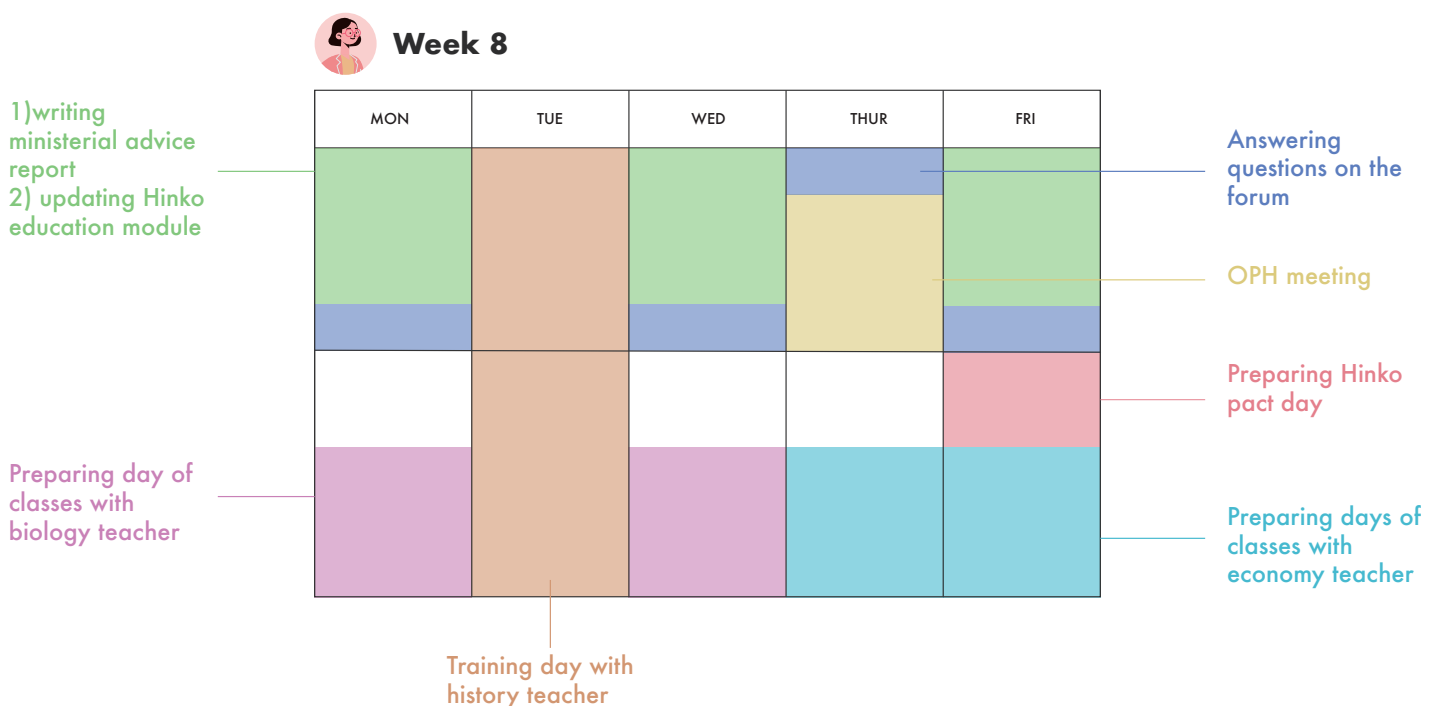
In our research we also found how every

school has to conduct a multidimensional learning project at least once a year. This project should involve students in deciding the learning targets, integrate the topic to at least three subjects and delve into the topic in various ways (research, practical projects, art etc) [5] It is quite an effort for schools to fulfil the requirement. This is where our proposal makes best use of this situation as opportunity, as Hinko could fulfill the requirement of a multidisciplinary learning project. Thus Hinko would not add too much extra hours to the schools and teachers' work, but instead create a systematic and structured way to fill one of the many requirements a school has.

5.1 Hinko Team: Experts and a platform

Experts

The core of the Hinko team consists of climate experts. They are a selection of the current climate education experts in Finland. They are knowledgeable frontrunners who are passionate about advancing climate education. The experts



This is how we think an expert's schedule could look like. It would include all the following activities

assist teachers in creating lesson plans that integrate climate education to their subject. They answer any factual climate education questions the teachers have as well as providing teachers with support to overcome inconfidence and awkwardness around bringing climate change discussion to the classroom. The initial class planning and advice is given through online meetings, followed by a day where the expert visits the teachers school to co-teach the collectively prepared lessons and help to facilitate student discussion in class.

As you can see in the sample weekly agenda of the expert, the expert's week is not only occupied with educating school teachers. They also take time to reflect on the experiences and practices and summarise these insights into reports for the ministry, presentations with relevant entities such as the Finnish National Agency (OPH), NGO's and universities with teacher education programs.

