



Irén Andresen and Miryam Pippich

Across Subjects

Supporting teachers in interdisciplinary project planning

A service and interaction design diploma

The Oslo School of Architecture and Design

2018

Across subjects

Supporting teachers in
interdisciplinary project planning

A Service & Interaction Design Diploma Project
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The Oslo School of Architecture and Design
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Abstract

In 2020 a Subject Renewal in Norwegian primary education will introduce a new curriculum with more focus on interdisciplinary teaching. Interdisciplinary teaching emphasizes collaboration between teachers from different subjects. There are no pre-existing solutions to address the complexity resulting from collaboration across subjects.

To facilitate the transition from the present to 2020 we state our key research question:

How might we support teachers in interdisciplinary project planning?

We used an open, user-centered, iterative approach along with more traditional qualitative research methods such as interviews, conversations, observation and co-creative sessions with stakeholders.

The result is Samspill. A digital prototype and service proposal exploring how to support Norwegian middle school teachers in collaborative project planning across subjects.

Samspill provides transparency by offering teachers a collective overview over all of their schools interdisciplinary projects and giving insight into their colleagues' work. The projects are set up and planned in a visually and clear way, enabling teachers to share ideas and knowledge.

When a group of teachers is finished with a project plan, other teachers can be inspired and customize the plan in order to make a new one. In this way, the focus can always be on creating engaging learning experiences for the students.

Our design proposal exemplifies interdisciplinary collaboration among teachers in a concrete and visual way, and can encourage more openness among teachers and leaders towards the changes of the primary education subject curriculum.

Introduction

Education is something most of us have an experience with. We can relate to being a student in a classroom. However, we might not reflect upon what happens behind the scenes, in the planning and creation of the lessons and projects. Teachers are the ones shaping our learning journeys. They are the heart of education and have a great impact in shaping future generations.

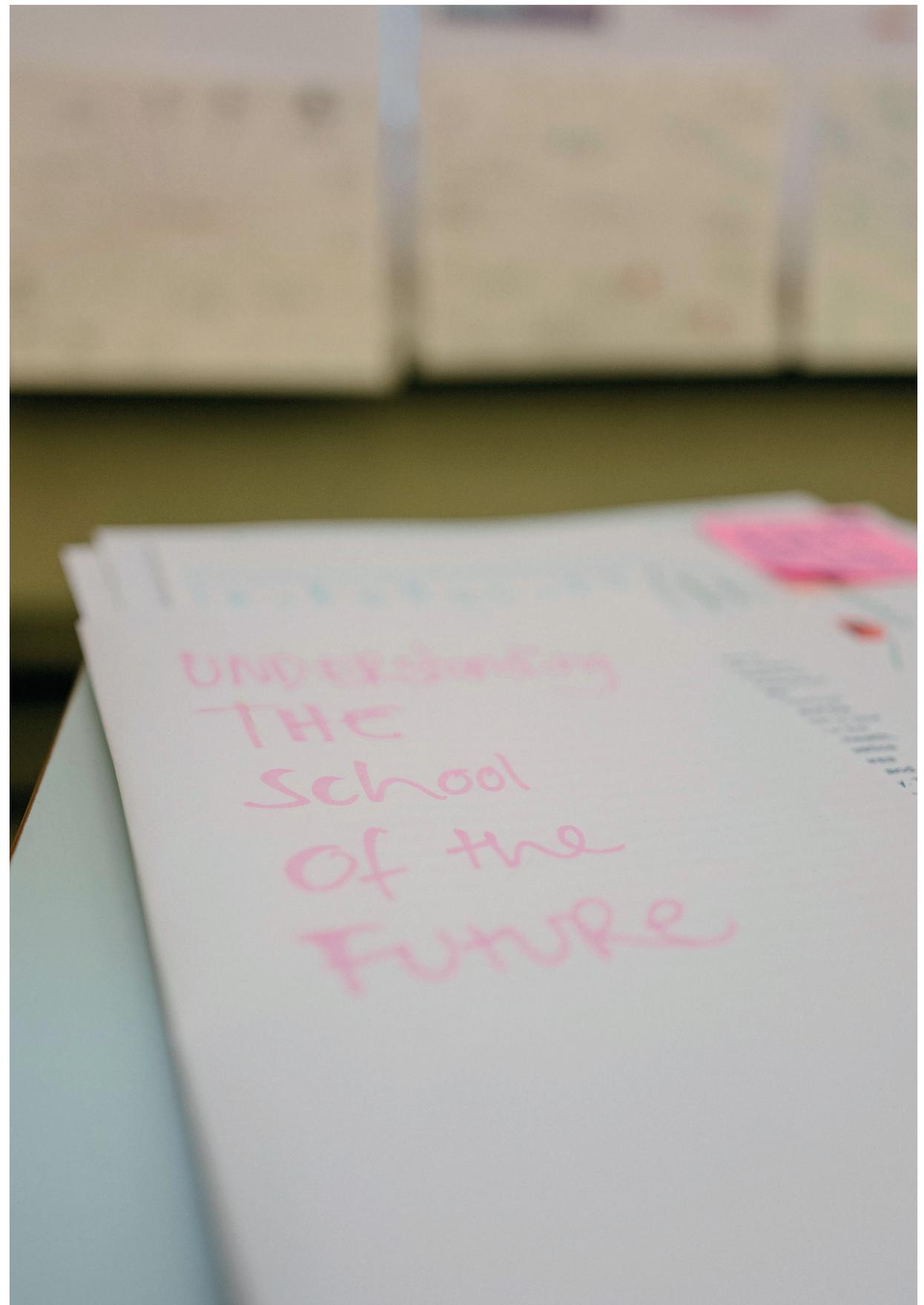
Teachers and Norwegian primary education is facing a Subject Renewal in 2020, called fagfornyelsen, introducing a new curriculum. It is a renewal of the Knowledge Promotion School Reform from 2006 (UDIR, 2017). The Subject Renewal will introduce an enhanced focus on teaching across subjects and disciplines.

When the renewal is introduced, it is put in the hands of the teachers and school leaders, and it is up to them to bring it to life and make it work in practice. Through interviews, conversations, observation, and immersing in the educational context, we identified a need for support among teachers in interdisciplinary project planning.

Teaching across subjects today is often complex. Teachers can experience messy planning processes, loss of valuable information and a lack of communication and sharing amongst each other. They rely on good support in the tools they use every day, but the existing solutions are not adjusted to the changes.

This diploma project explores how a digital service can support teachers from different subjects in collaborating, creating and planning projects together. We developed Samspill, a tool that aims to ease teachers adaptation to the renewal, enabling them to share knowledge between each other and the subjects. We want to create transparency through collaborative sharing, discussions and evaluation of interdisciplinary projects.

Samspill aims to trigger engagement, conversation and awareness by exemplifying a possible solution that can face the challenges that educators will be confronted in about two years.



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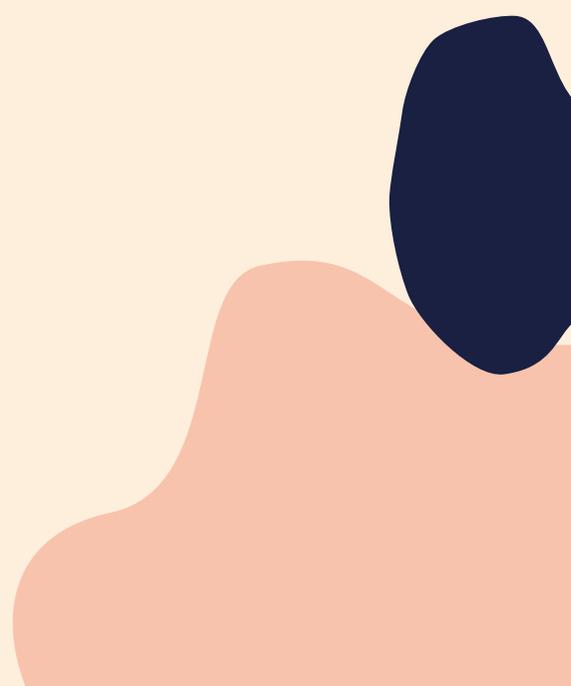
References

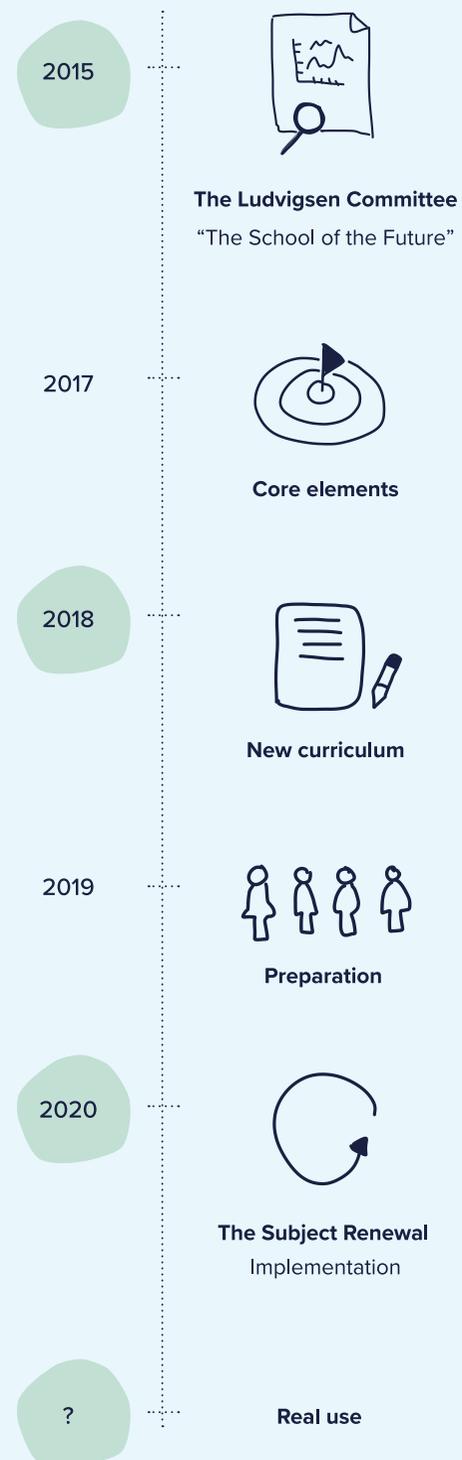
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Context & Brief

In this chapter you will be introduced to the educational context with a specific focus on the Subject Renewal and what it implicates. In the end of the chapter the project brief is presented.





Timeline for the Subject Renewal, (Adapted from UDIR, 2018)

The Subject Renewal

In 2015 the Ludvigsen Committee, a group of professors and experts selected by the government, wrote two reports with suggestions of a school renewal called "Student's learning in the Future School" (Kunnskapsdepartementet, 2014) and "The School of the Future" (Kunnskapsdepartementet, 2015). This sparked the start of a subject renewal that is currently under development and is planned to be implemented to Norwegian primary education in 2020-2021.

In the report, the Ludvigsen Committee states: "Education shall contribute to developing the knowledge and competences of pupils, so

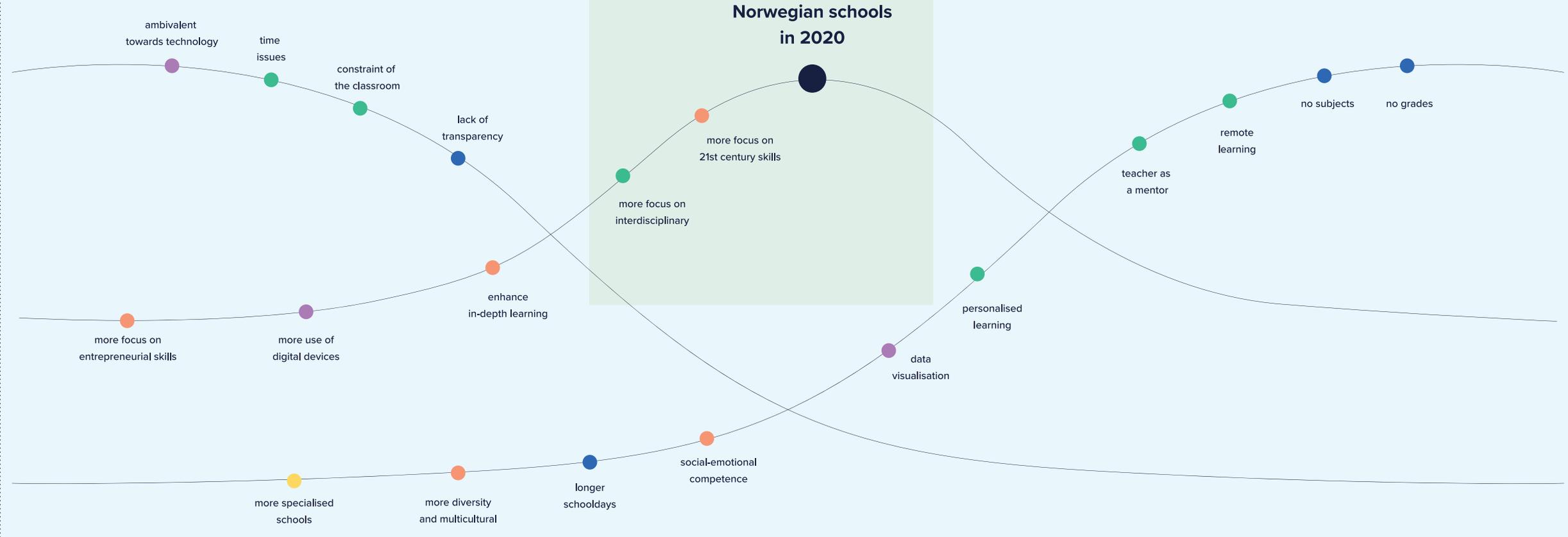
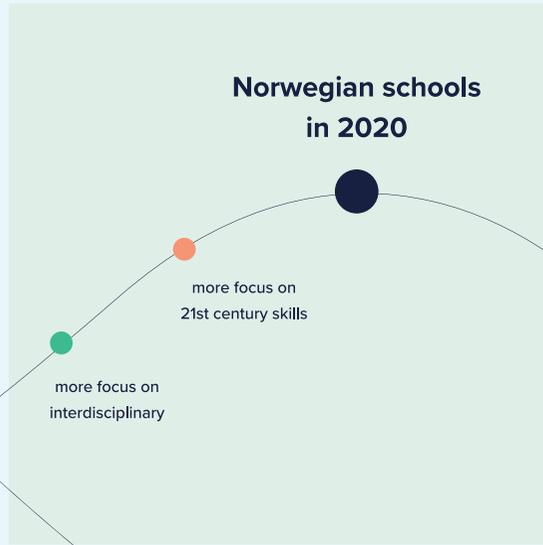
they may become active participants in an increasingly knowledge-intensive society. In today's society, knowledge is changing its content and form – in scientific disciplines, in new emerging knowledge fields and in working life. If the potentials of pupils are to be realised, the subjects must be renewed and the school must be developed."

A crucial question arose from the Committee: "Do schools today prepare the students for the society they will face in the future?"

the traditional school

the school in transition

the future school



2018

2020

2040



Three horizon model (Adapted by Curry and Hodgson, 2008)

The parts of the Subject Renewal (The School of the Future, 2015)

New elements

There are four primary areas which will be affected by change. These result in different teaching practices and new ways of thinking of student's learning.

New curriculum

Today, the curriculum is considered to have too many competence goals, resulting in a high amount of complexity for teachers and students alike. Teachers struggle to focus on which key topics must be covered, while students find it difficult to grasp the most important elements to study. The new curriculum will be specified with fewer competence goals.

Core elements

The core elements in the new curriculum are intended to articulate the fundamental content for each subject.

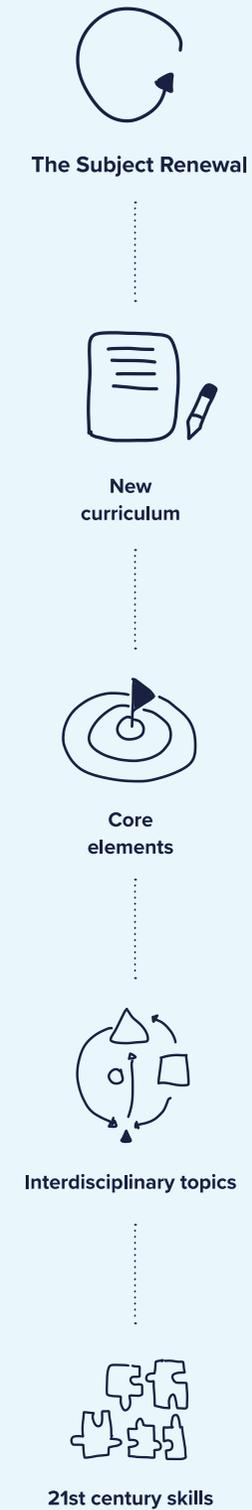
Interdisciplinary topics

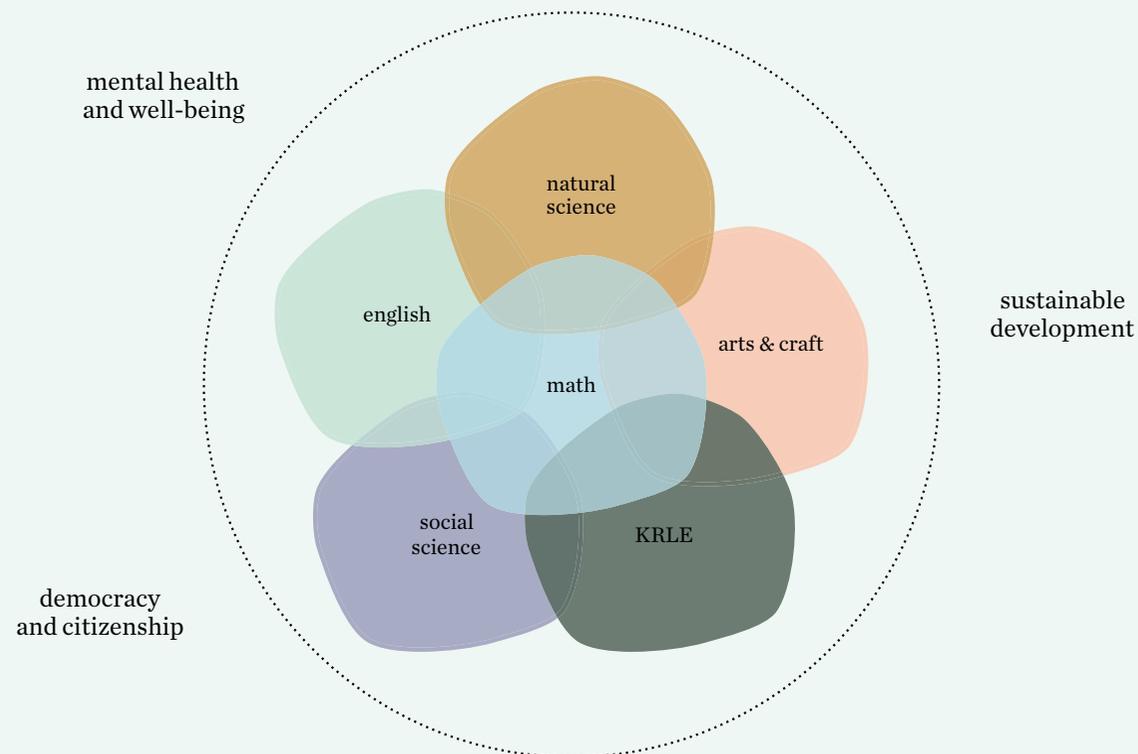
The interdisciplinary topics are not new in their own right. The innovation, however, lies in their interdisciplinary inclusion.

21st century skills learning

There will be a broader focus on 21st century skills, including more in-depth learning over time, such as project-based learning.

The integration of project-based learning and 21st century skills is an approach to prepare students for the future. It is not yet embedded in the current teaching practice as routine.





The three new interdisciplinary topics

“In the Subject Renewal there must be a focus on all subjects stimulating a comprehensive understanding and skills for students across disciplines and fields.”

Senior Advisor,
Utdanningsdirektoratet

Interdisciplinary topics

One of the new elements to the renewal is the focus on interdisciplinary teaching and the introduction of three main interdisciplinary topics. They present a major change in the teaching practice.

The Ludvigsen Committee defines interdisciplinary work as pupils studying research questions or themes that require competence from a number of subjects (Kunnskapsdepartementet, 2015) The goal is that the pupils should have knowledge, curiosity and understanding for topic areas across the subjects. As a senior adviser at UDIR states “the world is not divided in subjects” (UDIR, 2018).

Three overarching interdisciplinary topics will be introduced in 2020: sustainable development, democracy and citizenship, public health and well-being (Kunnskapsdepartementet, 2015). These are based on current societal challenges.

The goal is to enable students to discuss and make reflective choices about what is necessary to enable sustainable development. The theme of democracy and citizenship will provide students with an understanding of the challenges involved in living together in a community and the importance of everyone having the same right to participate in society (Utdanningsdirektoratet, 2017).

In light of the growing individualisation of society and the easy access to information, the Committee finds that competences connected to making responsible choices in one’s own life are important, including knowledge about one’s own body and health, mental health, lifestyle, personal finances and consumption (Kunnskapsdepartementet, 2015).

Project brief

This project has an explorative and initially open problem statement, based on real-life practices and insights.

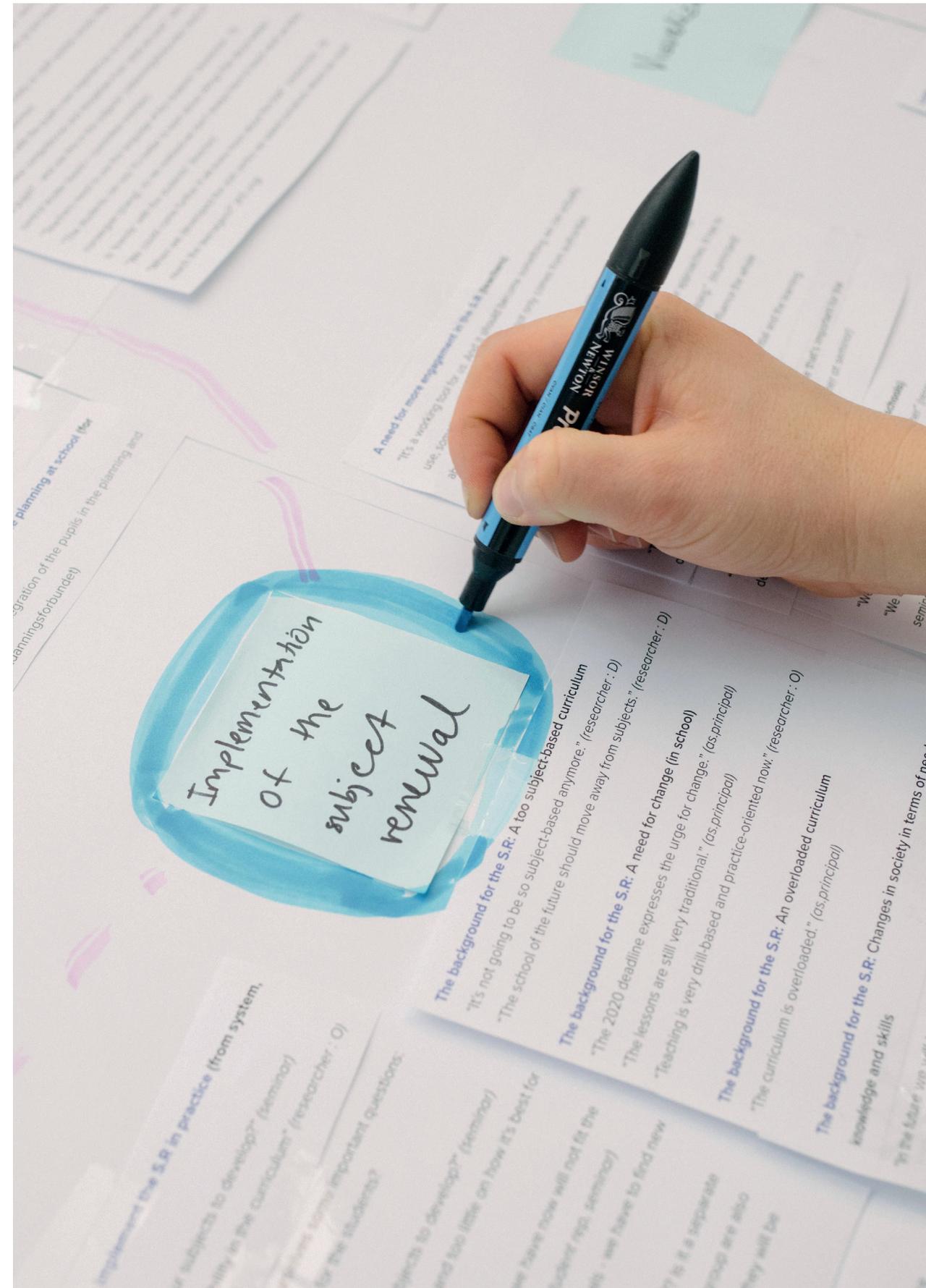
It started with discovering and mapping out a holistic perspective of the Subject Renewal, what it implicates and how it affects the stakeholders. Early it was discovered that we as designers can intervene and exemplify how the strategy of the new curriculum and principles can work more concrete in practice.