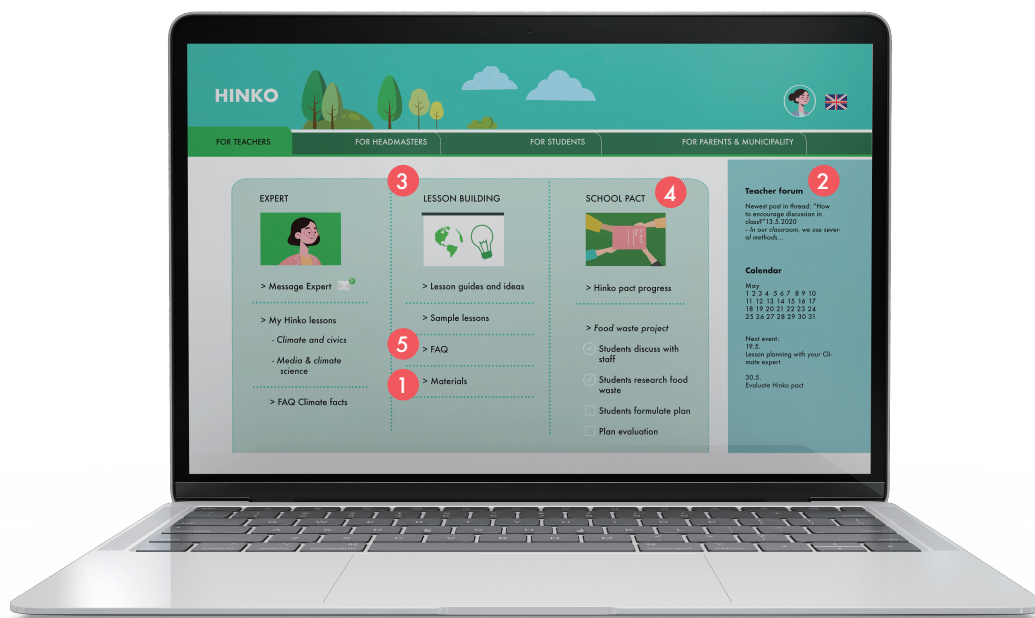
Platform

To scale up the experts' work, we make use of the Hinko platform. Here teachers can find teaching materials and ask any additional questions to the expert. In the beginning the expert will spend quite some time

to answer these questions, but over time frequently asked questions (FAQ) with answers to most common questions can be collected.

From teacher perspective, the platform offers

- 1) Links to validated material databases. Teachers can use these materials to prepare their classes and it reduces their time of having to search and fact check these materials, as these materials are already in line with the curriculum. Open ilmasto-opas could be one of these material databases that are linked with Hinko. These materials can directly be shared with students.
- 2) A forum to share best practices or concerns with one another on how to approach climate change. It would have both common and subject specific sections.
- 3) Recorded example lessons that show how a teacher could integrate climate education in their subject. These videos not only show content wise how to run these classes but also give examples of how to approach the conversation in class. In this way the video lessons give ideas, knowledge and pedagogical support.
- 4) School pact functionality (more on this in 5.2, step 4)
- 5) FAQ section, as explained above.



"Screenshot" of the platform

As this platform is digital it also provides an easy way to collect information from teachers and schools (see also section 5.2 step 5). Information on what kind of materials they use, how they experience them, which schools get connected to the network. This information can be used to formulate specifically targeted action plans. If collected data for example shows that a certain region is left out, further investigations about the reasons for this can be planned allowing for effective measures to be taken in bringing all regions (schools) aboard.

From the ministry perspective, the platform is relevant for information gathering purposes. Information can be collected about schools that have adopted the Hinko program, and how they differ from the school that haven't yet done it, what are the main obstacles and what best practices have emerged. Moreover, students, experts and teachers have the possibility to provide direct feedback through forms available to all, which would help the program adapt to their needs. The Hinko program would gather and analyse this information and forward it to the ministry.

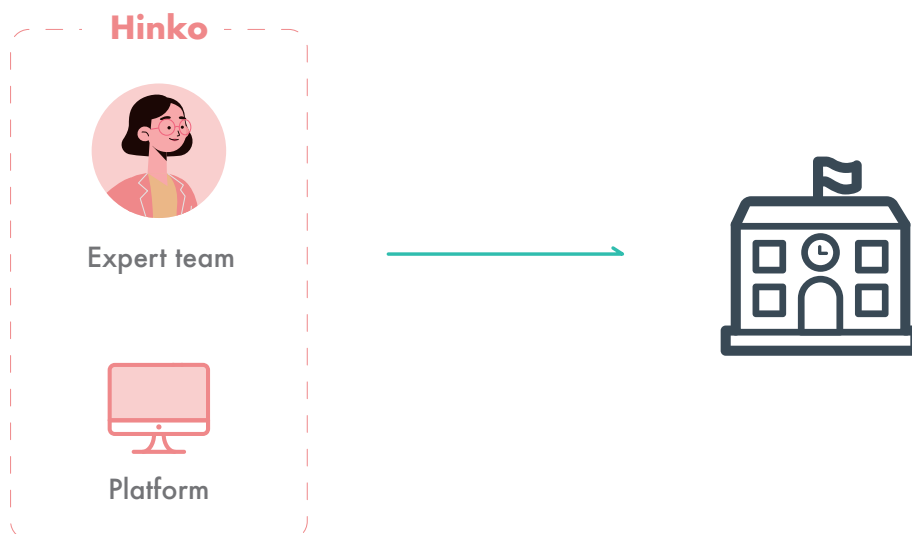
Additionally to scaling up the work from the expert, the platform also amplifies the network as it can connect different schools with each other. (For more information see section 5.2 step 4)

5.2 Hinko module: 5 steps

Our module is separated into 5 steps after the school has committed to participation in the Hinko program.

Step 0

Experts actively contact schools and municipalities and motivate them to participate in the Hinko program. This active reach out is especially important to reassure not yet active schools of their ability to participate and create change. An incentive for schools' participation is that the Hinko programs fulfils the requirements of the multidimensional learning project, which is mandatory for upper comprehensive schools.



Initiating school pact and joining the Hinko program.

Step 1

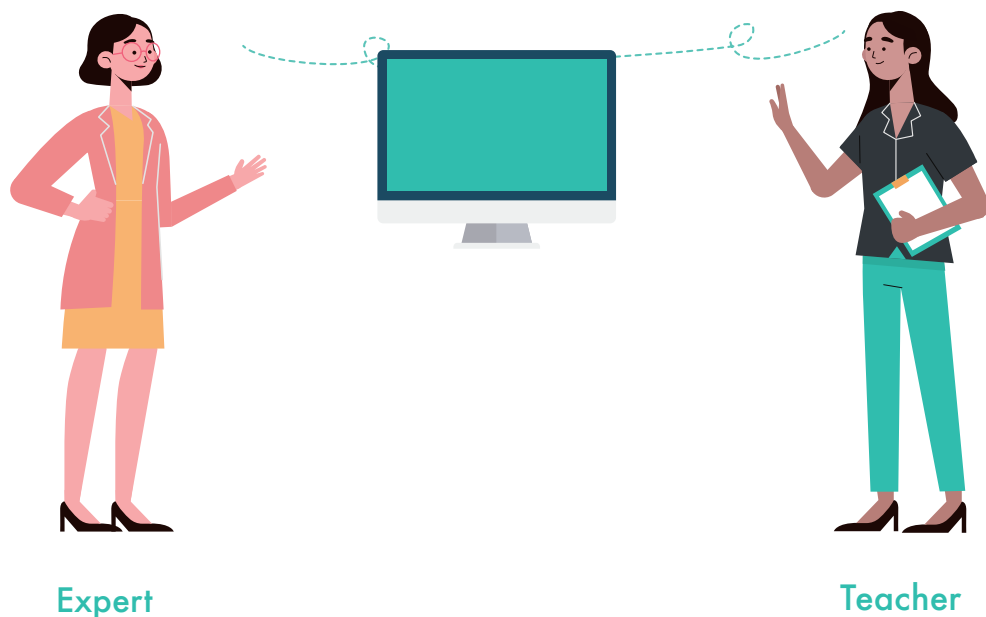
The school selects a set of diverse subject teachers who will follow the training program. After the collective kick-off meeting in which the structure of the module is explained and teachers receive a crash course on climate facts, individual meetings are planned.

In the first week of the teaching module, an expert communicates through online meetings with a specifically selected subject teacher. Together they prepare a day of classes that include climate change. This preparation aims to familiarise the teacher with integrating the topic in her classes by learning where to find credible teaching materials, learning good approaches to climate discussions in class, and providing moral support.