Our initial problem statement:

How can we explore, facilitate and visualise how the new principles from the Subject Renewal could be applied in the classroom in an integrated way?

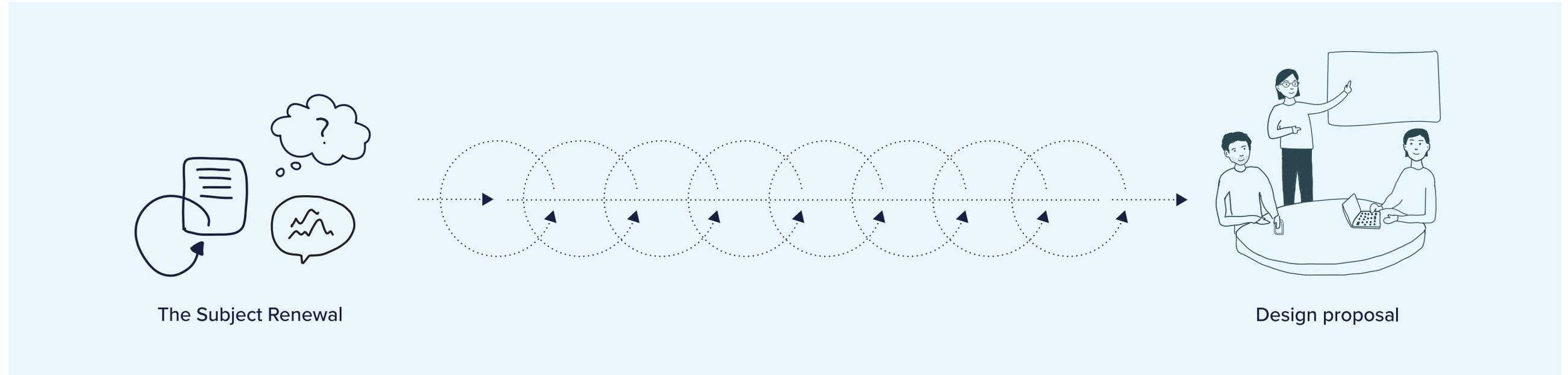
We found that there were three main stakeholders we could support - the students, the teachers and the system. These three stakeholders had to be viewed in a systemic context because the needs and opportunity areas are connected.

The initial open scope formed a basis for the project, with the freedom to explore and identify which areas and stakeholder we could best support and meet the needs of.



approach & methods

This chapter introduces you to our approach, different methods and techniques from the qualitative research that was used along the project.



Our process, a translation of a strategy to a concrete solution

Approach

This diploma is developed within the field of service and interaction design, a collaboration using knowledge and strengths from our specialised fields. The project has a user-centred approach with a basis in qualitative research followed by an iterative process which involves rapid prototyping and user testing to develop a digital, interactive solution. A service journey is developed to frame the main digital touchpoint.

Deliverables

The project aims, through designerly methods, to transform principles and strategies that is still abstract and that today is challenging

in practice, to something more tangible and concrete. The deliverables includes an overview of the context and its key challenges stated in this report, a clickable prototype that aims to meet the challenges and needs of the target group, and an introductory animation video.

Principles

The five service design principles (Bechmann, 2010; Mager, 2009; Stickdorn & Schneider, 2011) helped build the frame for this diploma, as well as a build-measure-learn approach (Eric Ries, 2011) resulting in an iterative development process.

Holistic — A complex and rich understanding of the system as a whole and its parts was mapped out. Covering problem areas and mapping out existing structures, needs and opportunity areas in Norwegian middle schools being confronted with a coming renewal.

Human-centered — Qualitative research, user testing and feedback build a foundation for the process to develop insights of the user’s experiences and needs.

Co-creative — Involving users and experts in interviews, conversations, ideation, feedback sessions and user testing throughout the project.

Alert to value — The diploma aims to create and exchange values for teachers relating to the Subject Renewal.

Visual representations — Visualisations such as maps, photographs, digital sketches, animations and prototypes are used in order to analyse, structure findings, communicate ideas and the solutions. Some visualisations are used for validations with experts and users.

Iterative development — Ideas and concepts for solutions was developed through rapid prototyping. These enabled more concrete communication of ideas. The prototypes were continuously tested with users, going from low-fidelity sketches to higher-fidelity digital, clickable prototypes.

A triple diamond process (Adapted from DOGA, 2018)

Process

This diploma project combines the triple diamond process framework (DOGA, 2018) including convergent and divergent phases with several iterations.

Research & Discover

What is the Subject Renewal and how does it affect teaching?

Insights & Analysis

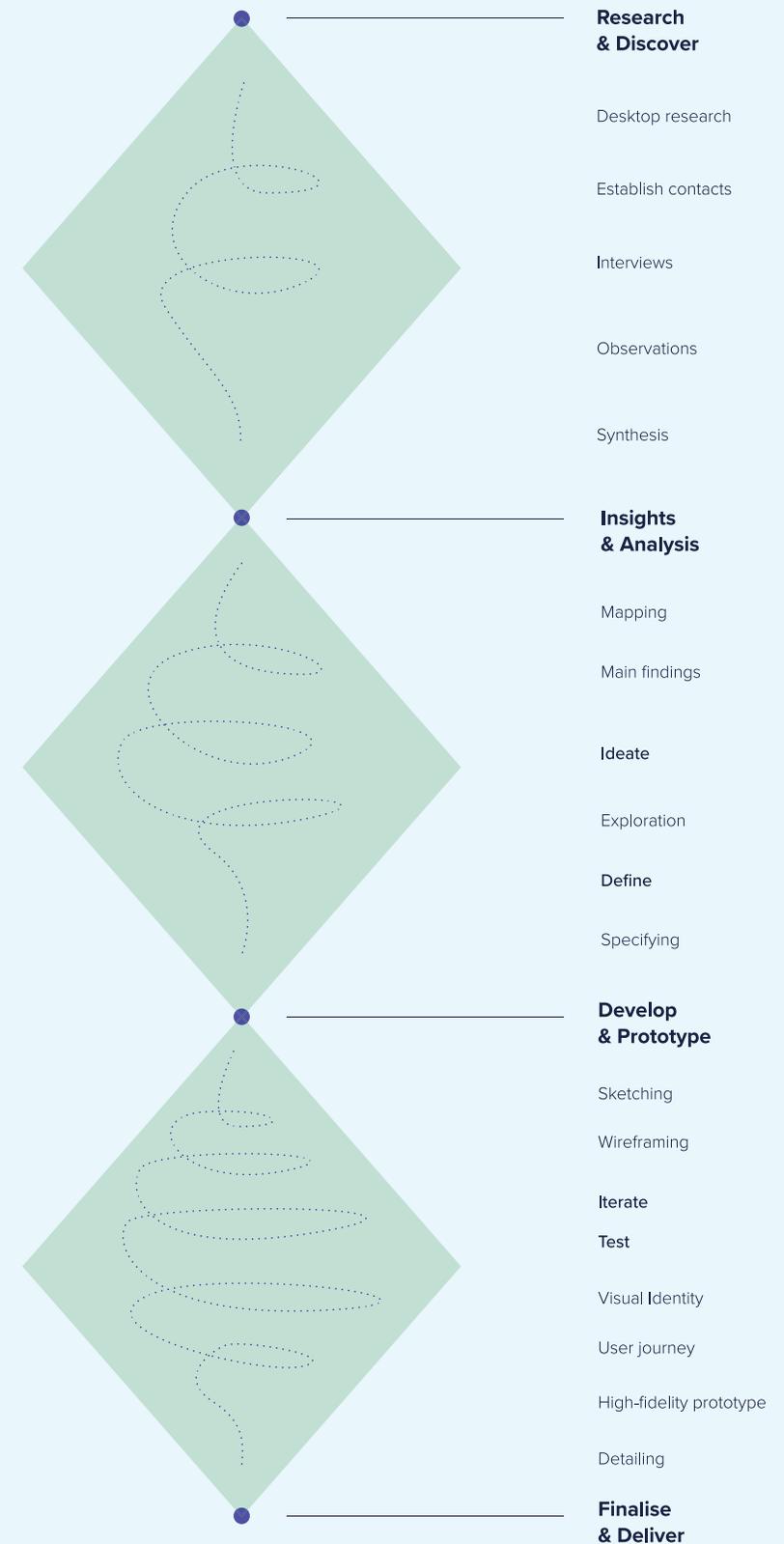
What key findings help to frame and scope the project?

Develop & Prototype

What could be a possible solution?

Finalise & Deliver

How and what is the experience of introducing the solution to Norwegian middle schools?





Immersing in the educational field

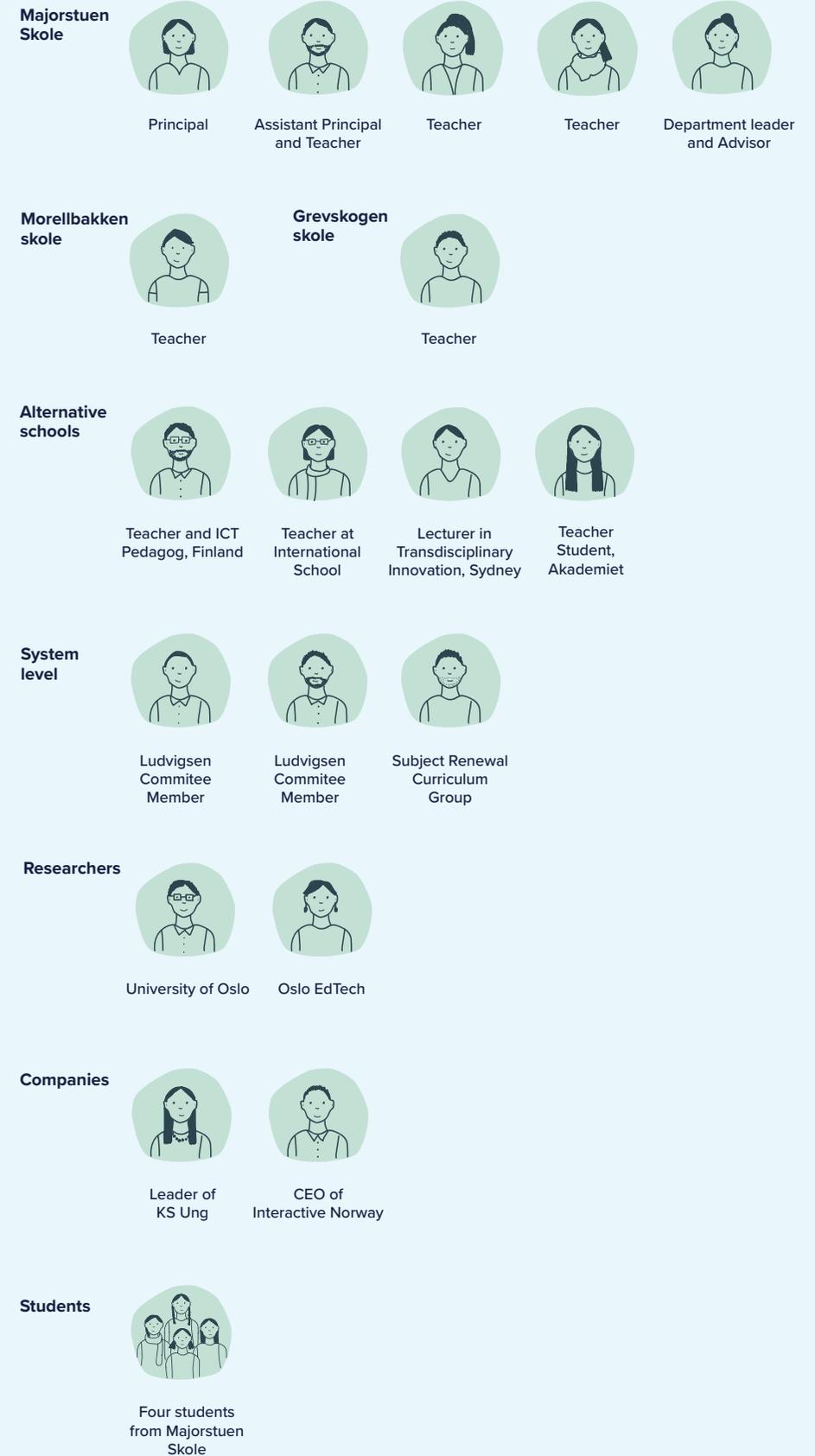
Immersing ourselves in the educational environment helped us to gain a better understanding of the challenges, opportunity areas and needs in accordance to the Subject Renewal. It was important to talk to actors in the different areas of the sector, both experts and users.

We chose to work with middle schools as a starting point because they are a part of the primary education that will be affected by the Subject Renewal. Majorstuen skole was used as a main arena to get in touch with teachers, to conduct interviews, testing and observation. We talked to teachers in other Oslo schools as well, to get wider opinions and views.

Users and experts interviews

Methods and techniques

Qualitative research methods such as interviews and observation with experts and users, participating in conferences and user testing were used to gather insights and discover opportunities. The goal with the initial research phase was to be open and get an overview of the Subject Renewal and the stakeholders involved and what this means for them. Methods such as user journey maps, a booklet design probe (Mattelmäki, 2006) and interview plans were used as tools to guide conversations, get an overview and understand the educational context.





Interviews

During the research phase and throughout the iterative process, a total of 22 interviews were organized with different actors from the field of education, both in the school and system level. Some teachers were interviewed several times.

15 interviews with teachers were aimed to gather as many insights as possible in order to understand the needs and opportunity areas. We considered a variety of teachers across different subjects, ages and years of experience. They gave us insights on how the current school system is structured and how they work in a daily, weekly and yearly structure.

The interviews were semi-structured (Preece, Rogers and Sharp, 2015) with an interview

plan guiding the conversation, but also with open questions to gain a rich dataset. Some interviews were supported with design artefacts to trigger thoughts and conversation, such as user journey maps and sketches.

It was important to talk to a wide range of stakeholders including researchers, companies, Utdanningsforbundet and Utdanningsdirektoratet, to get a holistic view of the context and field. Interviews with teachers from alternative school systems, an International Baccalaureate and a Finnish school, and insights about the Montessori system from a parent, revealed alternative structures and perspectives.



Observation

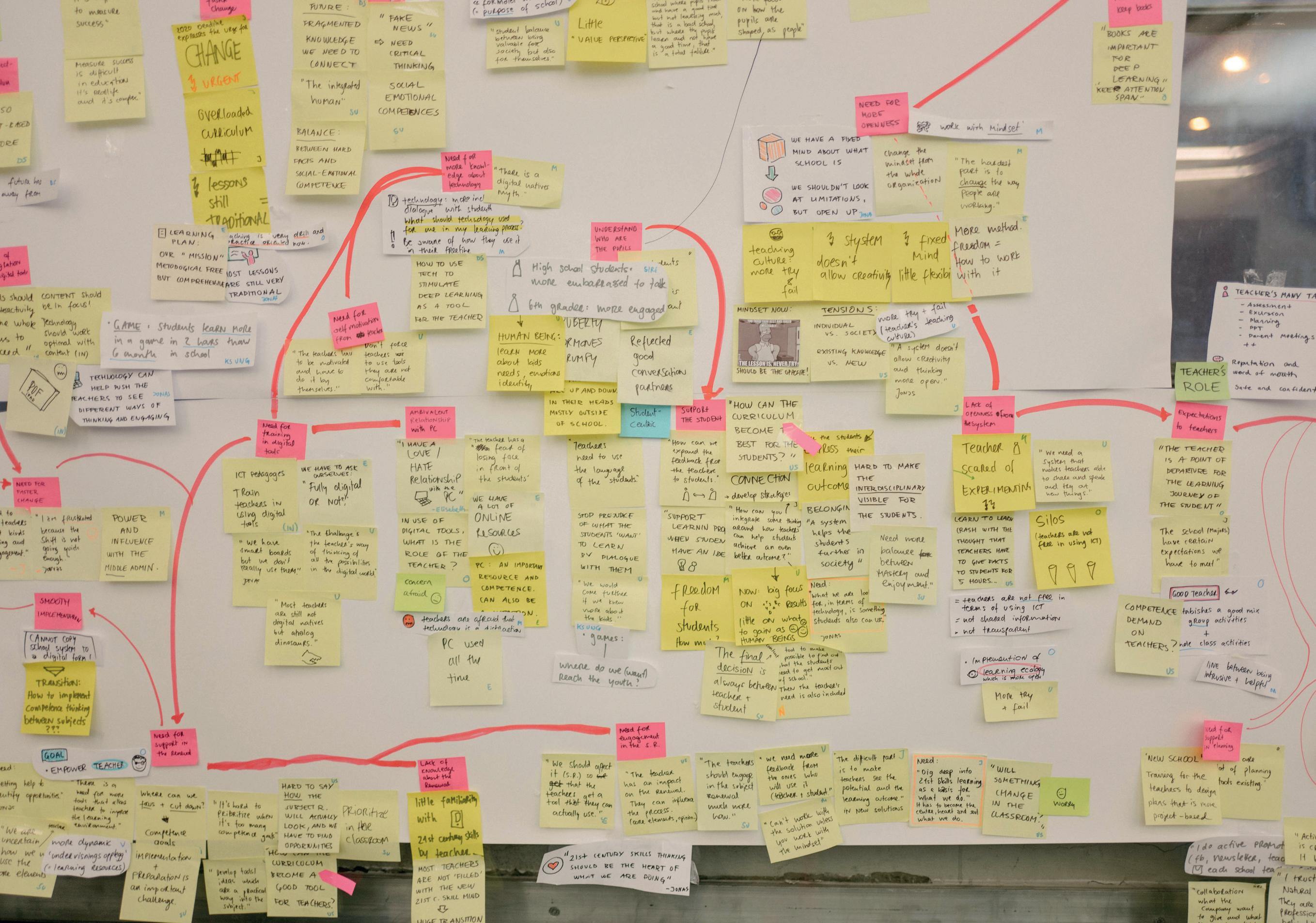
Direct observation in the field (Preece, Rogers and Sharp, 2015) was done to gather a deeper insight. We participated in two different lessons and classes in Majorstuen Skole, to get a wider impression of the tasks and activities of the teachers.

A staff meeting at Majorstuen Skole with around 60 teachers was attended, two conferences concerning the Subject Renewal and interdisciplinary teaching. An observation at the

KS Ung Visitor Centre with 8th grade students playing an interactive game to learn about local democracy, presented us with an alternative way of teaching.

Pictures and notes were taken in order to capture what was being observed. We used the fly-on-the-wall observation technique (Martin, Hanington, 2012), where we aimed to not be intrusive to the situation.





KEEP BOOKS
"BOOKS ARE IMPORTANT FOR DEEP LEARNING" "KEEP ATTENTION SPAN"

ON HOW THE PUPILS ARE SHAPED AS PEOPLE

Little
"VALUE PERSPECTIVE"

"student balance between being valuable for society but also for themselves"

"FAKE NEWS"
NEED CRITICAL THINKING
SOCIAL EMOTIONAL COMPETENCES

FRAGMENTED KNOWLEDGE WE NEED TO CONNECT
"The integrated human"
BALANCE: BETWEEN HARD FACTS AND SOCIAL-EMOTIONAL COMPETENCE

2020 creative expresses the urge for CHANGE
URGENT
Overloaded curriculum
Lessons still traditional

measure success is difficult in education it's real life and it's complex

NEED FOR MORE OPENNESS

WE HAVE A FIXED MIND ABOUT WHAT SCHOOL IS
WE SHOULDN'T LOOK AT LIMITATIONS, BUT OPEN UP

change the mindset from the whole organization

"The hardest part is to change the way people are working."

teaching culture: more try & fail

system doesn't allow creativity
fixed mind little flexibility

More method. freedom = how to work with it

MINDSET NOW: THE LESSONS NEVER TRY SHOULD BE THE OPPOSITE!

TENSIONS: INDIVIDUAL VS. SOCIETY
EXISTING KNOWLEDGE VS. NEW

more try + fail (teacher's teaching culture)
"A system doesn't allow creativity and thinking more open."
Jonas

TEACHER'S MANY TA
- Assessment
- Exursion
- Planning
- PPT
- Parent Meetings
++
Reputation and word of mouth
Safe and confident

TEACHER'S ROLE

Expectations to teachers

"THE TEACHER IS A POINT OF DEPARTURE FOR THE LEARNING JOURNEY OF THE STUDENT"
The school (majors) have certain expectations we have to meet

GOOD TEACHER
COMPETENCE tabishes a good mix group activities + class activities
TEACHERS? note

LINE between being intrusive + helpful

Need for support in planning

'NEW SCHOOL' lot of planning tools existing
Training for the teachers to design plans that is more project-based

"I do active promot (fb, newsletter, teach [T] each school tea"

"collaboration what the company want to give and what profession bel"

HOW CAN THE CURRICULUM BECOME THE BEST FOR THE STUDENTS?
CONNECTION
learning outcome
BELONGIN
"A system helps the students further in society"
Need more balance between mastery and enjoyment.

freedom for students
Now: big focus ON results little ON what HUMAN BEINGS
Need: "what we are looking for, in terms of technology, is something students also can use."

The final decision is always between teacher + student
tool to make possible to find out what the students need to get most out of school.
then the teacher's need is also included

Need for engagement in the S.R.

"We should affect it (S.R.) so we get that the teachers get a tool that they can actually use."

"The teacher has an impact on the renewal. They can influence the process. (core elements, opinion)"

"we need more feedback from the ones who will use it (teacher + student)"
"Can't work with the solution unless you work with the mindset"

The difficult part is to make teachers see the potential and the learning outcome in new solutions

Need: "Dig deep into 21st skills learning as a basis for what we do." It has to become the center, heart and soul what we do.

"WILL SOMETHING CHANGE IN THE CLASSROOM?"

"21st CENTURY SKILLS THINKING SHOULD BE THE HEART OF WHAT WE ARE DOING"
-Jonas

little familiarity with 21st century skills by teacher
MOST TEACHERS ARE NOT 'FILLED' WITH THE NEW 21ST C. SKILL MIND
HUGE TRANSITION

HARD TO SAY HOW THE SUBJECT R. WILL ACTUALLY LOOK, AND WE HAVE TO FIND OPPORTUNITIES
Prioritize in the classroom

"It's hard to prioritize when it's too many competence goals"

Competence goals
Preparation is an important challenge

develop tools, ideas which are a practical way into the subject."