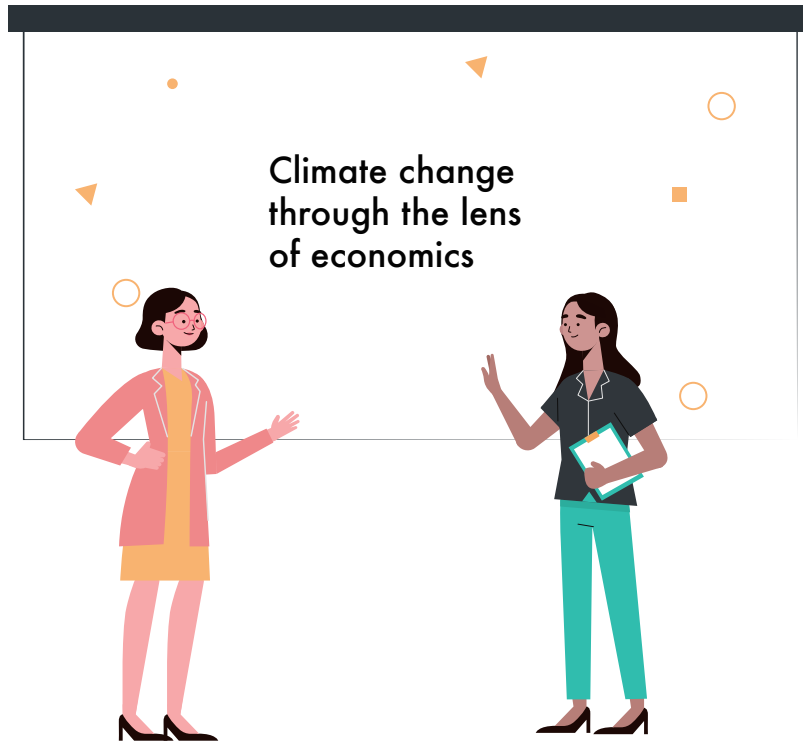
By preparing the classes together with the Hinko expert, lesson preparation and learning about teaching climate education are combined. This makes Hinko not another thing on top of the teachers schedule, but something integrated within

the already existing workload. Having these meetings online also restricts the amount of time the expert needs to be physically present, reducing the need to travel.

In the second week, the expert visits the school. Together with the teacher, they co-teach the prepared classes. The expert's presence creates a safe space for the teacher to experiment with different pedagogical approaches. When conducting an open discussion about climate change is something new and the teacher is uncertain about how to manage this conversation, the teacher can make use of the expert. With the expert, she can experience facilitating an open conversation about a political topic, without overstepping the sensitive role of schools and educational institutions when it comes to political positioning. This positive experience equips the teacher with the confidence and skills to integrate climate education in future classes independently and continue using diverse pedagogical methods in the classroom.



Expert helps teacher to prepare lessons with climate focus.



Co-teach the class

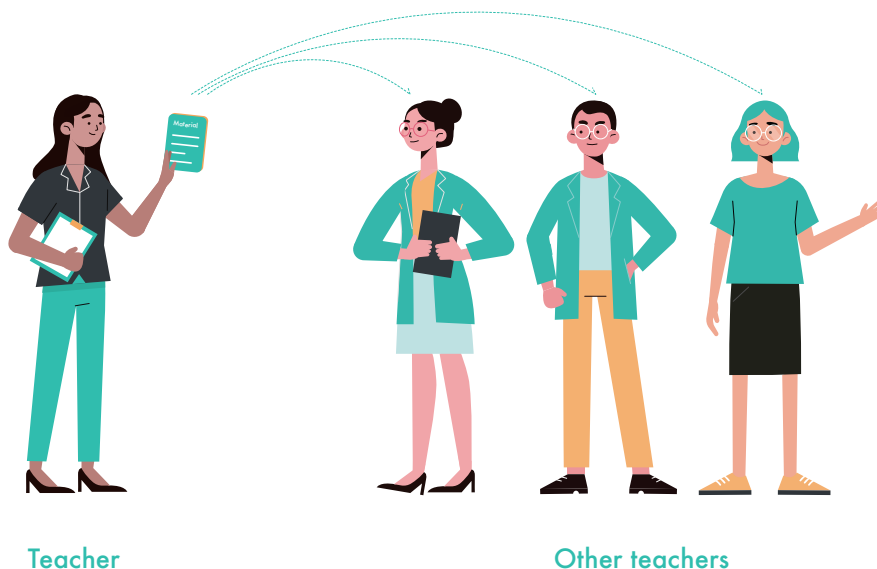
Combining the teaching of students with the training of teachers is another time-effective element in the Hinko program. Time is not lost by having to sequence training and teaching.

Step 2

As time is pressing and there is only a limited number of experts, instead of the expert training all the teachers, the selected subject teacher and the platform take over

the expert's supporting role in the school.

Hinko-trained teachers share their knowledge and skills with fellow teachers and are supported in this role by the platform. The platform's function in this is to provide access to knowledge otherwise provided by the expert through the FAQ section, recorded lessons and the peer network in schools and online. Over time a network of schools is built and teachers can share best practices with one another,



Teacher

Other teachers

spreading knowledge and experience not only within the school borders but across.

Step 3

As different subject teachers are trained in integrating climate in their subject teaching, it leads to the introduction of various perspectives on climate to students. As students have difficulties in connecting different bits of climate information in the traditional education system, Hinko emphasises the importance of connecting these different perspectives. That is why the school is encouraged to establish discussions between students and teachers all along the process, to help build links across topics. At the same time these discussions stimulate critical reflection among students and lead them to develop critical thinking skills and formulate a well informed opinion on the topic.