HOW THE CURRICULUM BECOME A GOOD TOOL FOR TEACHERS?

PC used all the time
teachers are afraid that technology is a distraction

AMBIVALENT RELATIONSHIP WITH PC
"I HAVE A LOVE / HATE RELATIONSHIP WITH ME PC"
IN USE OF DIGITAL TOOLS, WHAT IS THE ROLE OF THE TEACHER?
concern afraid

WE HAVE A LOT OF ONLINE RESOURCES
PC: AN IMPORTANT RESOURCE AND COMPETENCE. CAN ALSO BE

"The teacher has a fear of losing face in front of the students"

Teachers need to use the language of the students
STOP PREJUDICE OF WHAT THE STUDENTS 'WANT' TO LEARN BY DIALOGUE WITH THEM

"We would come further if we knew more about the kids."
"games"

where do we (want) reach the youth?

Need for self-motivation from teacher

"The teachers have to be motivated and have to do it by themselves."

Don't force teachers to use tools they are not comfortable with.

Need for training in digital tools

ICT pedagogues
Train teachers in using digital tools

WE HAVE TO ASK OURSELVES: "Fully digital OR NOT?"
"The challenge is the teacher's way of thinking of all the possibilities in the digital world."

"We have smart boards but we don't really use them."

"Most teachers are still not digital natives but analog dinosaurs."

Need for support in the Renewal

POWER AND INFLUENCE WITH THE MIDDLE ADMIN.
"I am frustrated because the shift is not going wide enough."
Jonas

SMOOTH IMPLEMENTATION

(CANNOT COPY school system to a digital form)

TRANSITION: How to implement competence thinking between subjects???

GOAL: EMPOWER TEACHER

There is a need for more tools that allow teacher to improve the learning environment.
"We are uncertain how we use 'undervisings app' use the more elements"

Preparation is an important challenge

NEED FOR FASTER CHANGE

TEACHERS
"I am frustrated because the shift is not going wide enough."
Jonas

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SMOOTH IMPLEMENTATION

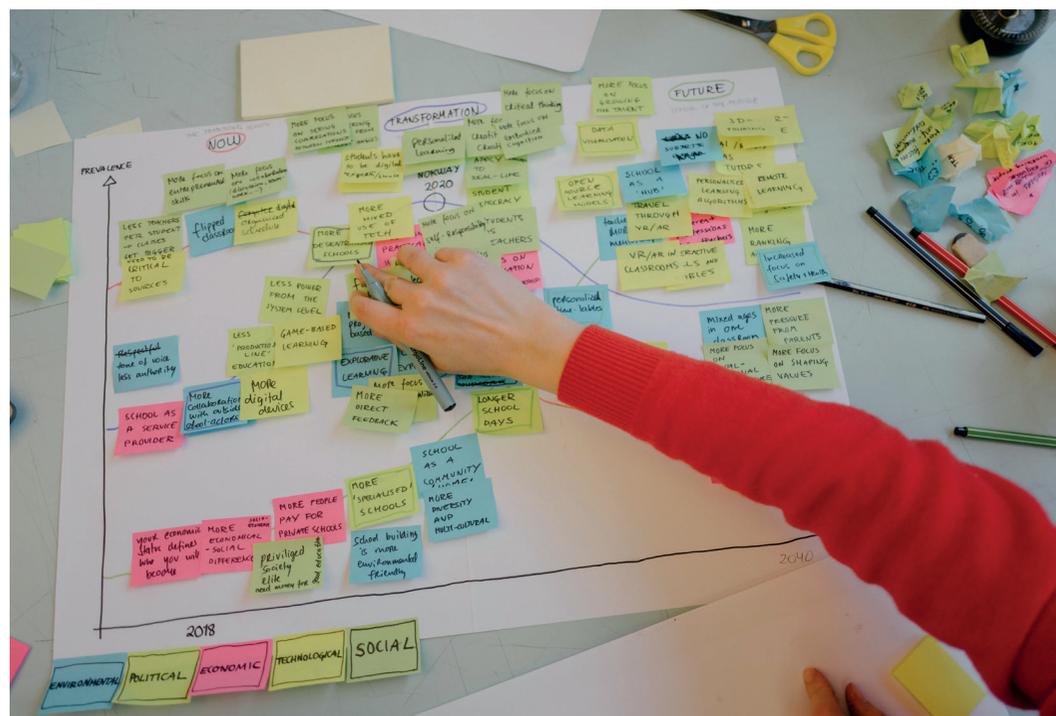
(CANNOT COPY school system to a digital form)

TRANSITION: How to implement competence thinking between subjects???

GOAL: EMPOWER TEACHER

There is a need for more tools that allow teacher to improve the learning environment.
"We are uncertain how we use 'undervisings app' use the more elements"

Preparation is an important challenge



Mapping and visualisation

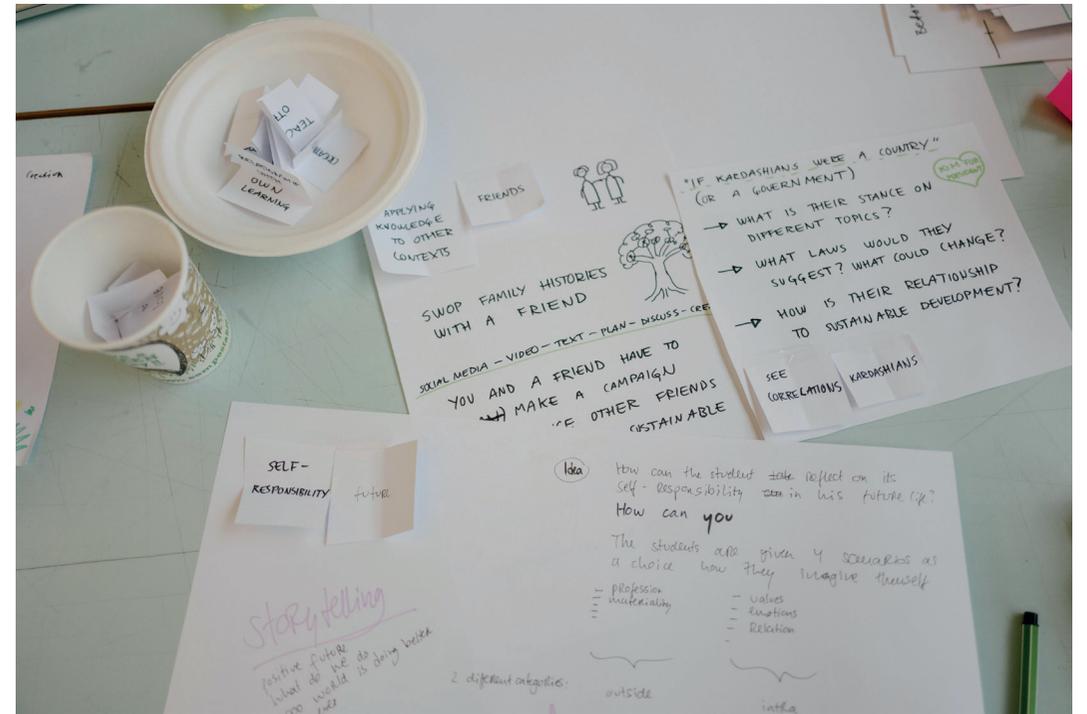
Mappings, user journeys, data visualisation, and sketches were used to dive into the complexity of the context. It helped in analysing the data and reveal the main insights. Some visualisations and maps were also used to convey ideas and facilitate interviews with users and experts.



Rich Design Space

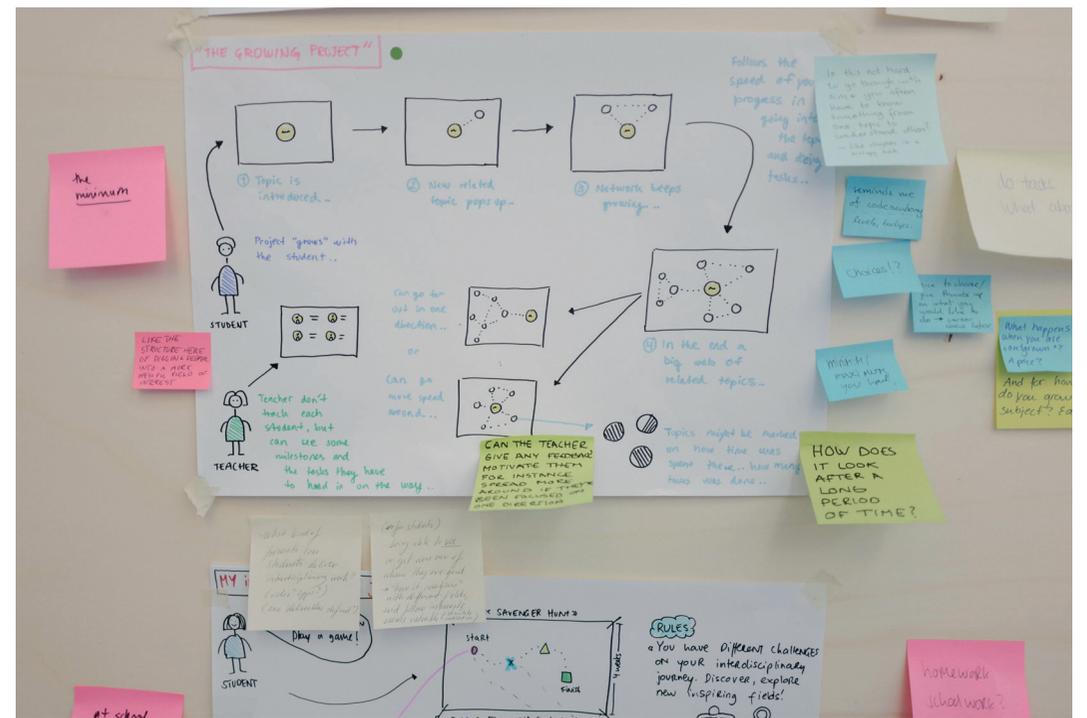
A rich design space was used as a method for reflection, analysis and for making research results explicit. In order to get an overview of the complexity of the topic, the design space was used to make large amounts of information accessible, forming dynamic and changeable iterations, ideas and concepts (Sevaldson, 2008). It encouraged us to make changes in terms of the scoping and framing throughout the design process.





Ideation Techniques

Different ideation techniques such as forced association, the 5 why's, SCAMPER method (Interaction Design Foundation, 2017), validating ideas through voting and POINT method (SILK, 2008) helped ideas start flowing. There was different idea phases in the project. The initial ideation was open and looking for opportunities. The second was based around solving the revealed problem areas. Within the final scope, the third ideation was about specifics and details concerning the prototype.





THE PROFILE

in a team project:

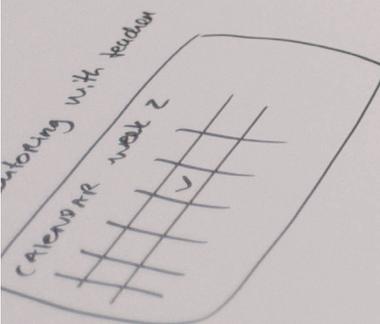
INDIVIDUAL PROFILE

ANNA

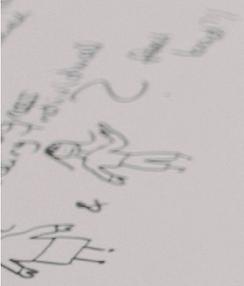
Task 1

Task 2

No



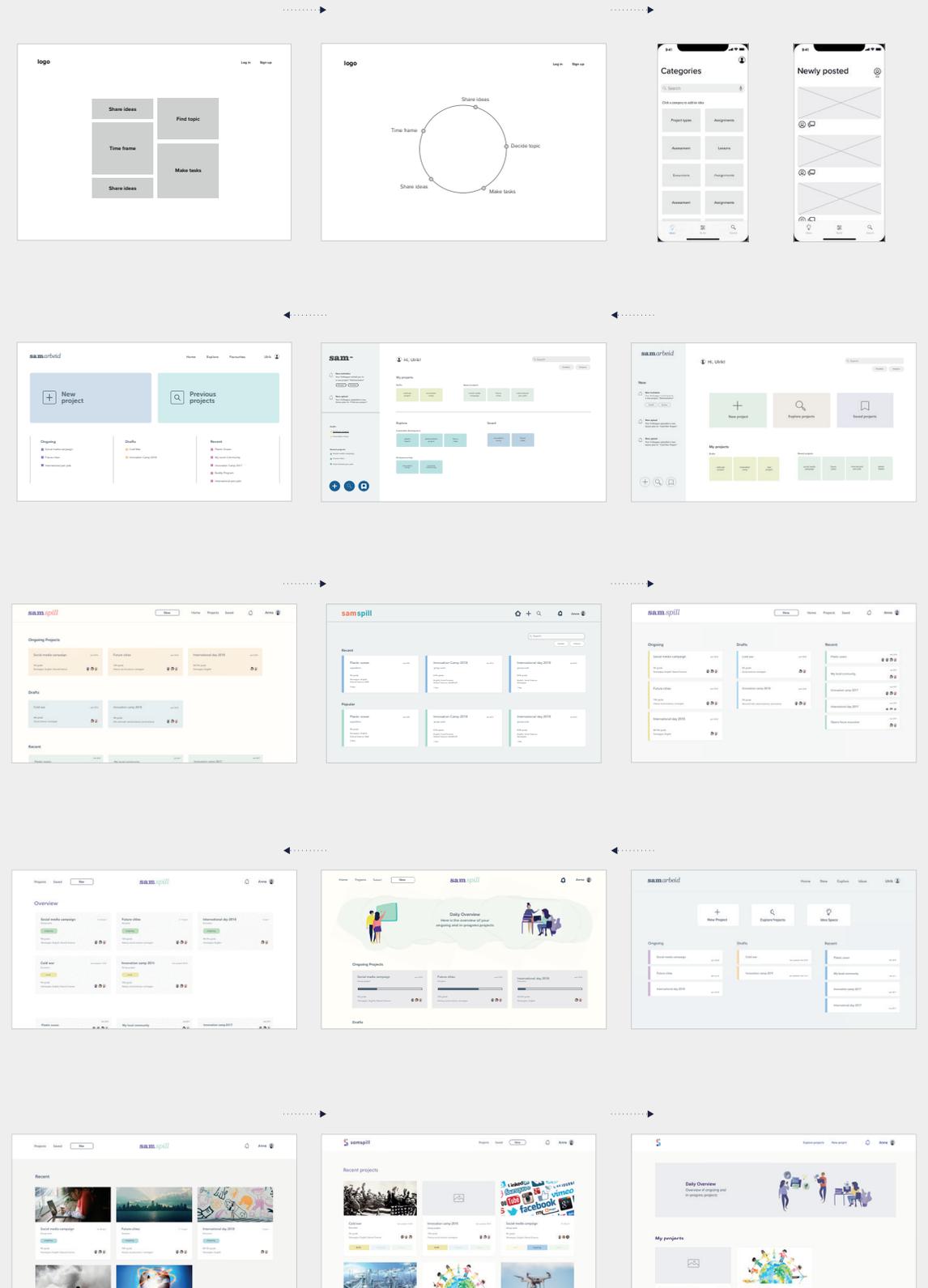
Both look interesting with a week



working with teacher



A selection of the home page development



Iterative development

A clickable prototype has been developed with continuous validation through both casual feedback sessions and more formal user testing, giving the opportunity to do quick changes and build on new findings. This development is based on the methodology of a build-measure-learn feedback loop (Eric Ries, 2011), starting with a minimum viable product or MVP to begin the process of learning as quickly as possible.

Testing and feedback

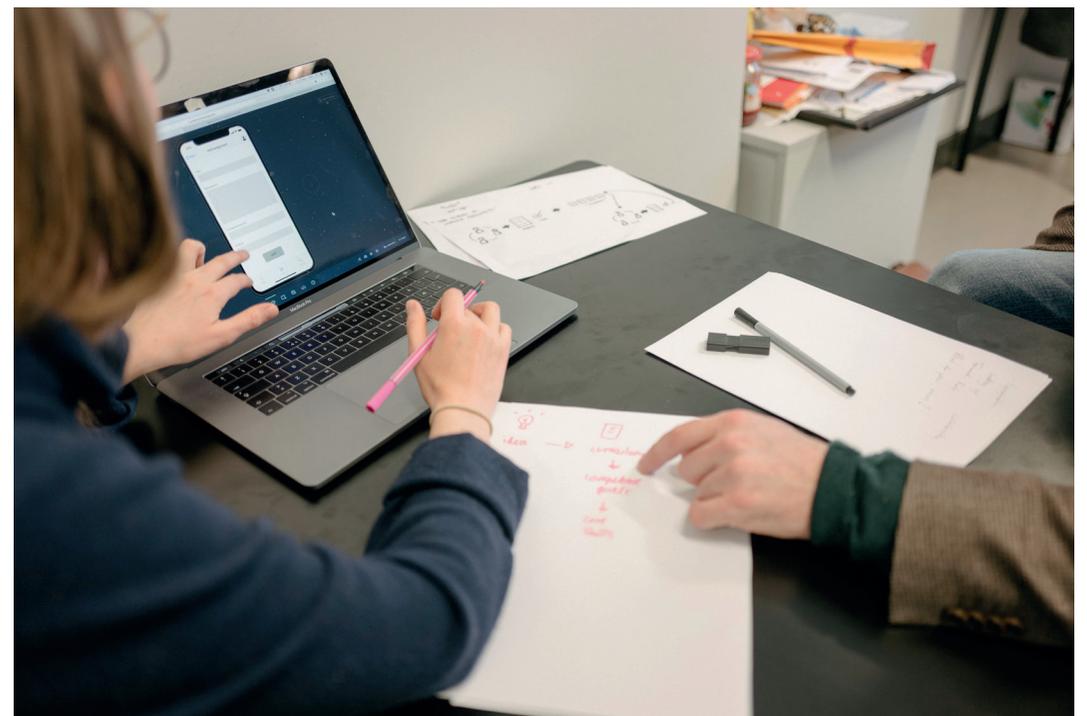
In seven user testing and feedback sessions with teachers individually and in groups, they were exposed to prototypes on paper and digitally. Tests were conducted from the first until the last prototype to evaluate the overall understanding and ideate on opportunities.

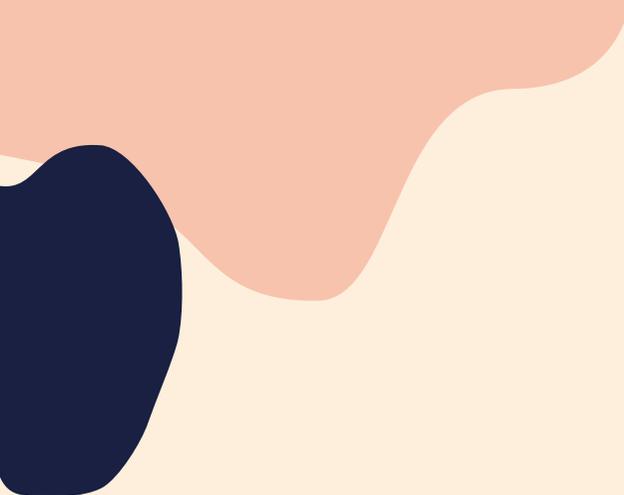
The type of user tests (Interaction Design Foundation, n.d.) that was conducted can be divided in two categories.

The first was to question if the target group would use this. Desirability was tested through hybrids

of interview and design artefacts to get reactions to ideas and concepts.

The second was to question if the target group could use this. The usability was tested through different methods of going through a clickable prototype. We used the think-aloud method to allow the participant to verbalize their thoughts as they moved through the interface (Jakob Nielsen, 2012).





research & findings

This chapter introduces you to the key aspects of the research about the Subject Renewal and its impact and challenges on Norwegian middle schools. It concludes with the final problem statement.



Initial findings

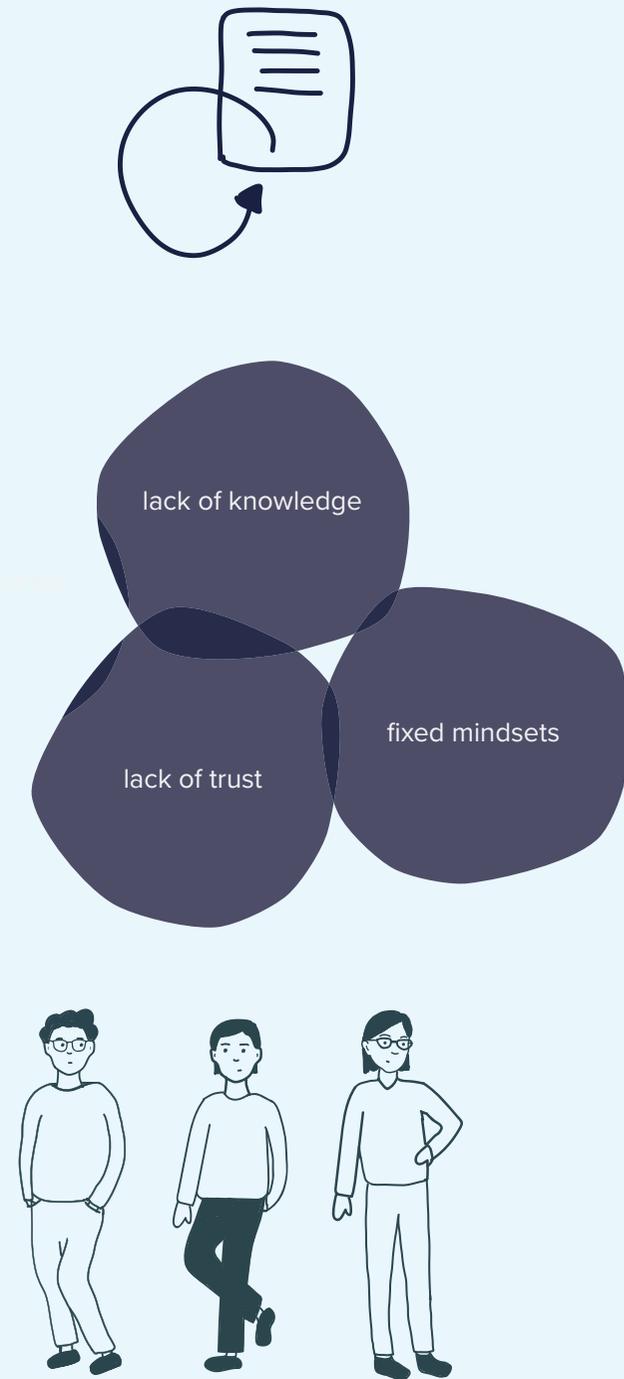
Barriers

We found there are several emotions involved in the implementation of the Subject Renewal. The different stakeholders, the school system, the leaders and teachers can perceive barriers towards it. These are interlinked and it is fundamental to overcome these barriers. They are taken in account and addressed in this diploma project.

According to Fink and Stoll (1998) resistance to change is a natural and predictable response. Found in empirical data (Nolan, Goodstein, Pfeiffer, 1993) there are numerous reasons for this resistance. For example, fear of the unknown, fear of failure in a new situation, preference for the present situation, lack of confidence and fear of loss of status, rights and privileges. Organizational changes are experienced emotionally, because they tap into identity relevant issues and alter relationships that constitute our identity (Kiefer T., Müller R. 2013).

Educators are experiencing a fear of change and insecurity around what is going to happen when the renewal is implemented. Some teachers are not updated about what the renewal includes, and they are not sure how much will change. They can feel a lack of ownership to changes if they are not involved in the development or implementation process. This contributes to uncertainty and a lack of trust to what is being introduced.

There are often fixed mindsets among educators towards new solutions or principles, which serves as a barrier towards a smooth implementation of the renewal. A project leader for research driven innovation at Oslo Edtech stated that it is not possible to work on a solution unless you work with a mindset.



“Most teachers are not filled with the new 21st century skills mindset and the renewal will be a huge transition. One of the things that limits us, is the way we plan.. We are not opening up and looking for alternatives...We have a fixed mind about what school is. That is also why the committee has been eager to focus on interdisciplinary areas. It helps schools to relearn and rethink learning.”

Assistant principal,
Majorstuen skole



It's hard to do an interdisciplinary project project

experiences teachers. >>

<< We don't have problem settings... I need suggestions >>

guideline

<< It's so much work... planning, organizing... coordinating...>>

who of is available
ect together?
how to start
ation

I would rather follow the existing plan I have! >>

<< Are my students interested?
Are my students enough prepared theoretically?>>

main

ow how
he project. >>

WHAT DO I NEED
(AS A TEACHER) TO
MORE EASILY BE ABLE
TO DO INTERDIS. PROJECTS
?

The identified opportunities

Opportunities

We found opportunities to overcome the mentioned barriers through the several needs of different stakeholders in the system level, the school leaders and the teachers.

Openness

More openness in schools would allow more trying and failing. Today, teachers can experience that there is not much acceptance or time for trying new things.

Engagement

More engagement and involvement among teachers, concerning the new principles that the renewal will provide, could reduce uncertainty. Not all teachers are familiar or engaged with the new principles coming in 2020.

Support

The new principles imply new ways of working and teaching. This leads to a need of support among educators in the transition and implementation of the renewal.

Collaboration

With more focus on interdisciplinary teaching, the teachers will have to work together. There is a need for more collaboration between educators to make the 2020 transition smooth.



“We need a system that makes teachers able to share, speak, and try out new things”

Head of central leader board
utdanningsforbundet and committee member

“The implementation and preparation will be an important challenge”

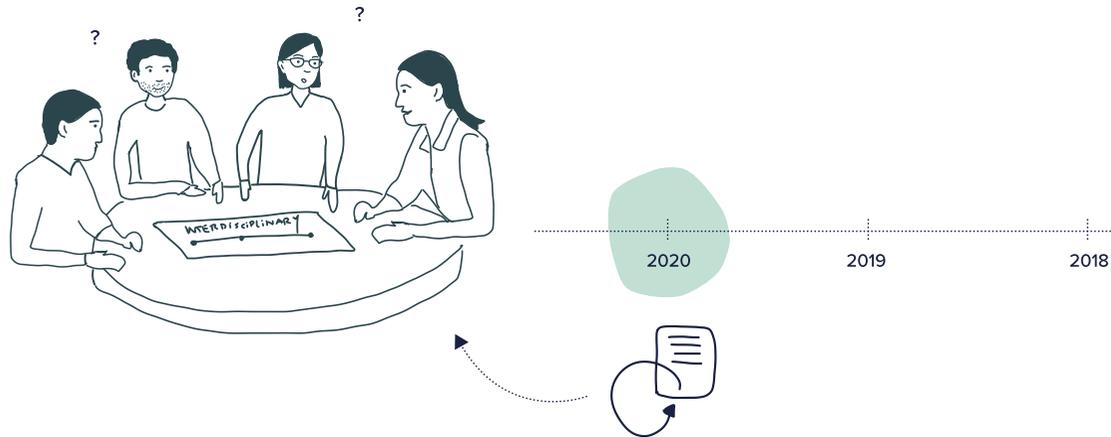
Student representative,
seminar

“It’s [the new curriculum] a working tool for us teachers. And it should become something we can actually use, something that is also ours and not only comes from authorities above.”

Teacher,
seminar

“I find few guidelines, little experience, content and inspiration for interdisciplinary projects because the concept is new. There is a lot of talk about 21st century skills, but not so much evidence.”

Assistant principal and teacher,
Majorstuen Skole

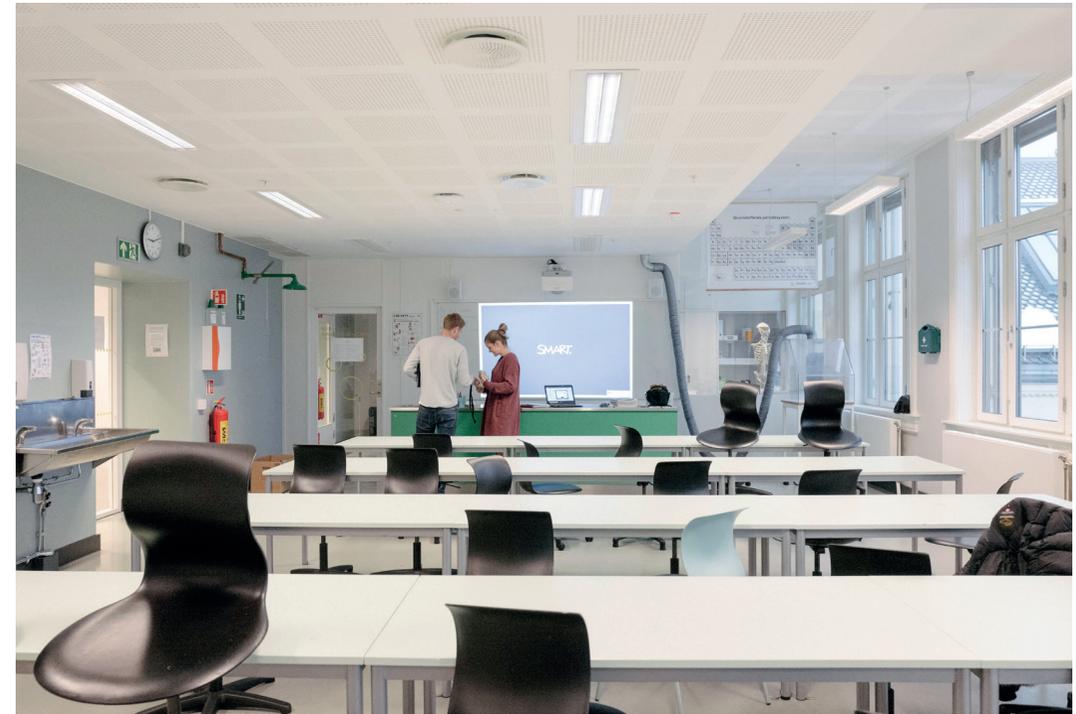


“It’s hard to say how the Subject Renewal actually will look like, so we need to find opportunities.”

Student representative,
Subject Renewal seminar

How will the changes affect the teaching practice?

The content of the Subject Renewal is currently in development by Utdanningsdirektoratet. The practical implementation and the question of how it will work is still very uncertain. When the renewal is implemented in 2020, there will be a shift and a need for support in the transition. Today, the renewal is a strategy on paper, and for educators it can appear abstract. This is where we as designers see an opportunity to intervene and make it tangible.



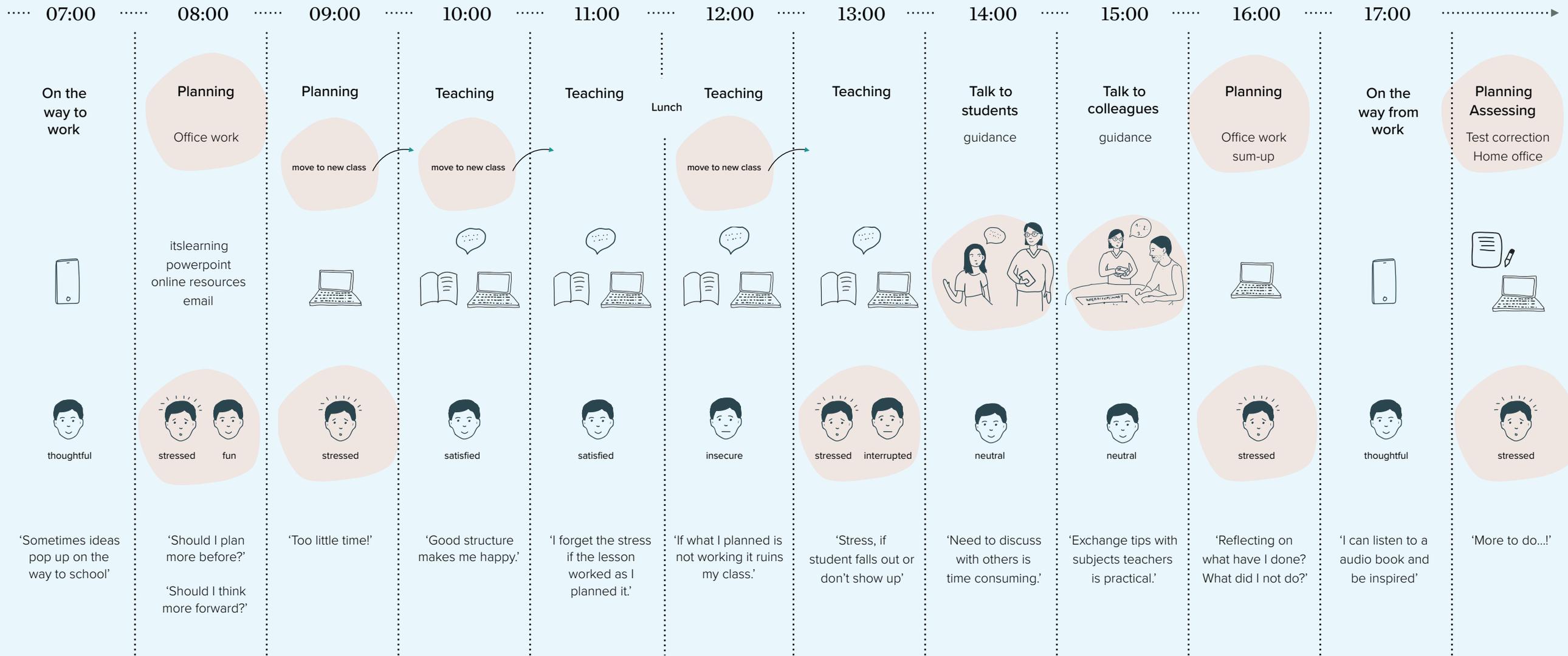
Teachers

Who are they?

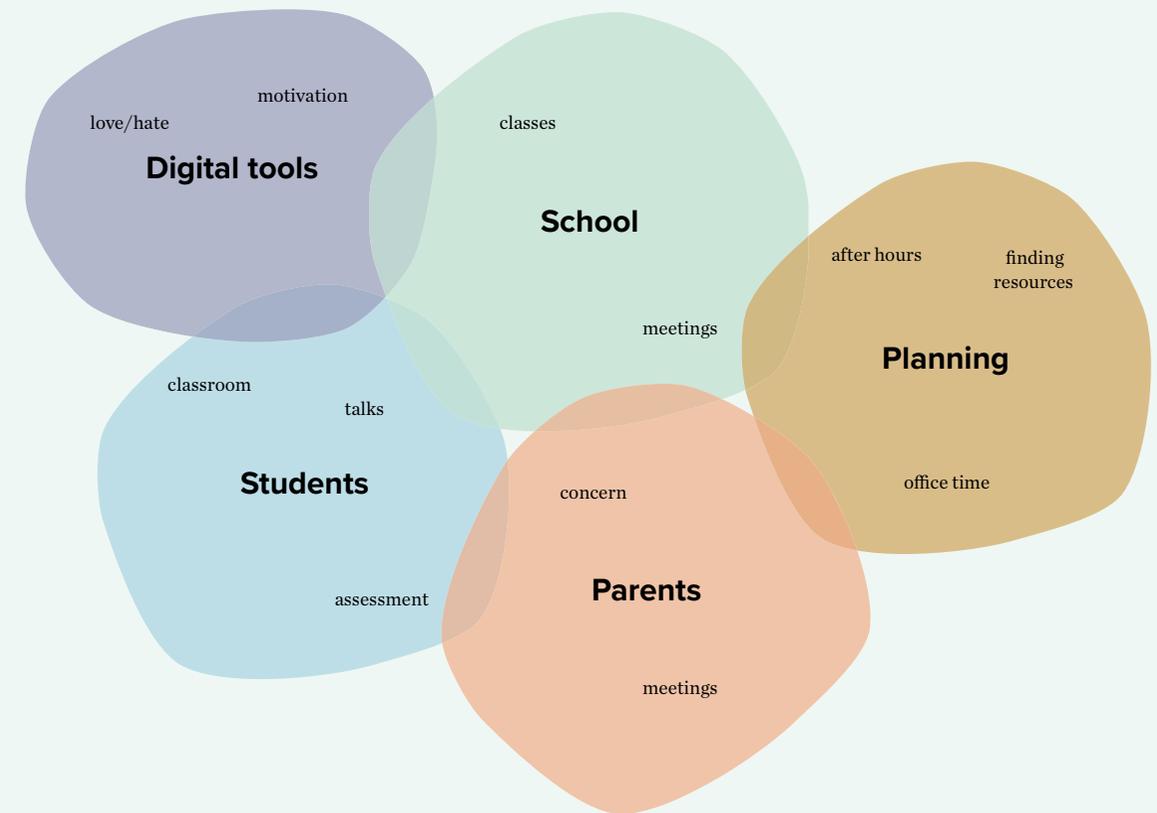
The experience in planning projects is different for each teacher. However, there are aspects which are more and less common, which were identified through our research. It has been crucial to get a firm understanding of teachers' everyday life.

Teachers are required to choose a subject to specialise early on in their education. Because of this, teachers are often very identified with their subject and can be hesitant to go out of their comfort zone of their own discipline. Even though there are weekly staff meetings and

oral collaboration between the teachers, they are still experiencing being in their "subject silos" when teaching. The assistant principal at Majorstuen skole revealed: "Teachers stay in their black boxes in the classroom". This means that teachers mostly work in their subject and seldom collaborate interdisciplinary. To enhance transparency, there could be more sharing, especially between teachers of different disciplines.



The different aspects of a teacher's everyday life



Teacher's everyday life

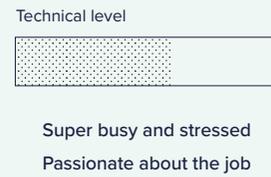
With the help from the teachers we interviewed and talked to, we were able to map out their everyday life, their role and responsibilities.

The everyday life of a teacher is busy and the profession can be stressful. Around half their time consists of planning and the other half of teaching. Teachers have to be prepared for every lesson, and they are always moving around the school from class to class. Some of their activities on a daily basis involve not only teaching in the classroom, but also communicating with the students individually, taking up conflicts that might occur with both students and colleagues, replying to emails, assessing tests and assignments.

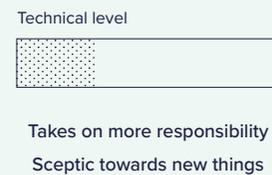
The planning is time-consuming. It involves planning the day-to-day lessons, the semester, the school year, midterms, exams and multiple projects at the same time. The focus is always on engaging the students in good lessons and assignments. There can be pressure on the teachers in delivering good results, coming from the school leaders, the municipality, and also internationally in tests like PISA (Program for International Student Assessment, OECD, 2018). Parents can also express concerns and provide pressure on the ways of teaching.



The hectic - engaged - on-the-go teacher



The traditional-structured teacher



The two personas

Characteristics

Teachers are a diverse group of people with different personalities, characteristics and ways of teaching. However, there are some characteristics that reoccur, that we can sum-up in two personas.

The hectic-engaged-on-the-go teacher is always very busy and stressed because of limited time. At the same time engaged and passionate about the job. He/she looks continuously for new inspiration and likes to discuss ideas with colleagues. The technical level and interest is often medium to high.

The traditional-structured teacher is often very routinised and takes on more responsibility in meetings or in projects. However, he/she is not so open and can be sceptic to new structures and solutions. The technical level and interest is often low to medium.

The exploration of these somewhat stereotypes brought another layer of clarity into the complex and rich teaching practise. This was taken further in the development of a prototype accessible to both personas.

Four key needs

In order to see similar patterns in the behaviour from teachers, four key needs were identified. These can of course vary according to many affecting factors and in accordance with each other.

Autonomy: A need for feeling in charge of one's own journey.

Teachers have a lot of responsibility for what happens in their own classroom. They need to feel trust from the system and their school, giving them a feeling of confidence and responsibility.

Inter-personality: A need for belonging to a community.

At the same time as teachers need an individuality, they also need to feel part of a bigger picture, and be able to discuss and collaborate with their colleagues.

Motivation: A need for always doing the best for the students.

There needs to be a personal motivation for always wanting to do a good job and prepare good lessons for the students.

Structure: A need for having an overview.

A lot of time goes into planning, and therefore there is a need for structure and overview.

These needs occur in different times, even during one day and can vary in strength.

Today, the need for autonomy can be more fulfilled, when teachers can feel in charge in the classroom. There can however be an experience of less inter-personality, when there is not much time for collaborating and sharing with colleagues.

This categorization of needs made us aware that the profession has several requirements which are important to take further in account to develop the solution.



Autonomy



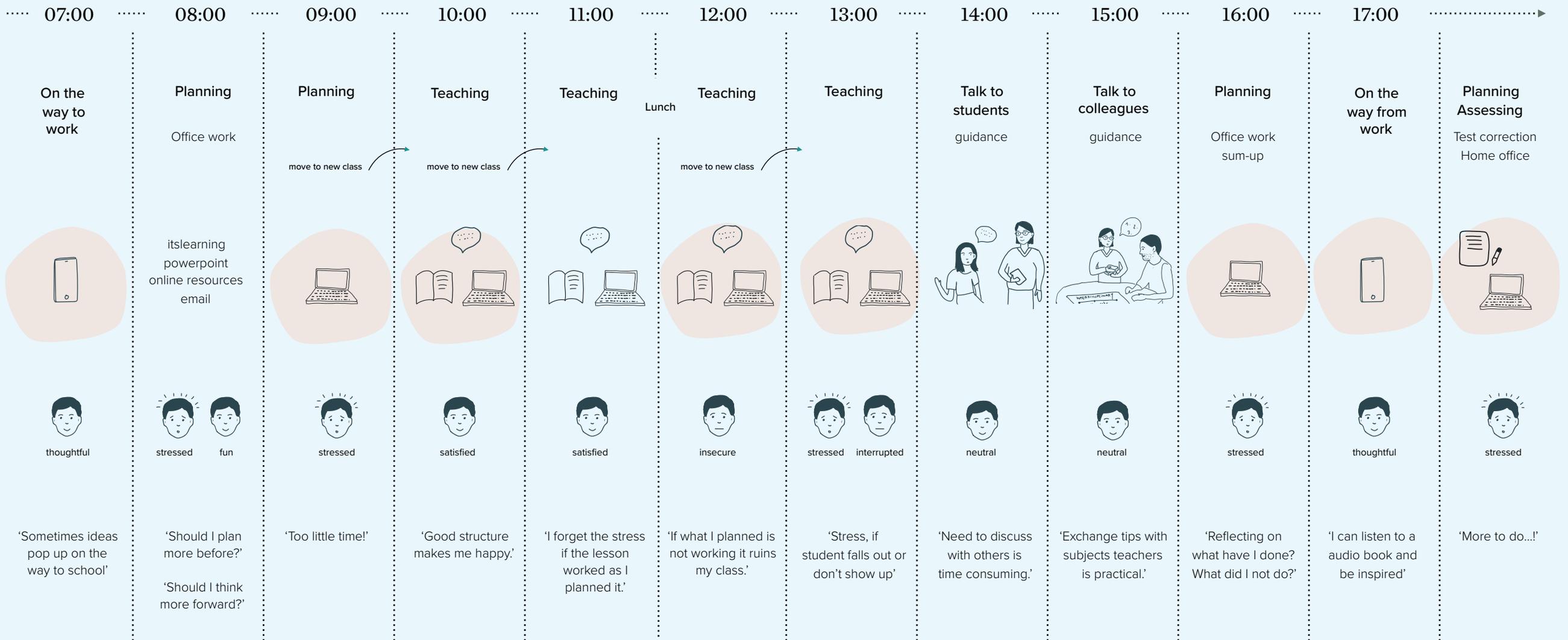
Inter-personality



Motivation



Structure



Existing solutions

In the everyday life of teachers, the main tool they use is the laptop or stationary computer. This is used throughout the day in office hours, in lessons and meetings. When 'on-the-go' the phone can be used for work-related matters - and this is usually before the start of the school day, in between lessons and after school hours. Email is their main communication tool. For planning, teachers mainly use writing programs like google drive, office 365 and Itslearning. But also word documents, google docs, Facebook, email, talking in the hallway, fronter, canvas, Portal Skoleplattform Oslo and printed papers.

Itslearning is a platform for both teachers and students where they can share documents and assignments. It is decided by the municipality that all Oslo schools have to use Itslearning for assessment. Analysis and interviews about the platform revealed that it is easy to get lost

in the many pages and features of the site. Teachers can become confused by the structure of folders within folders. Most importantly, there is a lack of support in collaboration, sharing and transparency, because the main structure is divided into subjects and teachers can not easily get access to their colleagues work.

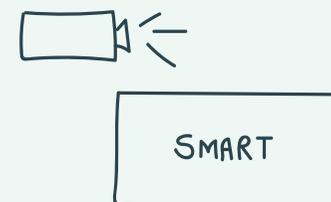
The teacher profession is compound of multiple elements, activities and challenges. It is complex to understand, because all the activities and the amount of time that goes into planning are not evident in direct observations or through conversation. Analysing existing solutions helped reveal how complex and sometimes messy and time-consuming planning can be. The existing solutions that are not adjusted to the changes that are coming with the renewal.

“There are no good solutions for interdisciplinary planning. Existing solutions does not support a natural workflow and planning journey.”