Step 4

The Hinko module aims to teach active citizenship to students by doing, not just by listening to lessons. In the School pact, students, teachers and staff choose climate action targets for their school to act on. To make the process uncomplicated, Hinko provides example targets in several theme categories, such as energy use, transport, food, waste management and carbon sequestering. In addition, there are common climate education targets.

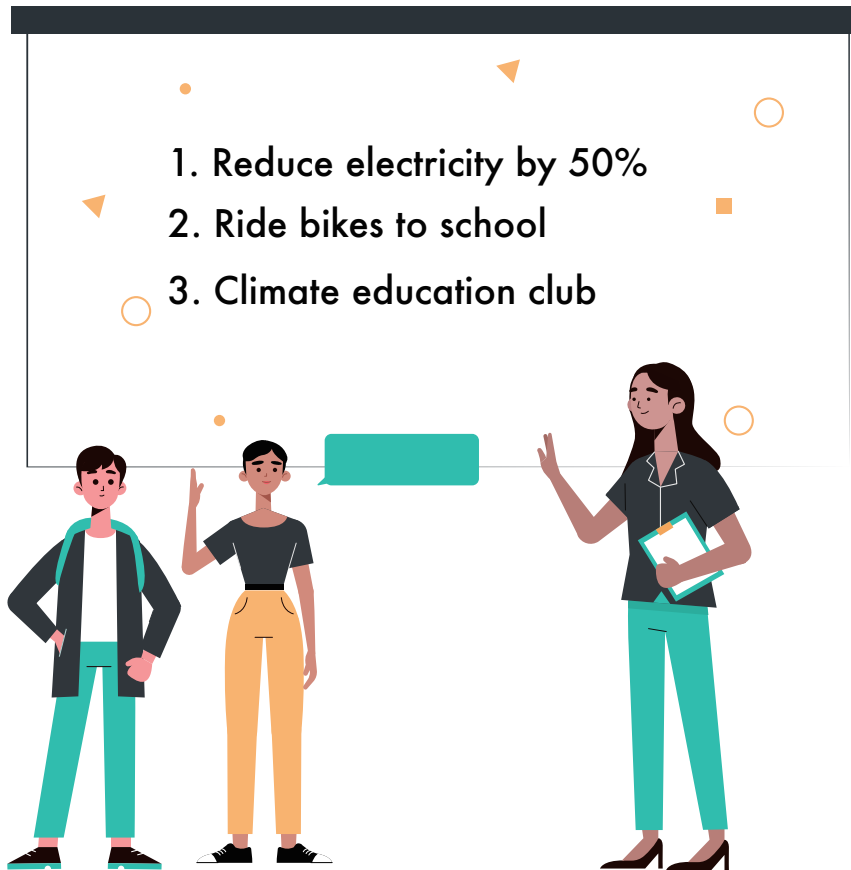
In co-creation exercises, the students, experts and teachers co-design their school's pact, a set of carbon emission reduction targets and climate education objectives individualised for their school. Targets are set once a year to fit within a five-year vision. Progress is reviewed annually and the five-year vision is redefined accordingly.



Targets that require only action from students, teachers and staff can be decided on within the school. Negotiations with the municipality may be needed for the more ambitious targets that require renovations or other investments. Hinko School pact

materials include advice on how to approach municipal decision makers about climate target investments.

Students and staff together take action toward these targets. Since some goals



might involve specific knowledge that is beyond the scope of teachers, Hinko connects schools to NGO's and external experts that can provide specific knowledge and expertise. For instance, an NGO who can come to the school to educate students and teachers about energy saving, carbon sequestration, climate-friendly food and other topics as needed.

Students report on the progress of the school pact on the Hinko platform, with leading responsibility on the older students. This information is visible to other Hinko schools, allowing schools to learn from each other and exchange best practices, possibly establishing partnerships if they are close to one another. This is how Hinko connects schools in a network of partners, sharing motivation, ideas and advice, perhaps even competing with each other in a friendly manner.

At the end of the school year, a Hinko event is held, where schools that made the most progress during the year are invited to attend and celebrate their successes.

To ensure schools' continued commitment to the Hinko program, schools are awarded with the Hinko school title after finishing the first five years of targets. Financial rewards from energy savings also encourage continuing Hinko school pact efforts.

Step 5

In various ways, Hinko gathers feedback. For example, after the day of in-class teacher training with the expert, the teacher and expert have a short evaluation conversation about the teacher's experiences, needs and challenges. The platform has more of a quantitative angle to gathering information. Here feedback is gathered through scores given to certain teaching materials, most visited sections of the platform and most often appearing questions. The last form of feedback is found within the Hinko report and the progress mapping of the targets on the platform. Analysis can be done on the different targets set. What targets do schools choose, is there a bias or preference to certain topics. How well do they proceed and do they need any additional help in fulfilling their pact. The feedback is analysed by the Hinko team and compiled into an evaluation report which is forwarded to relevant ministries and agencies. This gives the ministry the possibility to know on a more precise level what is happening in the field. Based on this contextual insight they can then decide to adapt the objectives of their policies or reallocate resources to where they seem most effective.

One of our design drivers is agileness. That is why we have integrated so many forms of



feedback, to allow for quick iterations on the way the experts teach and give guidance as well as to the chosen set-up. There are many variables that can be adjusted. For example, the amount of teachers that receive the initial training can be decided by the school, the length of the module can be adjusted based on what is needed in practice and so on.

5.3 Funding and positioning

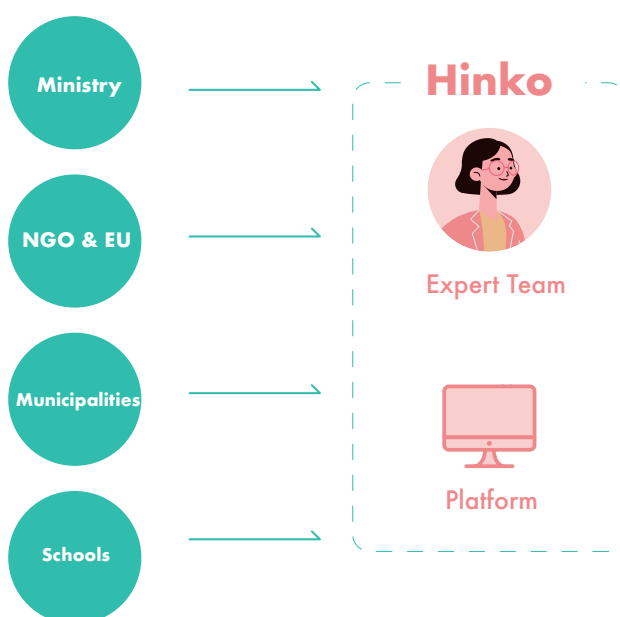
We envision that the pilot phase of Hinko could be funded by the Ministry of Education and Culture and Ministry of Environment as they both aim to boost climate education. Later, in the operative phase, Hinko project could be financed by several sources. Funders would include the Ministry of Environment and the Ministry of Education, foundations related to climate issues, EU funds as well as participating municipalities and schools. We find it very important to support the autonomy of the school in not having to wait until top down political decisions are taken and not tie the funding to one source such as the municipality. If an

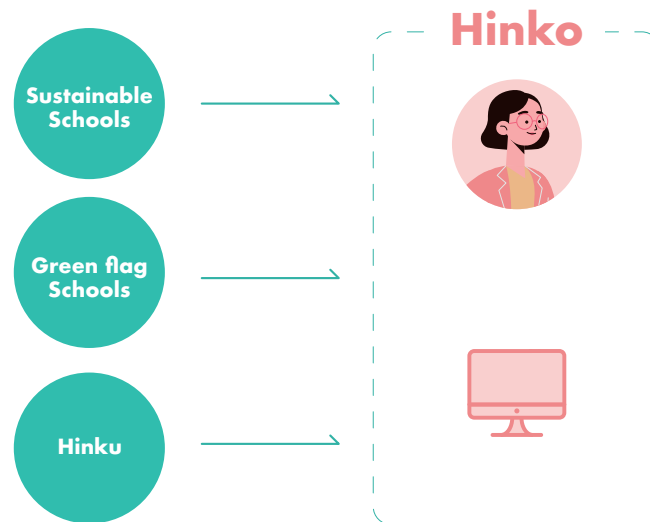
individual school wants to participate in Hinko, they could use part of their teacher training budget to join the program and network.

As it is not yet clear how Hinko will be funded and how its relation with informing the ministries is established, it needs yet to be determined within which entity Hinko should be run: It could be the Finnish National Agency of Education (OPH), one of the ministries, or Syke, the Finnish Environmental Institute, as all of these are governmental entities concerned with climate.

5.4 Collaboration opportunities

We have identified several potential collaboration partners. HiNku, the carbon neutral municipalities program is an obvious partner, especially in organising the school pact climate targets. HiNku can provide assistance and knowledge about energy saving in municipal framework. The Green Flag Schools is an international





certifying program, that awards the green flag to educational institutions that have for three years committed to environmental practices. Green flag certified schools have already a headstart in energy saving and other school pact targets.

Finally, Kestävä koulu (the sustainable school) is a new program that is in the beginning stages right now. As its goals are very much in line with Hinko, such as support for teachers in incorporating climate issues in teaching and getting the school environment in line with climate thinking, there is plenty of collaboration to explore. Support to teachers is an integral part of both Hinko and Kestävä koulu, where they differ is the school pact that brings active citizenship experiences to students.

Multiple collaborations would be ideal to bring together the best of all projects.

5.5 Benefits

We find it important that every stakeholder benefits from this program where possible. As these benefits have to be realised in practice, the following sections are a speculation on where we see that the program

could be of benefit. Overall, the module would be a time-efficient and human-centered way to share knowledge and raise the next generation of climate-conscious active citizens.