Assistant principal,
Majorstuen Skole



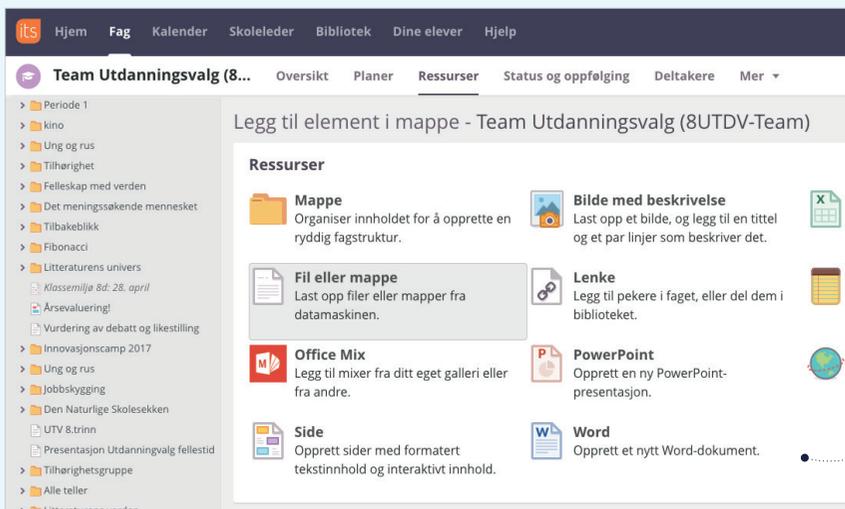
Papers, books, curriculum



Projector, SMART board or screen

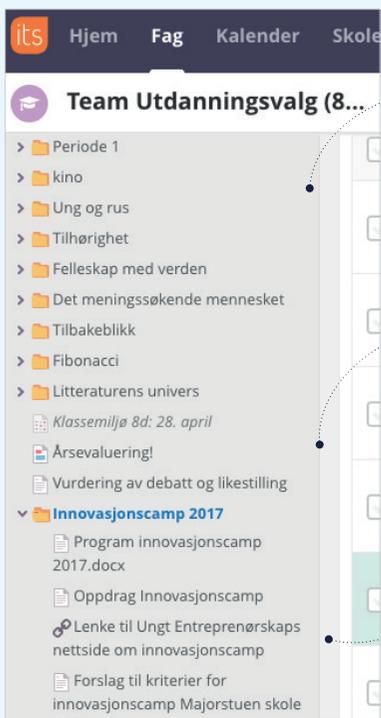
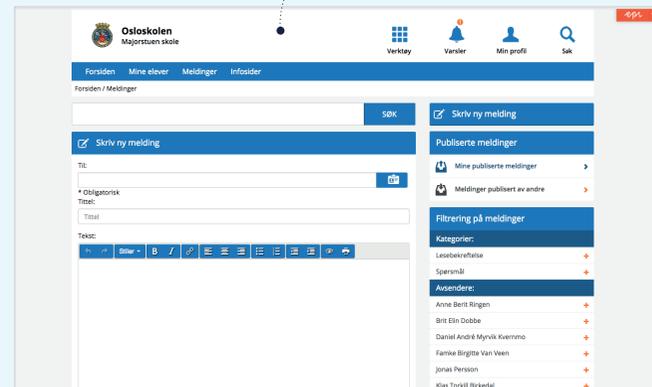


Laptop, stationary computer, phone
Online resources, software, email



Many features and functions solve too many things in one place

Portalen is used as a sort of 'start page' for teachers

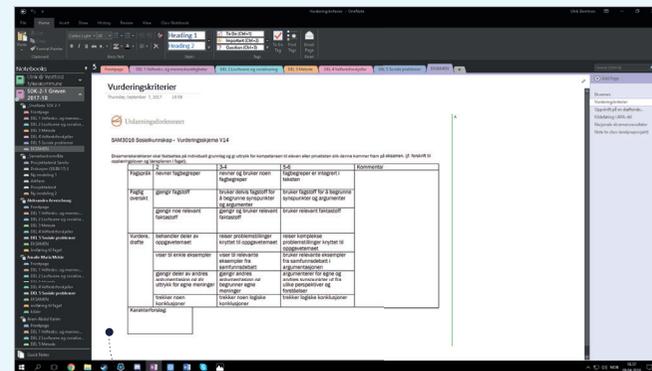
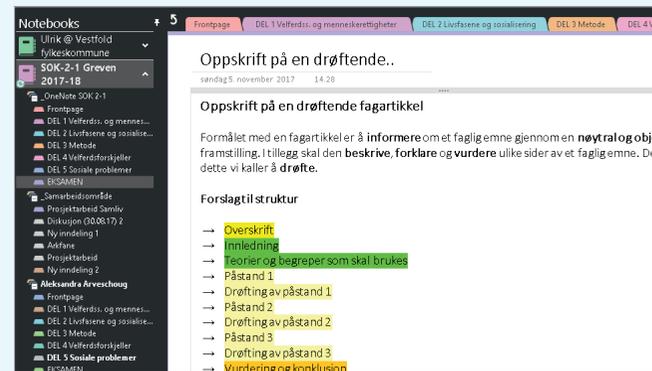


Dense use of space with a lot of information

Subject oriented, a project which is meant to be interdisciplinary is created in a subject folder

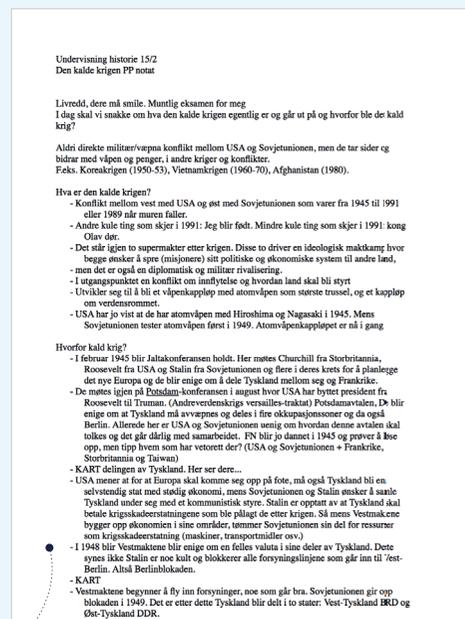
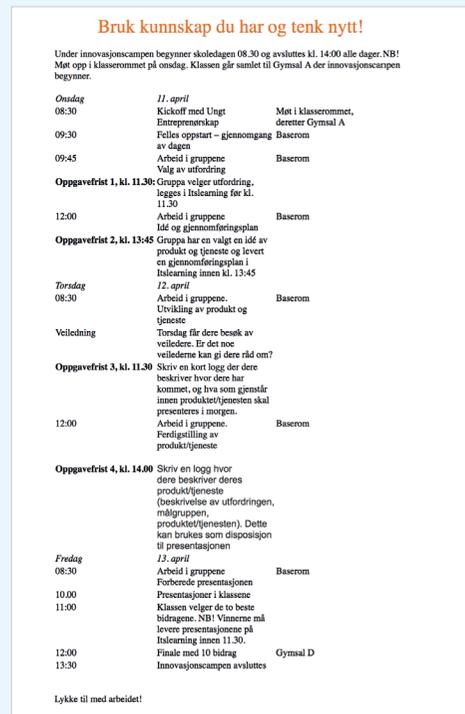
Many different type of files, no order, hidden information, difficult to differentiate

Double appearance of functions such as "legg til" can create confusion



Some teachers use OneNote, but the structure can become messy over time

Teachers work are often very text-based



“There is a need for more tools that allows teachers to improve the learning environment”

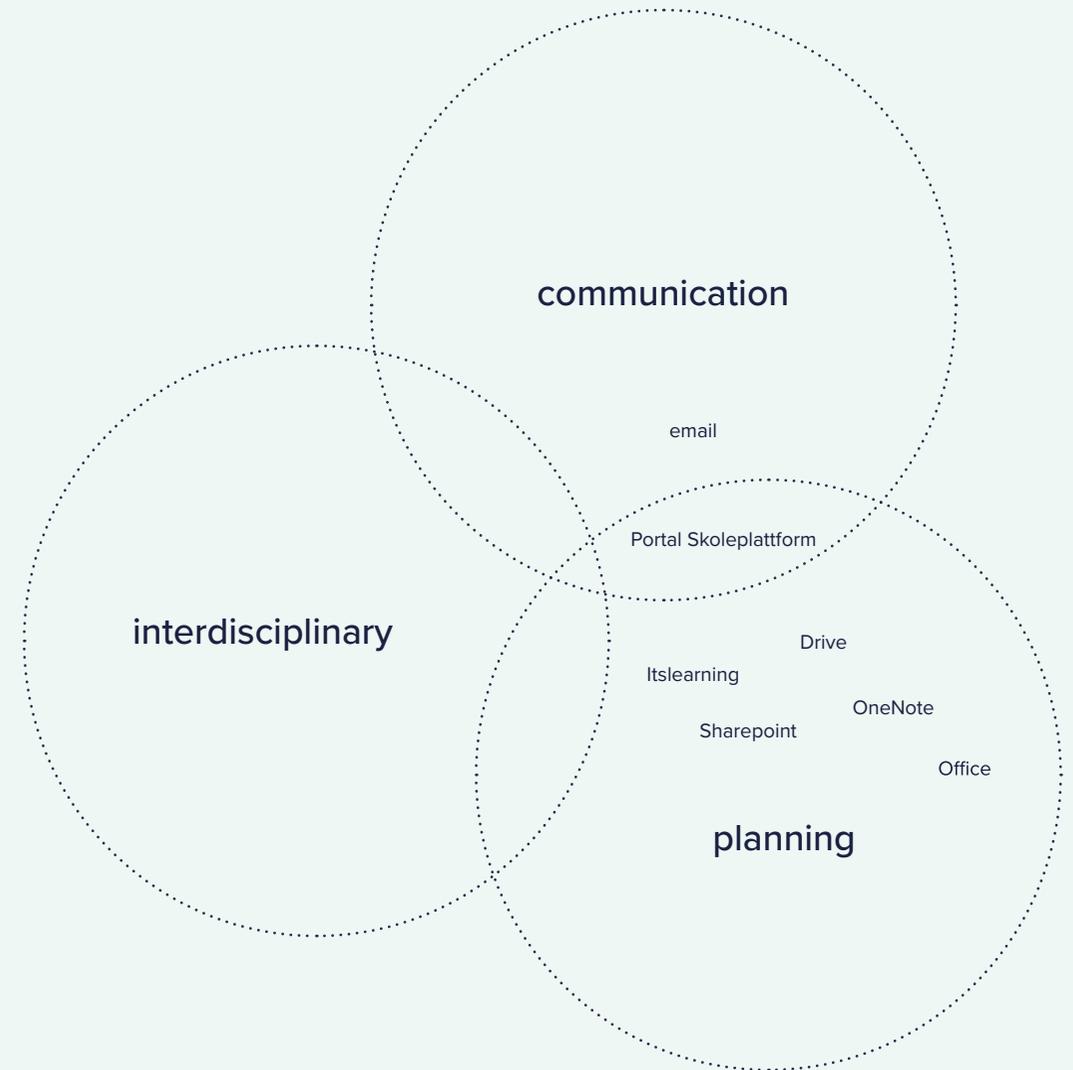
- Educational researcher, UiO

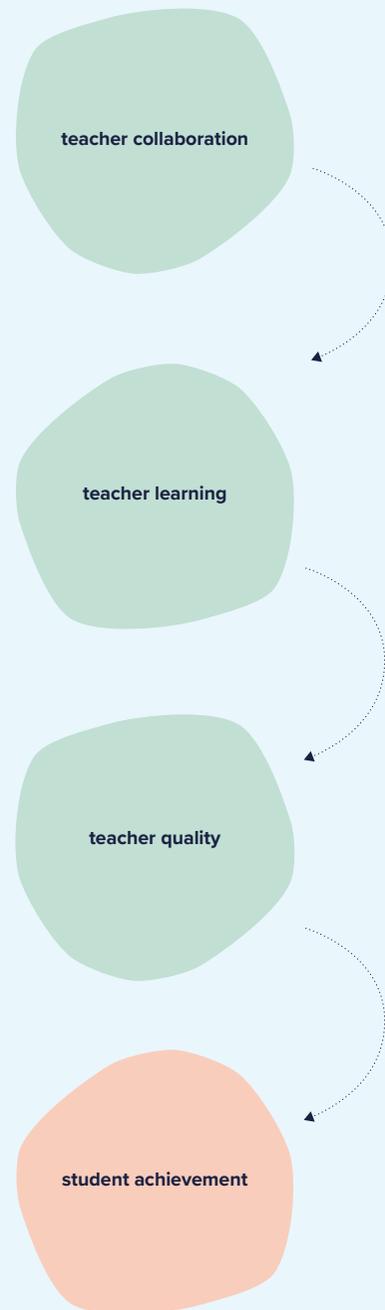
“We need a tool that makes it easier to work between disciplines”

- Teacher

Main takeaway: Lack of adjusted tools

There are a lot of planning tools out there, however we have not been able to find any that are directly targeted towards teachers working across subjects. Most solutions are for individual subject teacher planning or communication towards students, with little focus on the communication between teachers. This means that teachers stay isolated within their subjects and disciplines. The tools do not help to ideate for new projects and are not engaging.





“The opportunity to collaborate has been cited as the most important factor in institutional change.”

— Lassonde, Israel, Almasi, 2009

Current teacher collaboration

In interviews with teachers and the school leadership, several factors were mentioned around the importance of collaboration in school. In Majorstuen Skole, collaboration between teachers most often happen orally in talks and meetings. It is something teachers welcome and strive after. However, in the busy everyday life and with the tools they use today, there is often not enough time to share.

The assistant principal at Majorstuen skole named several factors why collaboration is important in teaching interdisciplinary. “It is more about developing strategies for working more effectively together, from individual working to collaborative sharing. Collaboration is the fun part, but now it is time-consuming.”

He named that teachers need more competences to collaborate among different subjects. To the question “What do I as a teacher need to more easily work interdisciplinary?” he described that there is a need for more collaboration among teachers. The key of successful interdisciplinary work is a sort of system for idea sharing and reflection in schools. At Majorstuen skole the sharing culture involves meetings, often led by a topic, an agenda and with some time for discussion or reflection. He revealed that there is a need to add some type of strategies to learn from each other, so they can do it more frequently.

In an observation of a staff meeting, guest lecturer Paul Warwick from Cambridge University talked about dialogic teaching. He mentioned benefits of sharing and building knowledge through

- Getting support
- Getting challenged
- Getting new knowledge
- Feeling more confident in working together

B. Eschler (2016) emphasizes in his dissertation that teacher’s collaboration involves two or more teachers in an interdependent relationship in which they interact by sharing information and knowledge, planning and by problem-solving.

In an action plan by the OECD for better lower secondary education in Norway, it aims to improve teachers classroom practice with the key challenge of strengthening collective teacher work. It is said that teaching is a social process and its quality depends on collective efficacy. Just changing individual teacher practice is not enough to succeed in changing teaching practice (OECD, 2011)

“We have to find new structures for collaboration.”

Assistant principal and teacher,
Majorstuen Skole

“Teachers are very identified with their subject and what they learned. If you go out of that space, it is very hard.”

Senior advisor,
Utdanningsdirektoratet

Main takeaway: Lack of sharing

Schools often have some sort of culture for idea sharing and reflection, most often through meetings. However, teachers most often stop sharing new ideas and problems throughout planning. Sharing thoughts and ideas can be very powerful. In most cases there is a lack of feedback and discussion among teachers during a project.

Teachers need a system that makes them able to share and speak and try out new things. It is crucial for teachers to talk and discuss with colleagues. There is a need to make more collective learning and sharing among teachers in other ways than today, through being able to review and recommend projects and ideate with each other.

Interdisciplinary teaching practices

A representative from UDIR, currently taking part in developing the new curriculum, talked about his outspoken belief in more interdisciplinary teaching : “A creative approach to subjects is about interdisciplinary and in-depth learning. This will strengthen students’ holistic understanding. Time, understanding and cooperation across disciplines will be essential to work well with the content.”

Taking part in a teachers conference organised by Naturfagsenteret, the discussion revealed many challenges for teachers to do interdisciplinary projects in practice: For teachers, it is hard to work outside their subject. For students, it is hard to see across subjects.

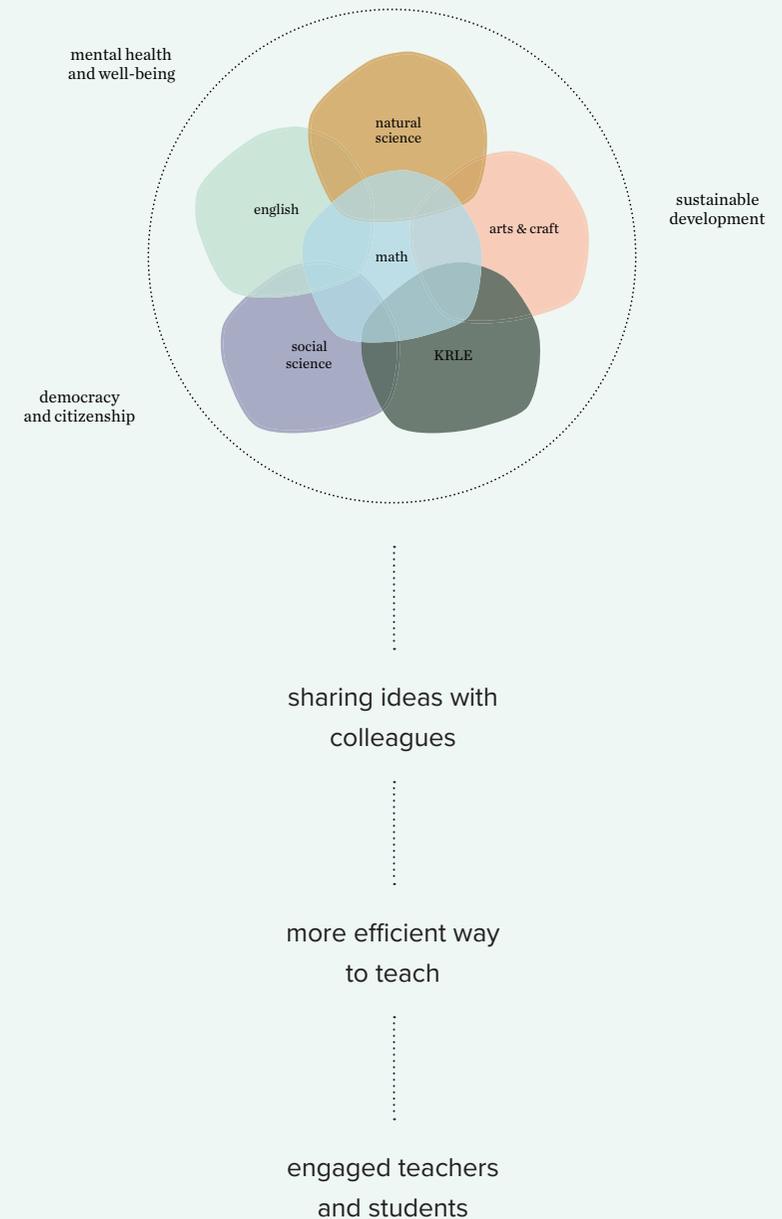
It can take up to three years before an interdisciplinary project is integrated and anchored in the competence goals. Teachers have to apply and plan, then evaluate and

develop till it finally can be integrated in the curriculum.

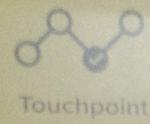
It is a challenge to cover all 21st century skills: From argumentation and reflection about a topic, to critical thinking, creative problem-solving and the dialogue.

The Head of Department of Economics and Social Sciences at Lillestrøm videregående skole talked about the success factors of working interdisciplinary.

- Both teachers and students get an ownership
- There is close work between teachers and leaders which can enhance the relationship among them
- Teachers have less uncertainty with more information along the way
- The focus is more on the learning and process, and not on the results



Phase



Interaction line



Visibility line



PHASE STARTING POINT

PHASE GET MORE DETAILED

PHASE START PLANNING

PHASE GET MORE SPECIFIC

PHASE STRUCTURE CONTENT

PHASE FINALISE PLAN

PHASE FINISH MY CONTENT

PHASE FINISH PROJECT

IDEA TO DO AN INTERDISCIPLINARY PROJECT

DECISION TO DO AN INTERDISCIPLINARY PROJECT

SHARE IDEAS

DECIDE TOPIC + GOAL

DECIDE WHICH SUBJECTS ARE INCLUDED / WHICH TEACHERS WILL BE INVOLVED?

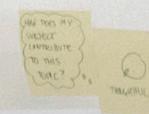
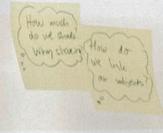
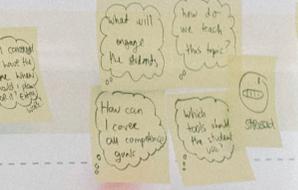
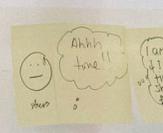
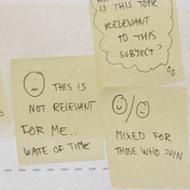
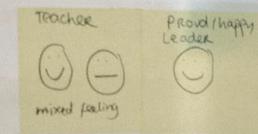
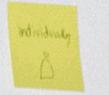
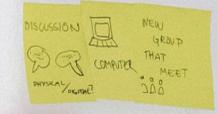
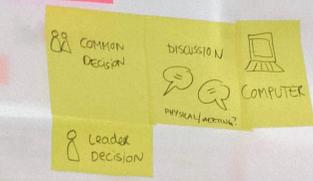
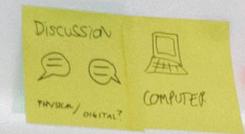
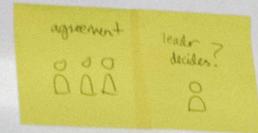
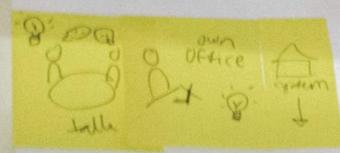
DECIDE TIME FRAME & DIVIDE RESPONSIBILITIES

CREATE TASKS

FINAL PROJECT STRUCTURE

WORK ON MY CONTENT

INTRO TO STUDENTS



curriculum

Mail

curriculum

ONLINE RESEARCH

curriculum

NEW SCHEDULE

parent presentation

parent - doc

parent presentation

governments laws UDIR

software

software

software

software

software

software

software

software

Responsibility & Who makes the initiative?

Time-consuming

everyone is heard

TIME CONSUMING

Decision Making

make it fit for everyone

Shaping the project

TIME

WE WANTED TO INVOLVE

WE WANTED TO INVOLVE

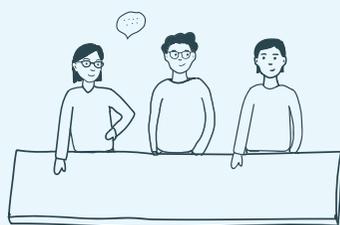
TO DO INTERDIS. PROJECTS?

teachers (n.a. n.a.)

User journey map

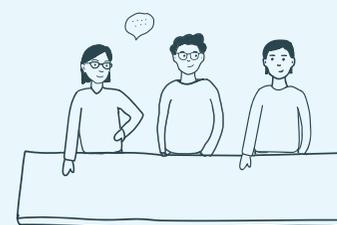
1.

Starting up
a new project



2.

Planning during
everyday life



Current phases of interdisciplinary projects

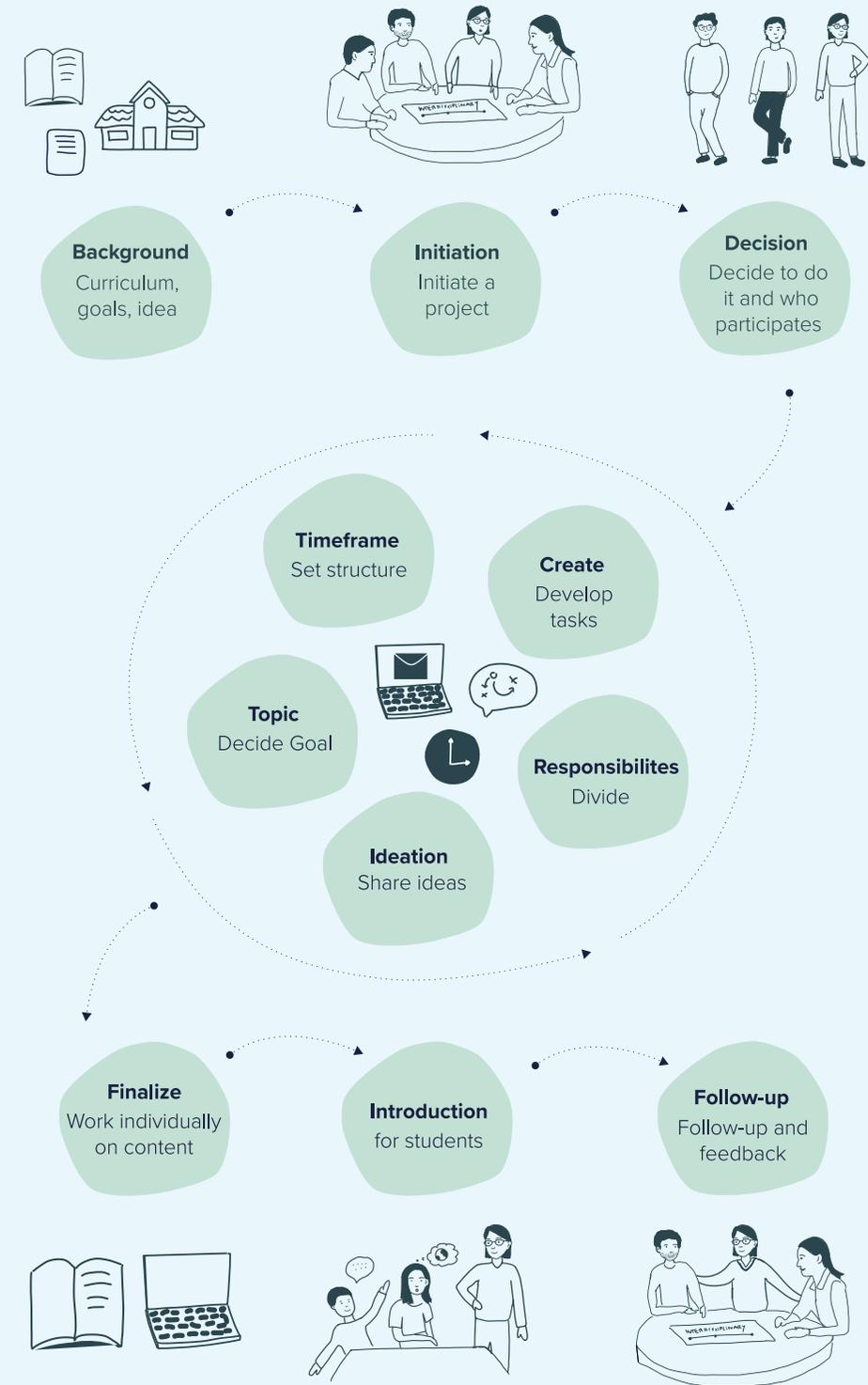
It was crucial to get a holistic overview how interdisciplinary projects are planned today. In one school year at Majorstuen skole they have three interdisciplinary projects: the innovation camp, a world literature day and a digital campaign day. These projects and ideas are integrated into the local curriculum and involve teachers and leaders for planning.