Starting with the Ministry of Education, Hinko provides a scalable intervention idea that would boost climate education in upper comprehensive schools. They would benefit from a regular flow of information allowing for more responsive budget allocation and interventions. In addition, the Ministry of Environment would benefit from seeing schools taking action to reduce their carbon footprints and spark change to reach the 2035 carbon-neutrality objectives.

For the school the combination of classes and pact fulfill the request of the multidimensional learning project that every compulsory education has to include. The school pact creates active citizenship learning experiences that are otherwise challenging to integrate. Taking the initiative to participate and take action may boost school spirit. Joining a network of schools and organizations can be beneficial in learning new ways of doing things and feeling connected.

For teachers, the benefits of Hinko are numerous. We believe teacher autonomy does not mean being 'alone'. Instead, our proposal strengthens teachers' confidence through expert and peer to peer support. Teachers develop new skills, with less additional work that normally comes with following training. Through the platform, teachers will have knowledge and materials at their hands, and assistance to normally time-consuming lesson planning.

The module will ensure that all students in upper comprehensive schools receive holistic, high-quality climate education that is responsive to current events. Students will develop a critical perspective on climate change and learn how they can contribute by lowering their individual and societal carbon footprint. With the school pact, students get active citizenship experiences that will shape their learning environment. This will be relevant immediately and also when they are older. They will know how they can participate in democratic (political) processes. They are capable of negotiating, developing a plan and following it through.

Experts would have the opportunity to advance climate education in Finland by using their network and skills in a meaningful and impactful full-time job in their field. They will use their knowledge to act as a bridge between schools and ministries to shape a climate-conscious and -active generation