We identified two different types of planning collaboration:

The initial collaboration when starting up a new project. Teachers often meet once or twice to plan the road ahead.

The everyday life collaboration and sharing as the planning happens over time. Educators will work more individually as the planning happens mostly over weeks or even over a semester, with the possibility for meetings in between.

Project planning process



The steps of a project

Planning is a process that happens over time, and it was challenging to get an overview of all the activities and communication involved during a planning process. There are different phases, activities, touchpoints, mixed feelings and challenges involved. It is not a linear process, but a dynamic experience over time.

The initial collaboration starts with an initiative or idea to do a project, from a teacher or a leader. This initiation can come from different sources. It could be that the curriculum states that the school has to do an interdisciplinary project, as it will be stated in the renewal. It can also come from a teacher who was inspired by the curriculum, by a project online or by what other schools have done.

This initiative is then followed by the decision to do the project and it is decided who will participate in planning it. The teachers who participate have to decide for a topic and goal, share ideas around it, develop tasks and setting the structure. This part of setting up the project is where there is most challenges, and this currently takes the most time. Teachers divide responsibilities and can finalise content individually. They can also meet in between.

When the plan is done, the teachers start the project by introducing it to students. Ideally, there would be a follow-up of the project after it is done, where the teachers discuss and reflect on how it went.



Main takeaway: Complex and time-consuming process

Projects often result in long documents with a rather confusing structure, where it is hard to go back to specific parts. This leads to a loss of overview and an inefficient way of working.

A teacher student in practice mentioned: “We [teachers] think we agree on the same, but there is often confusion”. There is often miscommunication because of the mixed use of tools where information can be spread in different places. “Do you have that paper? Where is that plan again... canvas? Itslearning? Or was it printed?”.

The assistant principal said that there is a big potential for lost information and knowledge today. A lot of communication is happening in

between lessons in hallways or in the office, and is therefore not documented. This can lead to miscommunication in decision-making and planning.

Working and planning interdisciplinary projects can be challenging because there is a lot of time and effort involved. The planning of a project, especially working through the details such as deciding for a responsible, is time-consuming. Planning requires a lot of teachers’ involvement. Some projects are cancelled early in the process because teachers are afraid it takes too much time to realise it.



Sum-up of the main challenges

The key challenges in current interdisciplinary teacher collaboration are:

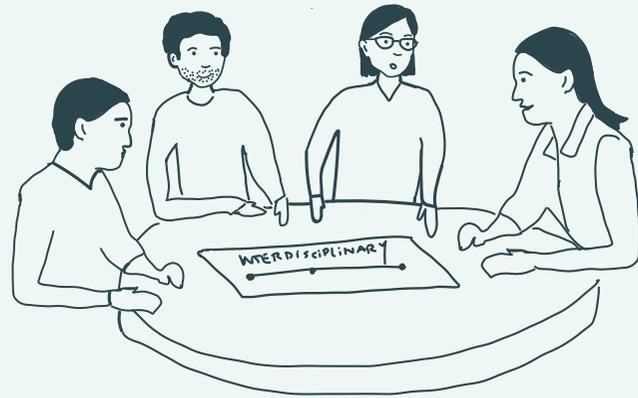
A lack of existing digital tools supporting teaching across subjects

Complex and time-consuming planning processes resulting in a lack of overview and a potential for lost information

Slow communication and a lack of sharing

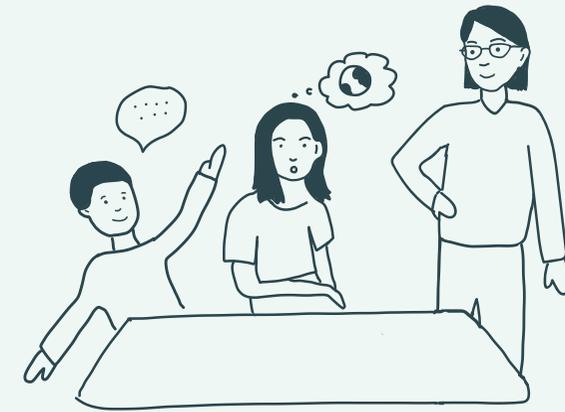
Fixed mindsets and a fear of change in the teaching practices

Few guidelines, little experience, content and inspiration



Final problem statement

How might we support teachers
in collaborative project planning
across subjects?

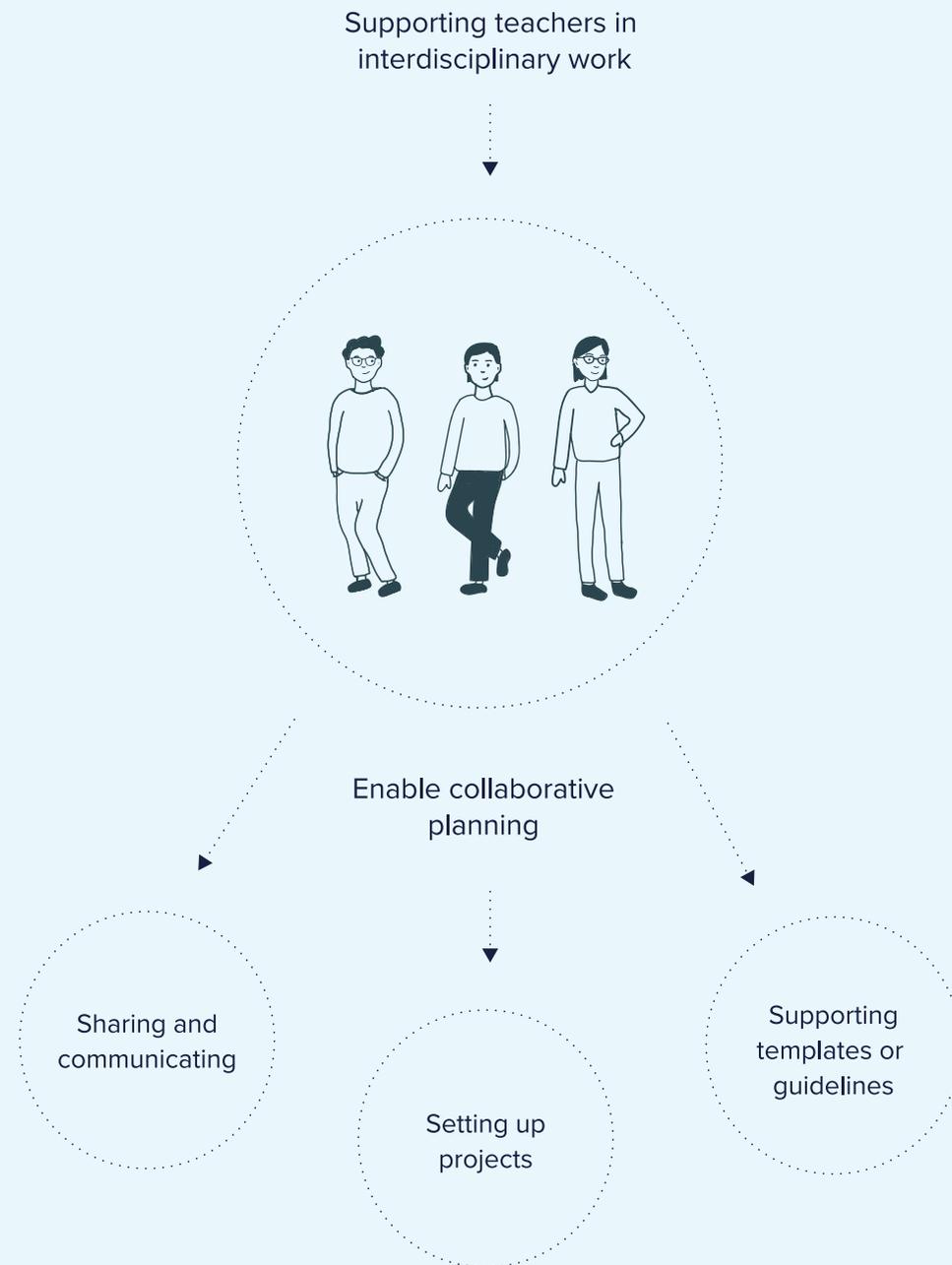


From our findings it was clear that there is a real need for supporting teachers in the transition of the renewal in relation to the challenges of working interdisciplinary now and after 2020.

The objective with our solution is to provide a tool for planning and collaboration that will enable teachers to make engaging interdisciplinary projects. In result, the students can more clearly see correlations and the holistic view of the topics they learn.

concept & prototyping

This chapter introduces you to the conceptualising and prototyping process towards the final proposal



Initial features

Teachers rely on digital applications and services for their work, in planning and communication. However, there is a lack of tools that support teachers in collaborative planning across subjects. Our main findings led us to wanting to develop a digital service that could answer to the discovered needs.

From this decision we could start conceptualising and visualising ideas through prototypes. The prototyping started with simple sketches on paper, evolving to wireframes and to higher-fidelity, digital prototypes.

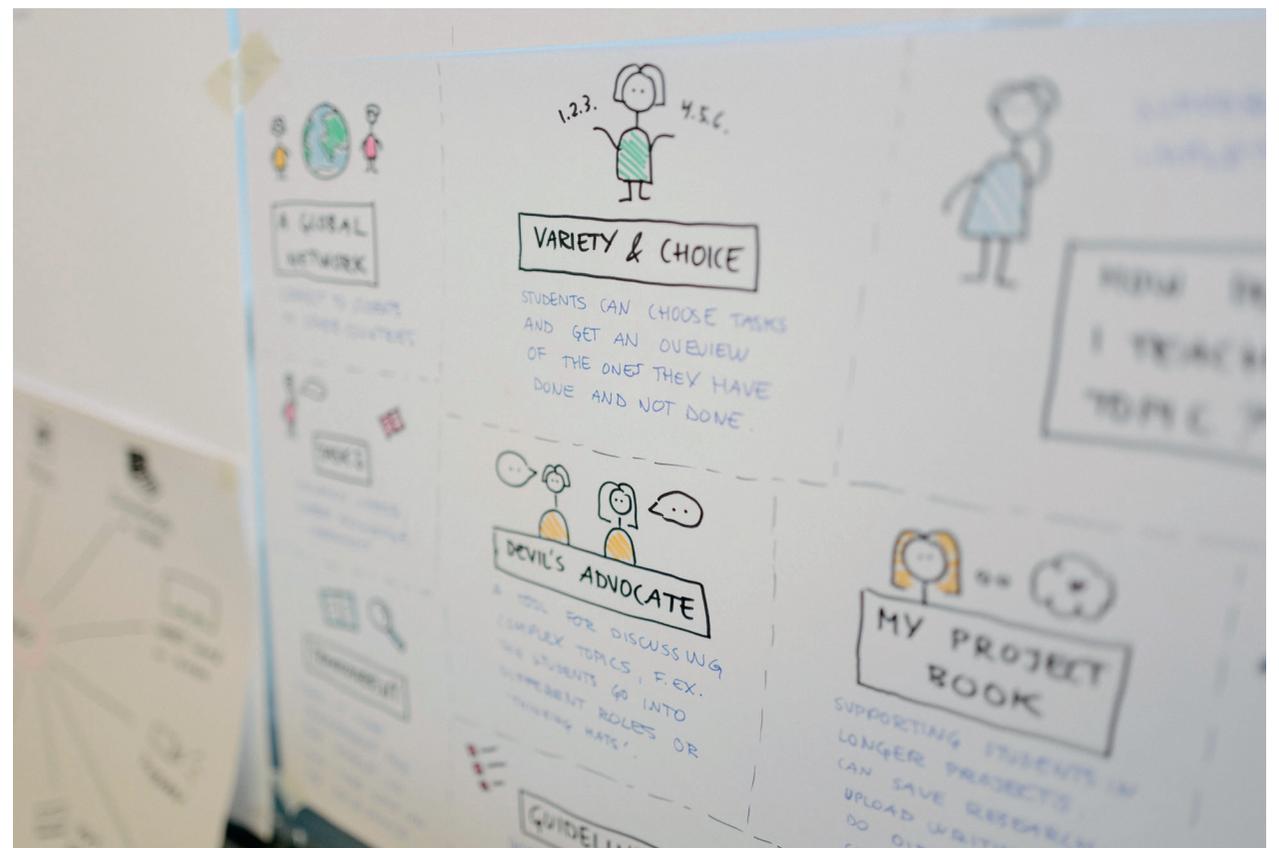
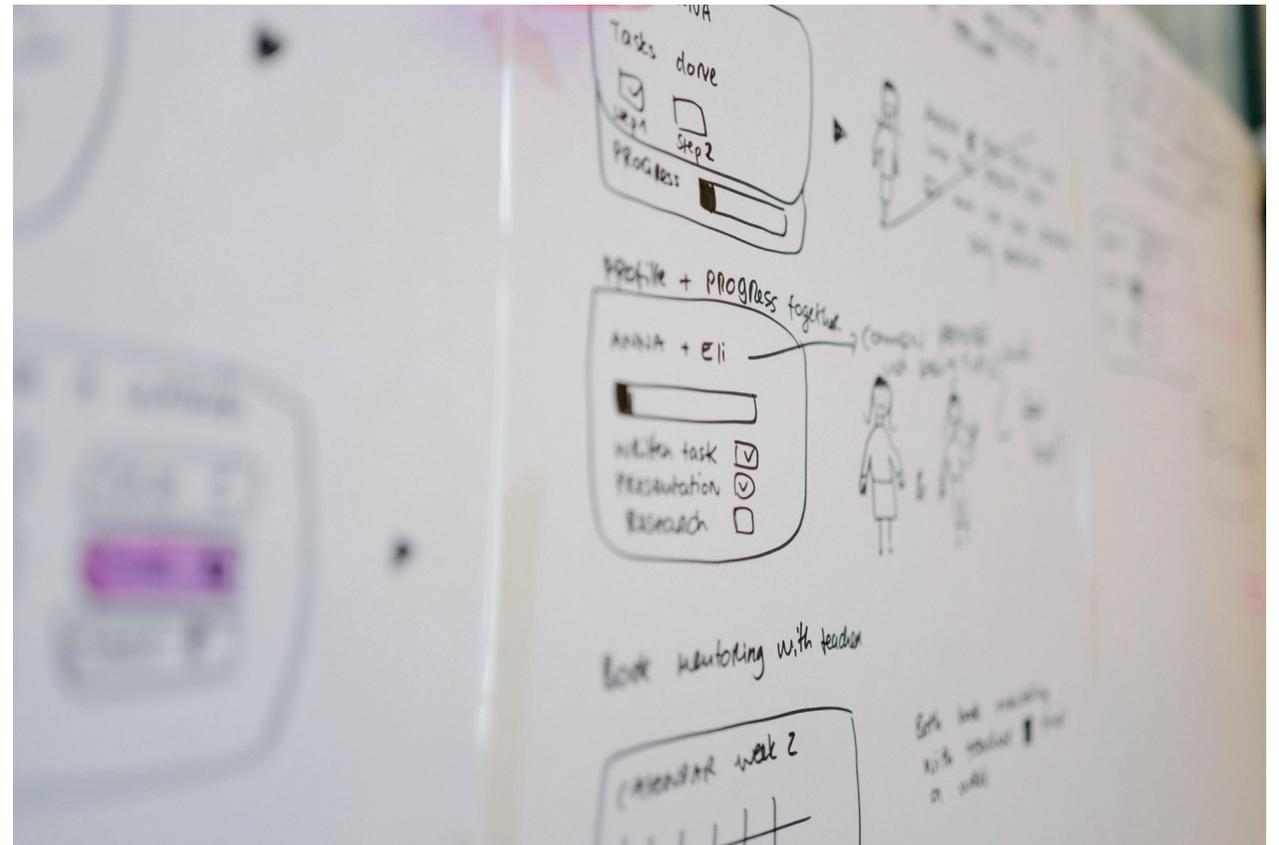
Through interviews and conversations we found that there is potential in supporting the teachers

specifically by including these three main features:

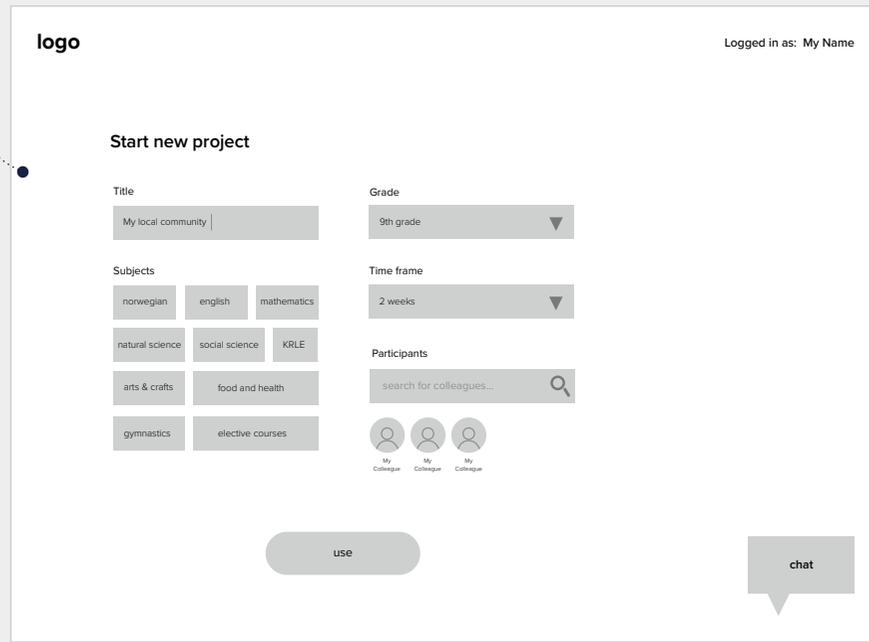
- setting up interdisciplinary project plans
- sharing and communicating with each other
- getting support in setting up projects through some sort of templates or guidelines

Sketching and visualisation supported a more efficient communication around how this potentially could work and look like. It was found that the solution could include :

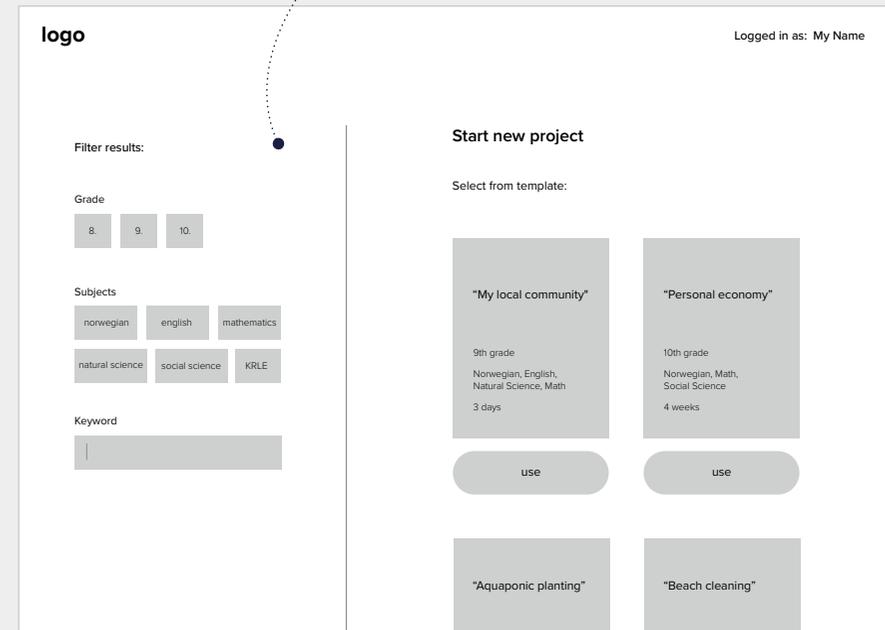
Teachers can plan and set up the projects both when they are together or by themselves
They can search for and browse through previous projects as a source of inspiration for new projects



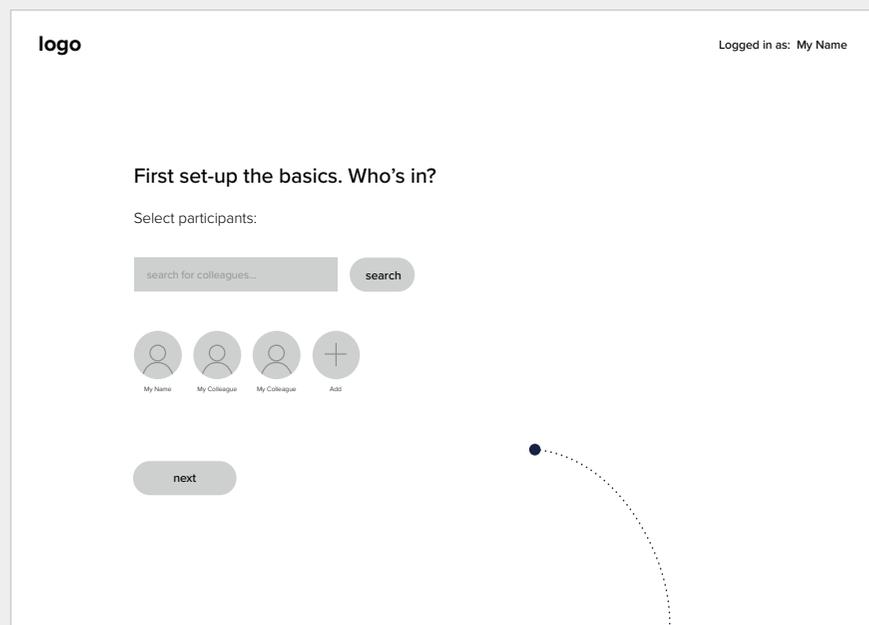
When starting a new project, what information do the teachers need?



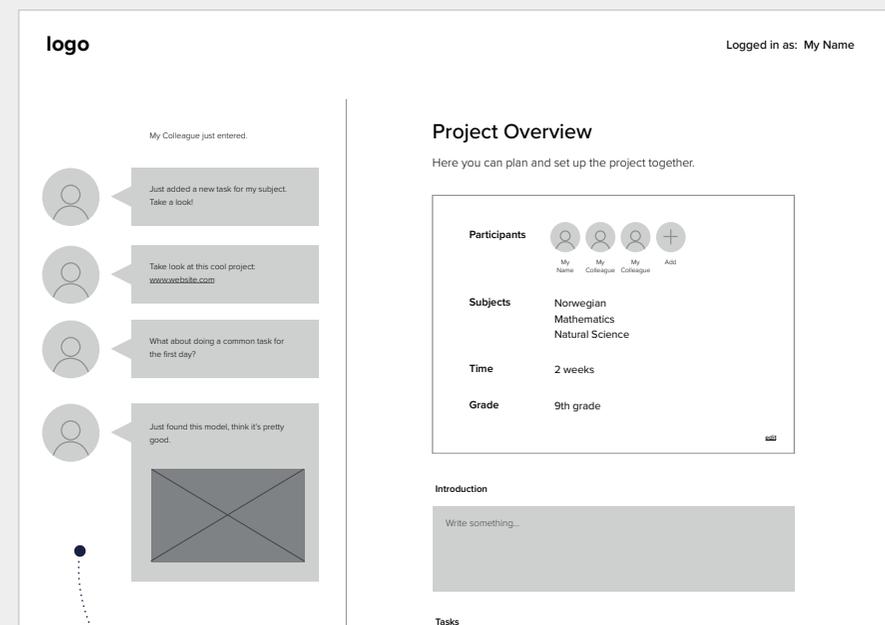
Can they browse through and filter previous projects and treat them like templates?



Could it be a step-by-step set-up?



How do they communicate when planning?
What do they need to add? Tasks?



Concept Model

Conceptualising

The prototypes and user testing led us to a conceptualisation of the ideas and features, including two flows of use, the first time use and use over time.

1. In the first time use the teachers start a project from scratch. They go through the iterative steps of ideation and planning, and save the project. After the project has happened and is finished they add how it went, what worked and what didn't work. The project plan with these evaluations is then saved to 'previous projects' and serves as 'template' for next projects.

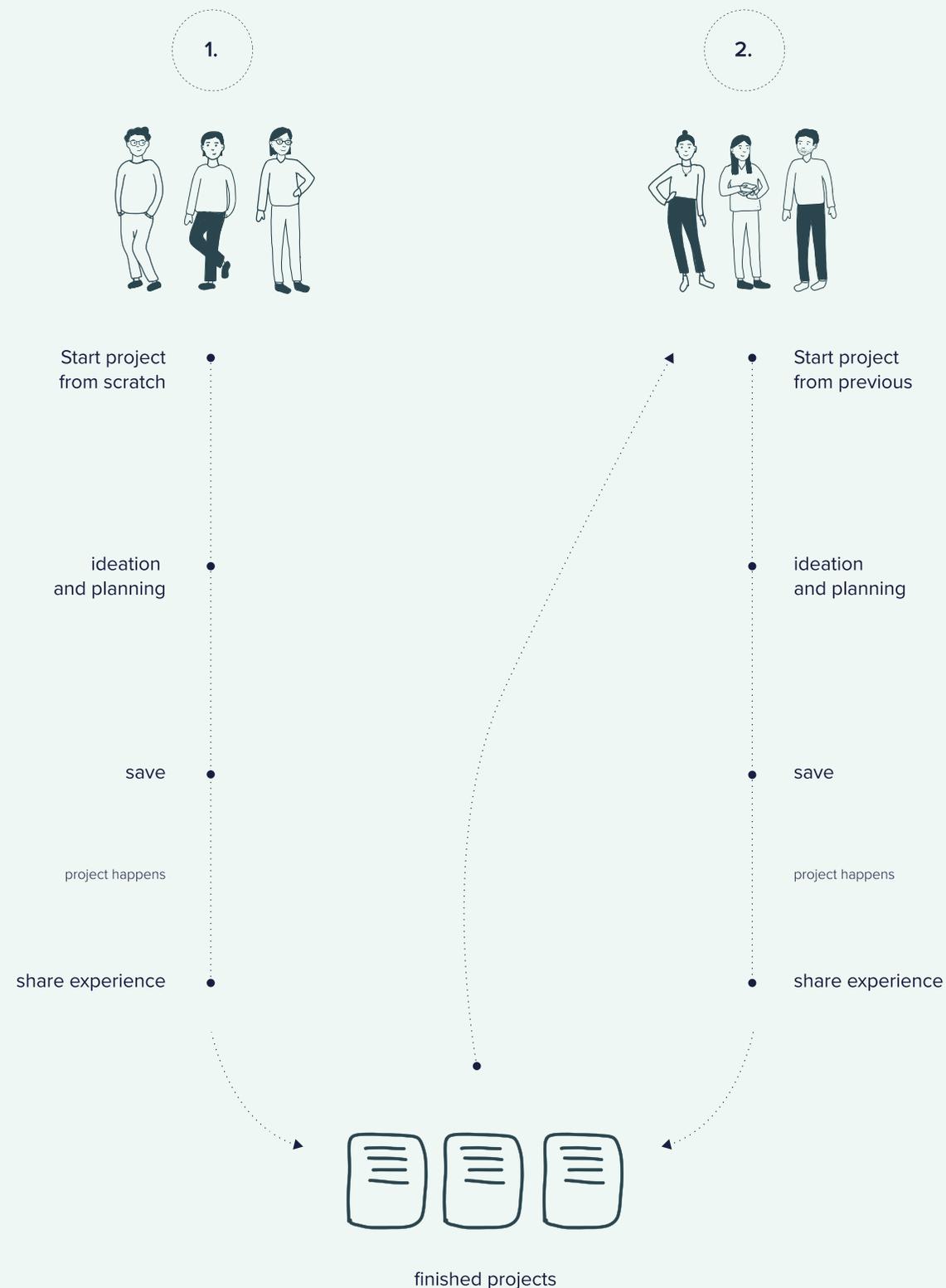
2. For the next uses, over time, the teachers can choose to start from scratch or from a previous project. If they start from a previous project they go through the same steps, by tweaking the existing project to fit their situation. They save the content, evaluate how it went, and this again becomes a new 'template' for next time.

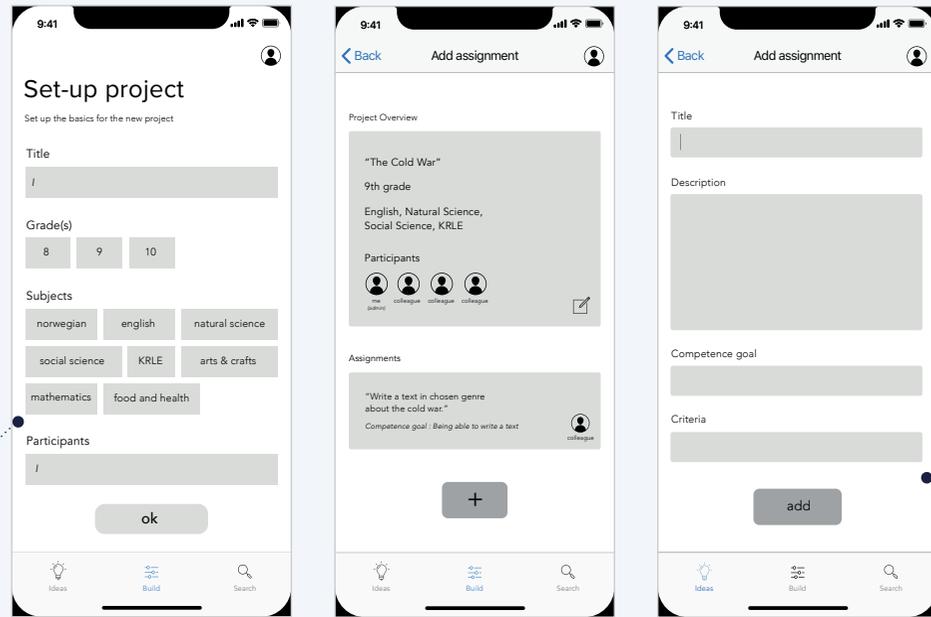
In this way the teachers build up their bank of interdisciplinary projects over time. Therefore, teachers are their own content providers. They can always access and reuse their previous projects, so they don't always have to start from scratch and reinvent the wheel.

This conceptualisation led to specifying the features to:

- Setting up projects from scratch or from previous projects
- Sharing and communicating ideas
- Exploring previous projects.

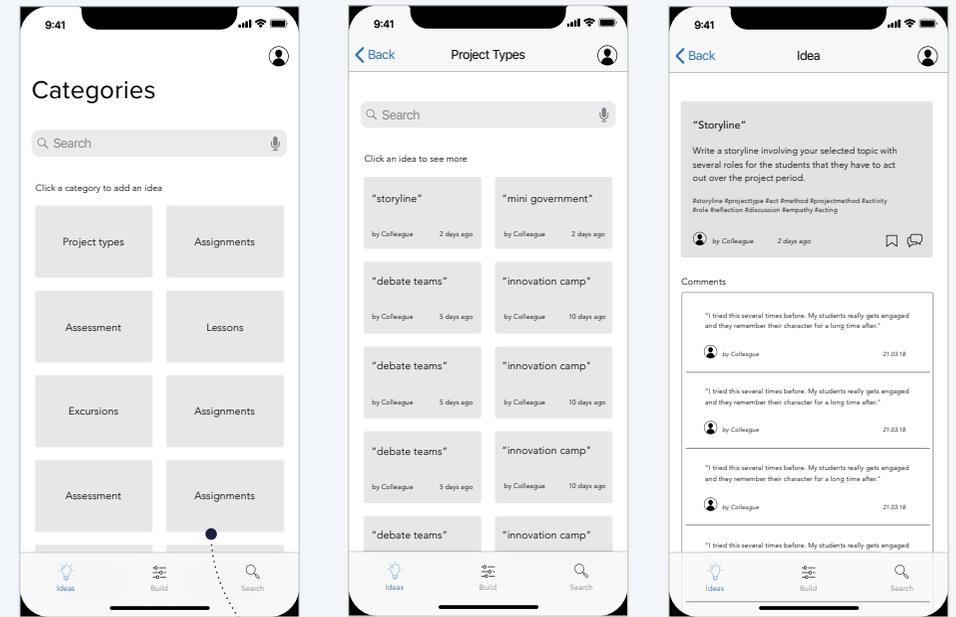
Simple and fast digital prototypes were developed for further testing and to explore these features.



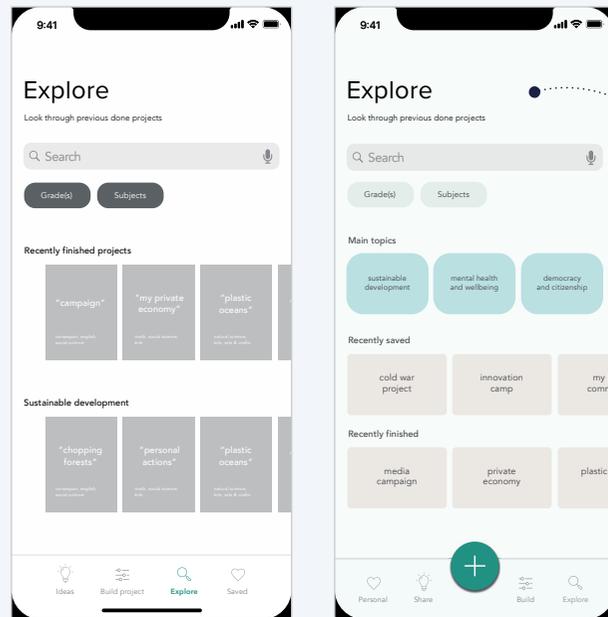


Setting up the project could include title, grades, subjects and participants

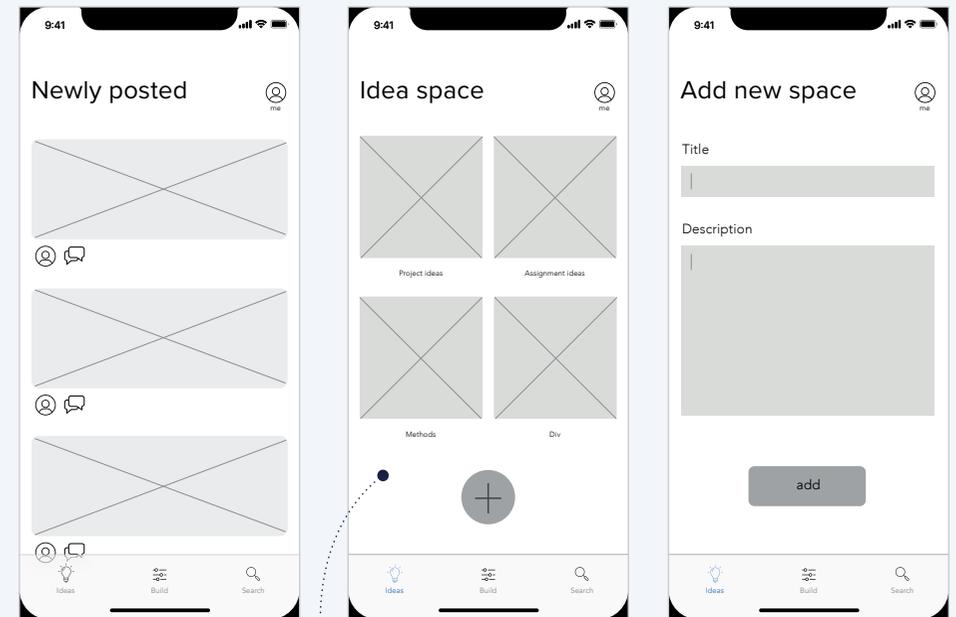
Exploring if what information they need to add to the plan



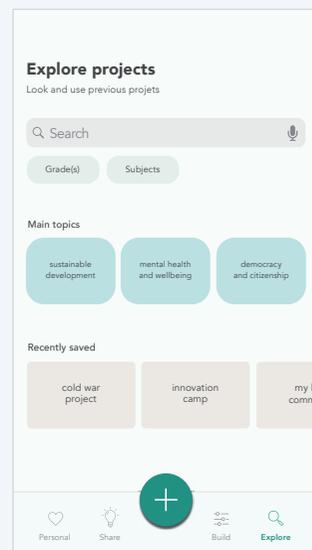
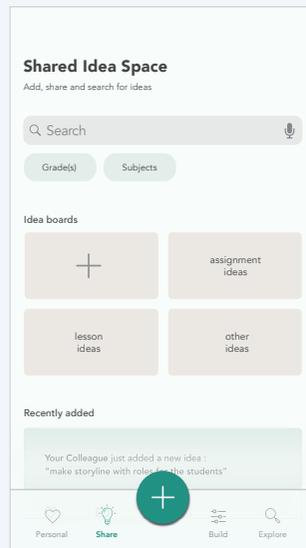
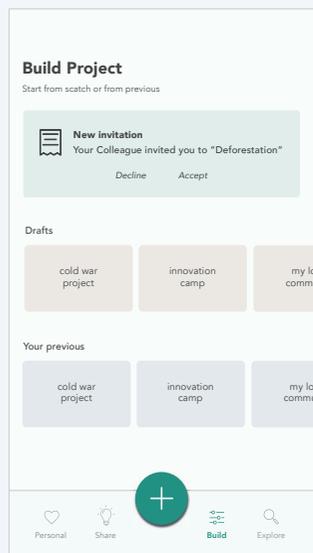
Exploring if projects and ideas can be divided into categories or types



Exploring how the previous projects are presented, they could be divided in categories



Could there be 'idea spaces' or 'idea feeds'?



Set-up, ideate and explore

A user test revealed a wish for making it easy to share ideas with colleagues. It should be possible to go back and forth in the process of ideating, setting up and planning the project. It was stated in a user test that it is very helpful to see previous projects, as starting a project from scratch every time can be very time-consuming. It was revealed that there is a wish for being on-the-go when sharing ideas for a project, for example when going back and forth from work. Still exploring what device this should be on, this led to going back and forth in prototyping on desktop format and mobile.

It was found that teachers' ideas are mostly text-based. It could be an idea for an assignment or for a method that students can use in a lesson, such as different ways the students can discuss a topic or ways they can reflect upon what they learned in the lesson. There could be a possibility to challenge their ideation by having the option

to also add photos, and in this way make it more visual.

When starting to set-up the project, it was found that one teacher could take or be assigned the responsibility as an 'administrator' by first setting up a working title, the grades included, the subjects included and then adding the other teachers in. Then all participants get the same overview and can add ideas, assignments or lesson plans to the project. The responsible or 'administrator' can also be a go-to person for the others, if they have questions or need advice.

Ideation and setting up projects was treated separately in some prototyping exploration, but it was found that these two steps should be more linked to each other. In this way the ideation is directly connected towards the project planning and can be used to ideate around the specific project that is being set up.

Context and device

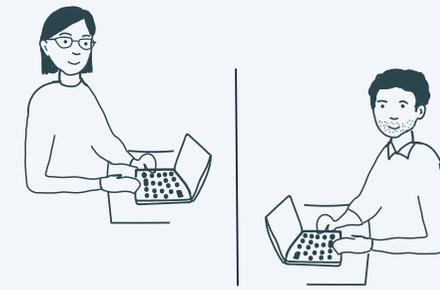
The decision for which device we should design for was back and forth. Starting with designing for desktop, as the computer is the most used device by teachers. Then shifting to mobile, as user testing stated a wish for on-the-go support. Further feedback and reflections led to considering the SMART touch screens that Oslo schools is provided with by the municipality. This could be a way to bridge the digital with the physical meetings. What if teachers could use the solution both individually and more integrated in the meeting context?

SMART is a company behind interactive boards and screens (SMART technologies, 2018). Their focus for education is on classroom interaction between students and students-teacher. Hence, there is an unused potential for teacher-teacher collaboration.

Schools like Majorstuen Skole are equipped with SMART boards or screens, but they are not being used and are locked away in closets because of this. What if they gained a new area for use, and teachers could try it out without having to be in front of the students? In a meeting with peers it could create a safer zone to try the technology.

It was decided that the solution will support the different contexts of meetings, office time and on-the-go, and therefore be a more integrated part of the experience. The main device for the design proposal will however be focused on the desktop, as this is the device the teachers use the most throughout their day.

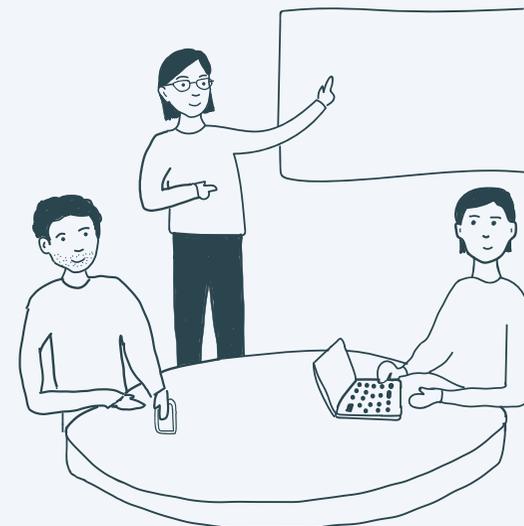
The three contexts



in the office

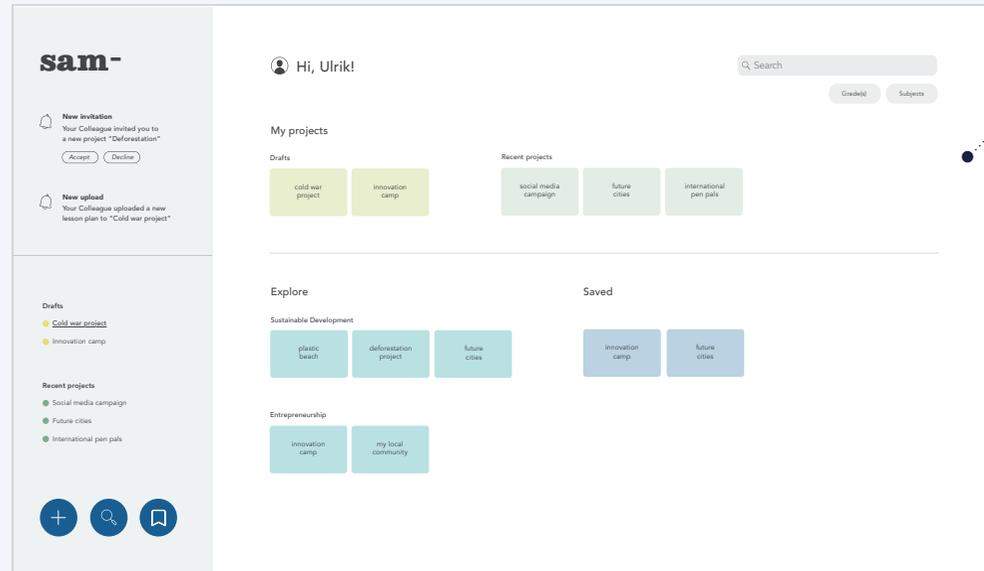


on-the-go

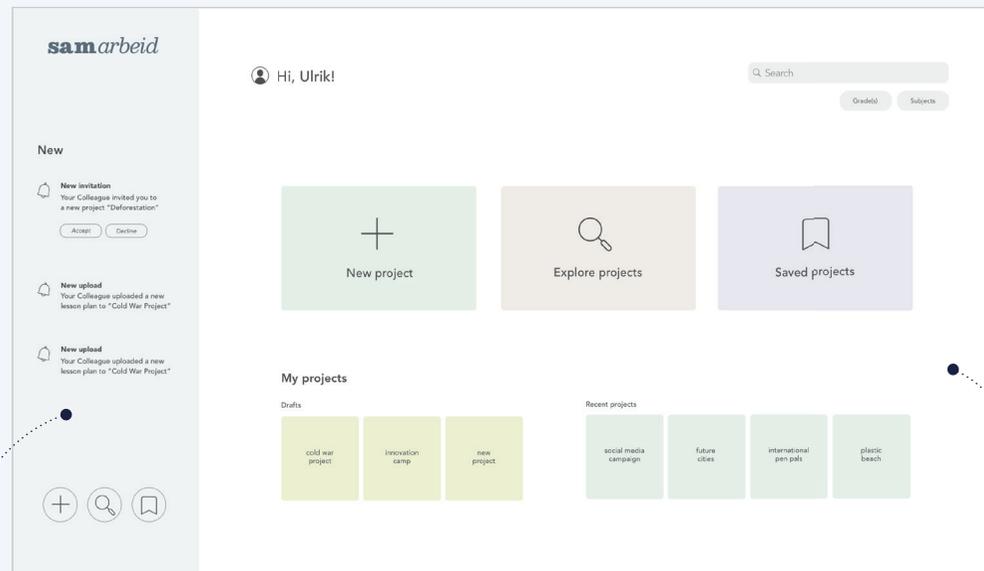
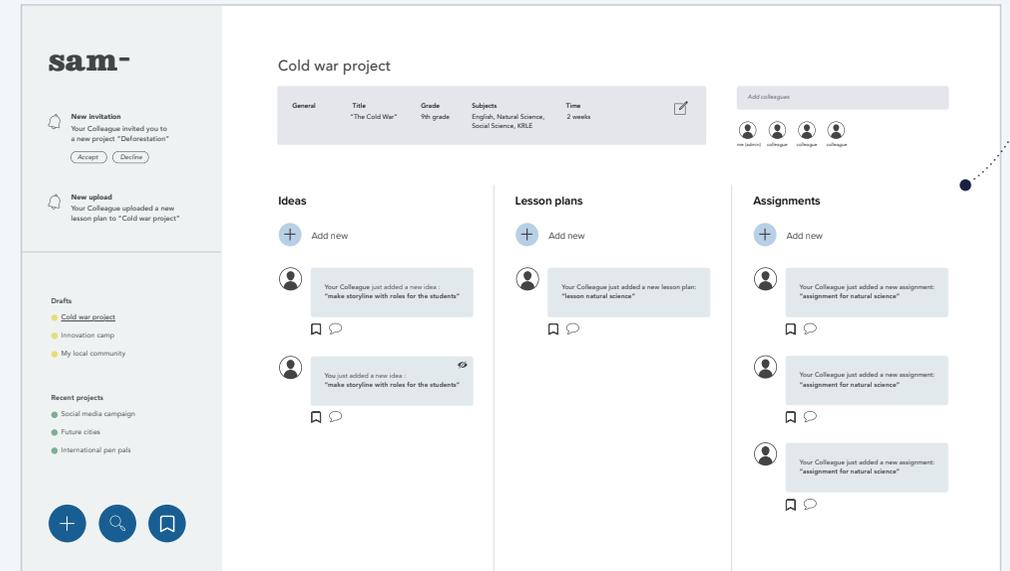


in meetings

Exploring if there could be a sort of home page

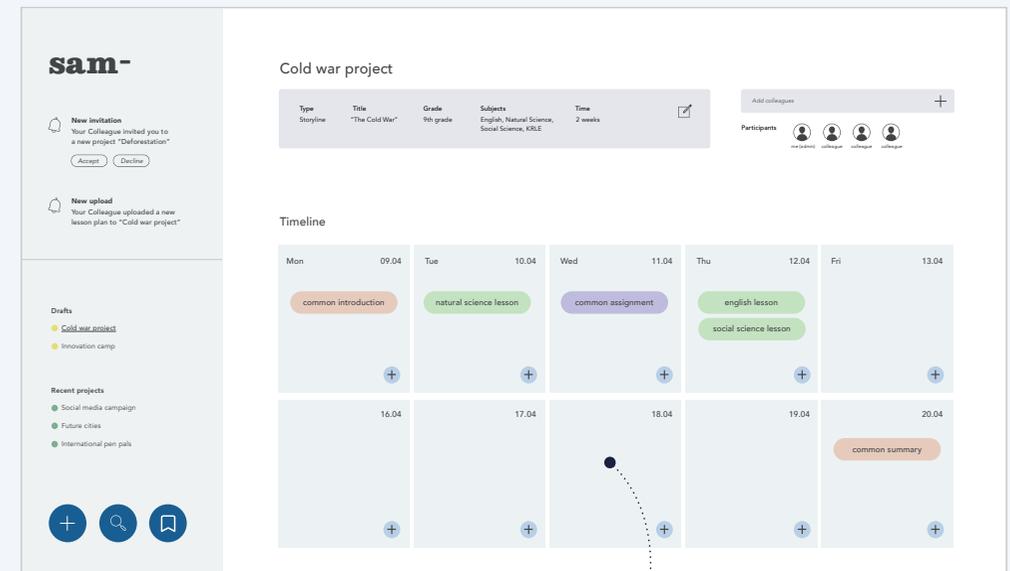


Exploring how the project plan is presented, if it could be divided in ideas, lessons, assignments.