6

Next Steps

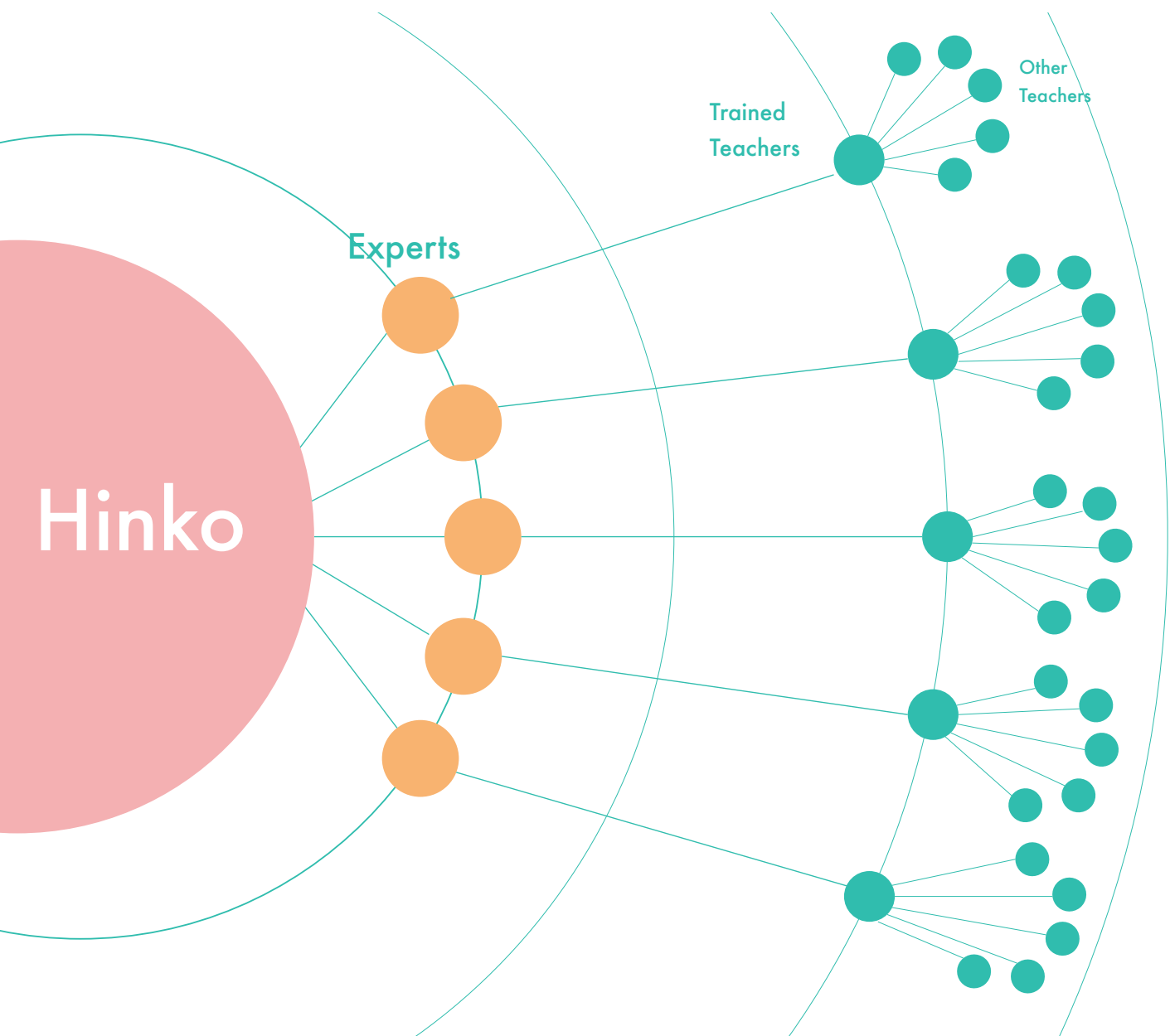
6.1 Pilot project

We know how unpredictable the reality can be. Therefore it does not make sense to develop a fully fleshed out proposal for Hinko for the following five years. Instead we want to use the idea of prototyping the program with on-the-ground experiences to build something that really answers practical needs. Therefore, we envision the program to start as a pilot which can evolve over time.

Before offering the Hinko program country-wide, it would be piloted in 3-5 schools. The final number will eventually depend on experts and the budget available, as well as the amount of schools volunteering. The

first step would be an open application round where schools who are interested can apply. The selection is made on their motivation to take action, not by how active in climate education the school already is .

Through practice and evaluation, any glitches in the program will be ironed out, as the module is adapted based on the pilot schools' experiences. An incentive to enrol as a pilot school is to have free access to the cover some of the costs. module as this pilot could be subsidised by the ministries. Later, schools will have to invest part of their budget to lanuch pilot phase. After the pilot phase, interested



schools can reach out to Hinko themselves, as we hope that the pilots will get media attention and raise awareness about the existence of the program. But at the same time experts continue reaching out to municipalities and schools to promote their work and get less 'active' schools to participate.

As more schools participate, the demand for experts increases. Expanding the Hinko team will reduce individual expert travel across Finland, as experts could be allocated to specific regions. At the same time we foresee that the training module will become obsolete at a certain point as every in-service teacher will have received climate education training and, new teachers' training already includes climate education. This does not necessarily mean the end of Hinko, as climate education is a very new field, its development continues. Hinko's role could expand to share best practices abroad, and the platform could be readapted to integrate other multidisciplinary education topics in school. However this is all speculation and time and practice has to tell what direction Hinko takes.

6.2 Limitations and further research requirements

With experts as validation on our proposal, some potential shortcomings stood out in our current proposal that will require further research:

1. Experts' availability and willingness to participate in the module needs to be investigated. As the proposal relies heavily on their knowledge and skills, the module could be adapted to their availability and expectations.

2. Estimated cost of the program including platform development and maintenance,

education experts' salaries and general running costs. If Hinko is internal to ministries, funds have to come from the ministry budget. However if it is decided to make Hinko an external program or a partner of existing NGO's a funding application can be made towards ELY-keskus.

3. Headmasters have a crucial role of allocating time and budget for annual projects. How could we include them more in the process and incentivise them? The Hinko process may need to be simplified to make sure that headmasters have enough time and don't set Hinko aside as headmasters are already overloaded with lots of tasks and Hinko should not become an additional one.

4. School incentives: A thorough reflection should be done on what possible incentives could be given to schools and municipalities to join this program and engage in the school pact. Co-creation workshops could be run to understand the school's opinion on the subject.

5. Parents' role and how can they be included in the process. In Rosa Forsbom's thesis [6] on climate education, it was discovered that parents' attitude was more important in determining the students' attitudes than friends' attitudes. The impact of home environment and the possible conflicting messages from education and from home should not be underestimated. If parents are engaged positively, students learning can inform parents as well, leading to a snow-ball effect in climate consciousness.

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- [7] Some illustration from <<https://www.freepik.com>>

Appendixes

People we interviewed

Name	Role
Pinja Sipari	Climate education specialist
Heta-Elena Heiskanen	Ministry employee
Hanelle Cantell	Book writer and climate education researcher
Essi Aarnio-Linnanvuori	Researcher
Salla Ryttilä	Headmaster secondary school
Anna Liimatainen	Counsellor of Education at Finnish National Board of Education
Hannele Pohjonen	OPH
Tuomas Kulha	Headmaster
Aura Piha	The coordinator of Ammatilaisen kädenjälki project (Sykli)
Sterre van de Ven	Student
Nicklas Wilhelmsson	Ministry employee
Anna Muotka	Climate education researcher
Minna Lappinniemi	Special education teacher
lina	Student

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Rinna Saramaki, Zhengshuang Han,
Noah Peysson and Design for Government course at Aalto University



Ministry of
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Ympäristöministeriö
Miljöministeriet
Ministry of the Environment