There could be a dashboard-like bar on the side for quick access

There could be clear buttons with the different options

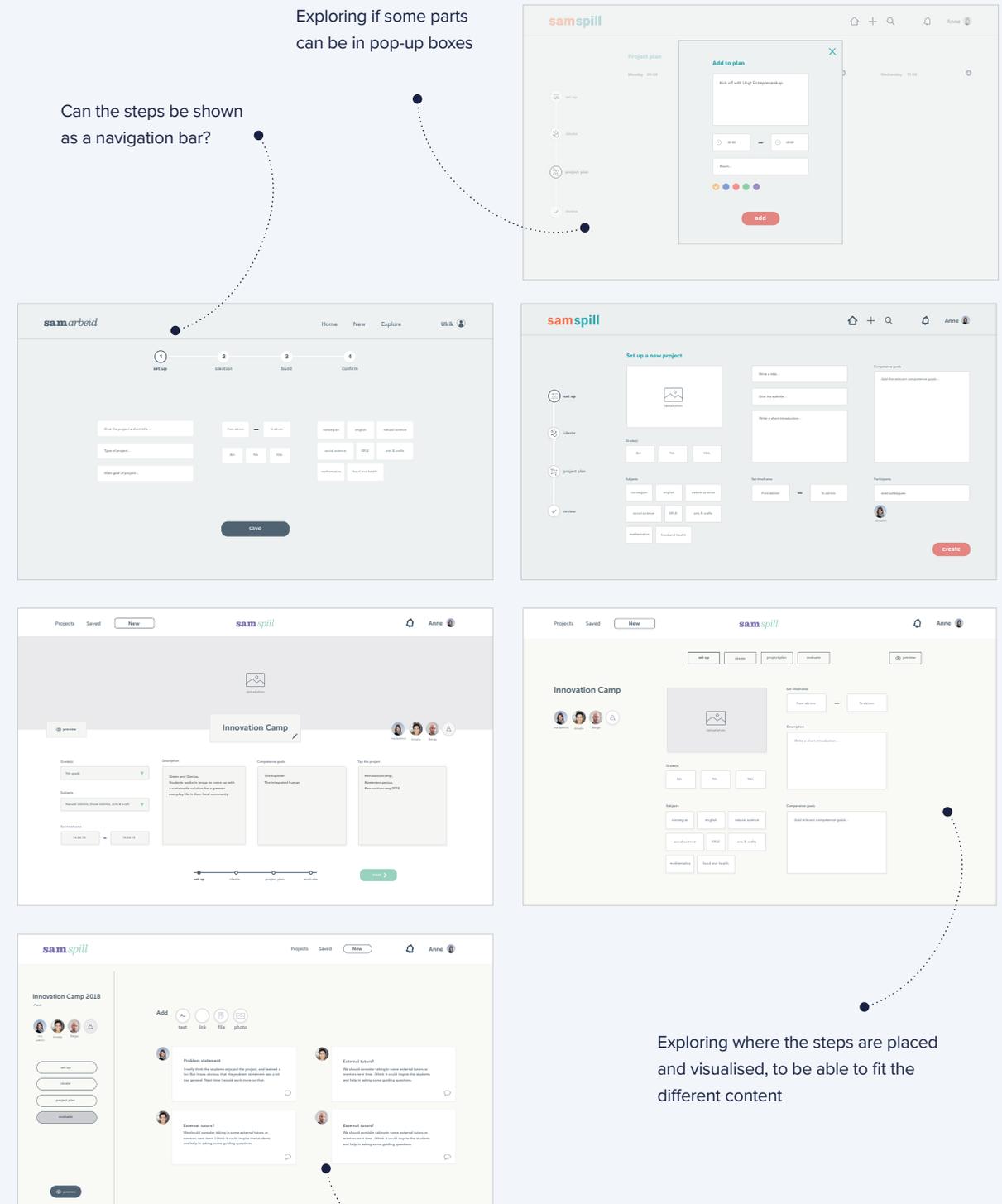


The plan could have a calendar style overview

Exploring the setting up of a project

Can the steps be shown as a navigation bar?

Exploring if some parts can be in pop-up boxes



Exploring where the steps are placed and visualised, to be able to fit the different content

How are the participants sharing and communicating?

The planning steps

Through developing a richer understanding of teachers' interdisciplinary projects and planning throughout our process, the content of the prototype evolved consequently. The initial three steps of set-up, ideate and explore expanded into several core pages and a planning phase divided into four steps: set-up, ideate, plan and evaluate. How to navigate between these steps and the content of each of them, was explored through several iterations.

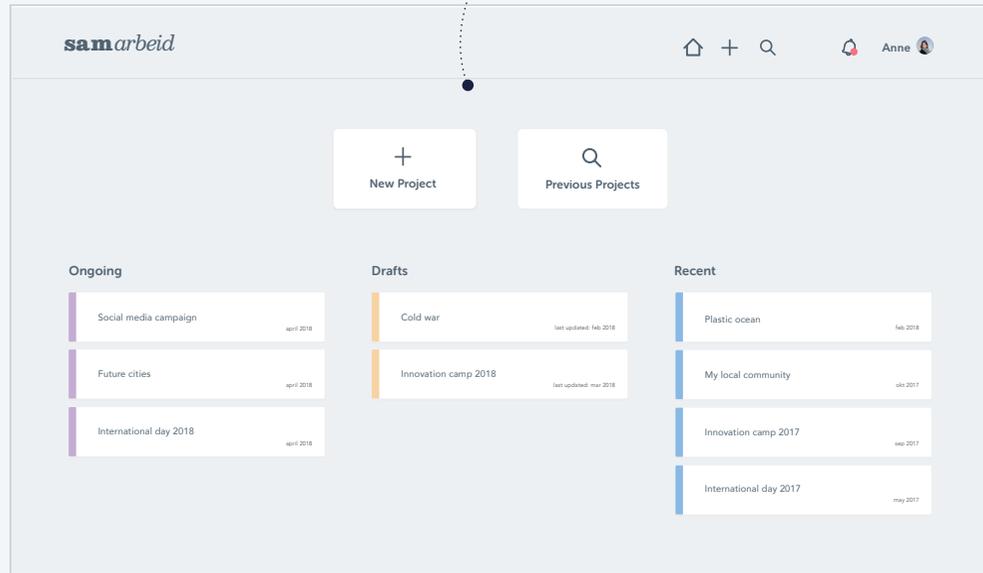
It was found that the projects the teachers make has to be presented in an engaging way, so that they are accessible and eye-catching. This representation was explored, including what

information describes a project the best and the prioritisation of this. The projects are represented in an explore page where teachers can browse and search previously finished projects. They are also represented in a home page, a more personal overview with a quick access to the user's own projects that they are working on.

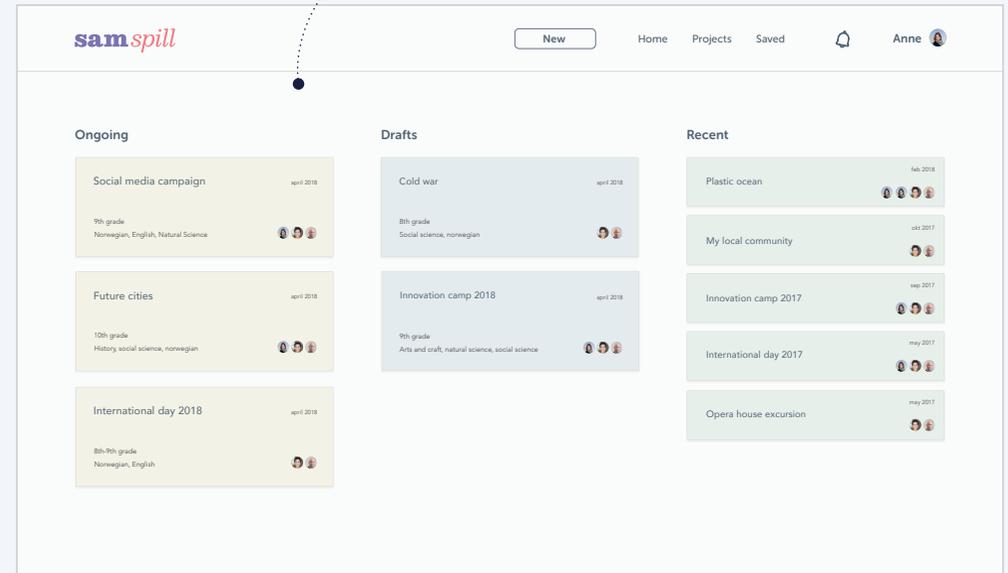
A profile was developed to show the feature of saving projects. As the project bank expands over time, teachers might want to save favourites or projects they find especially interesting or inspiring.

concept & prototyping

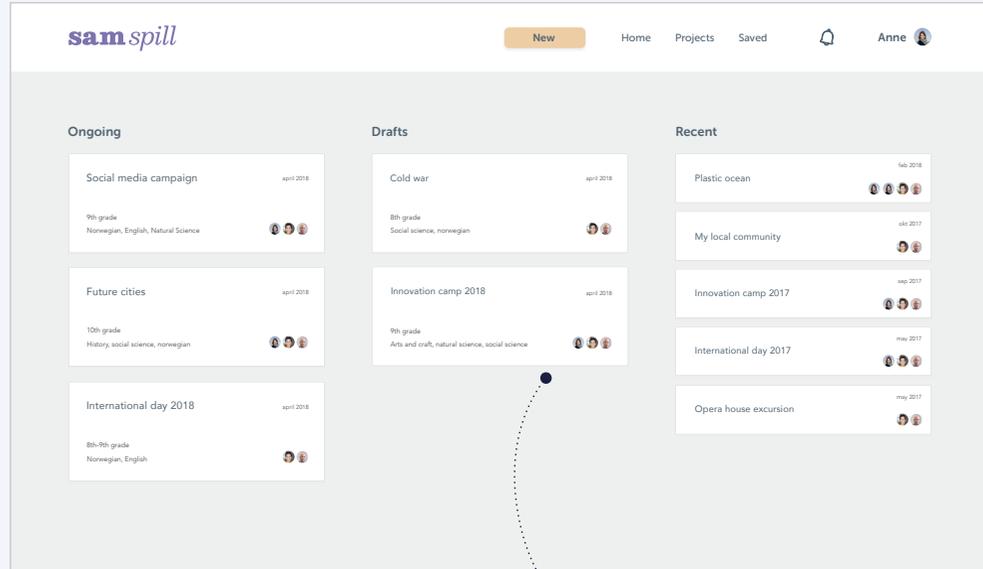
Exploring the home page and what information is showed



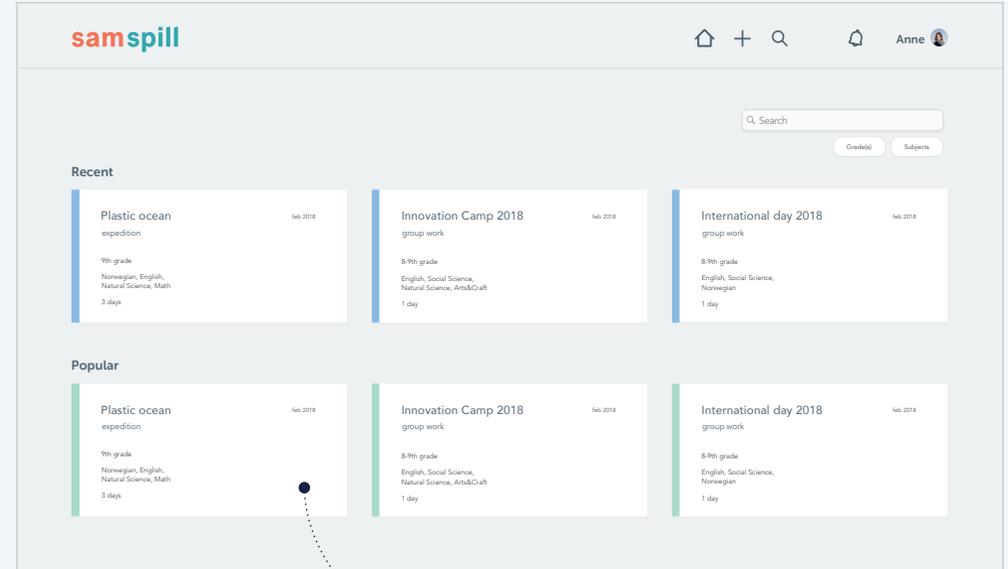
Maybe the projects have some sort of colour coding



How is projects presented? Maybe the participants is shown

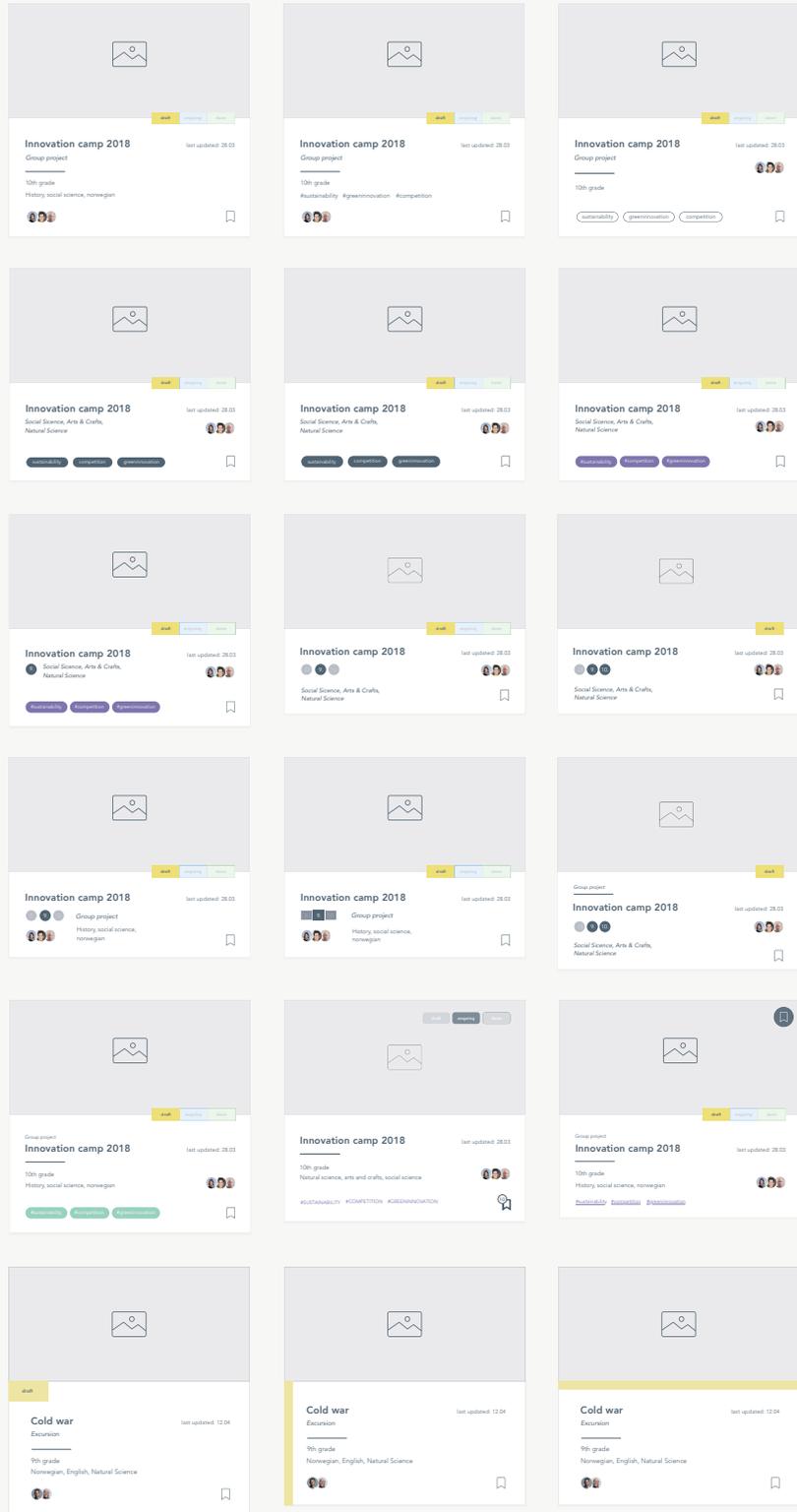


How much information is shown about the projects?



concept & prototyping

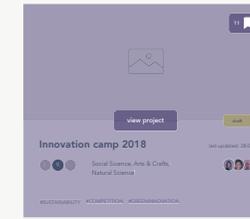
All projects can be presented with a photo



How is status of the project shown?

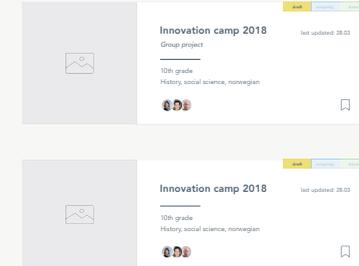
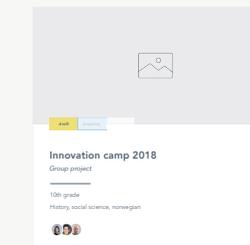
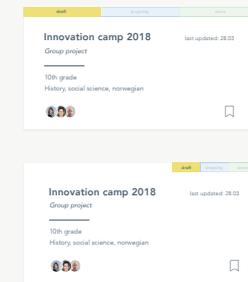
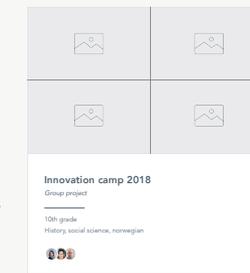
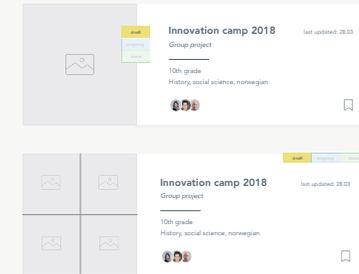
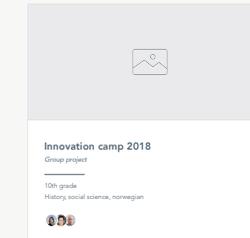
Is the status colour coded?

How is information shown and prioritised?



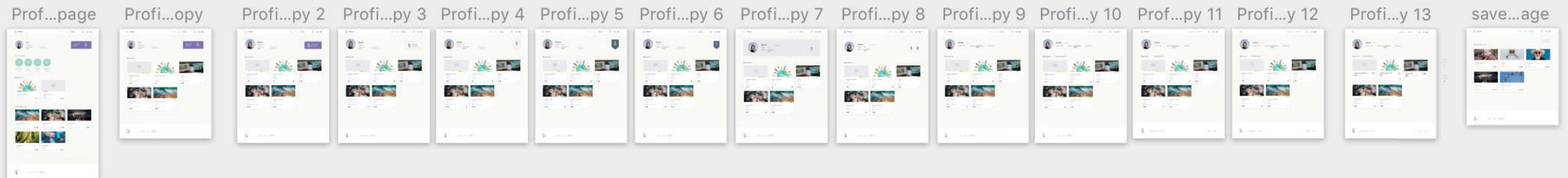
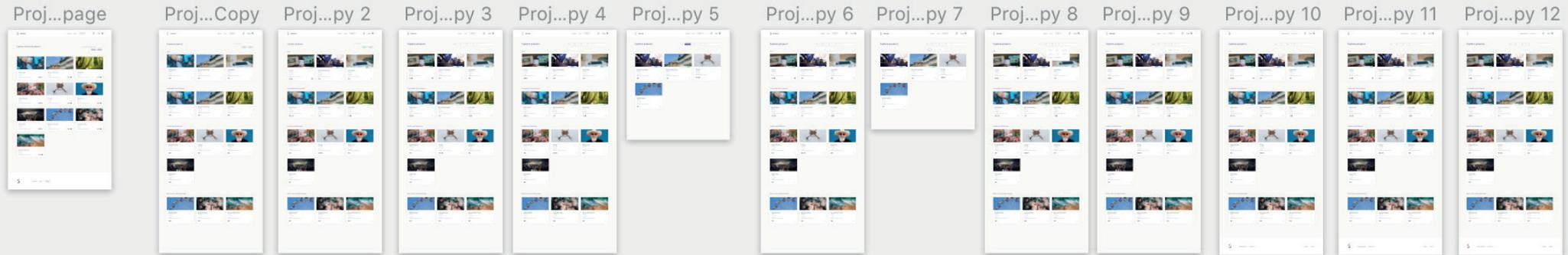
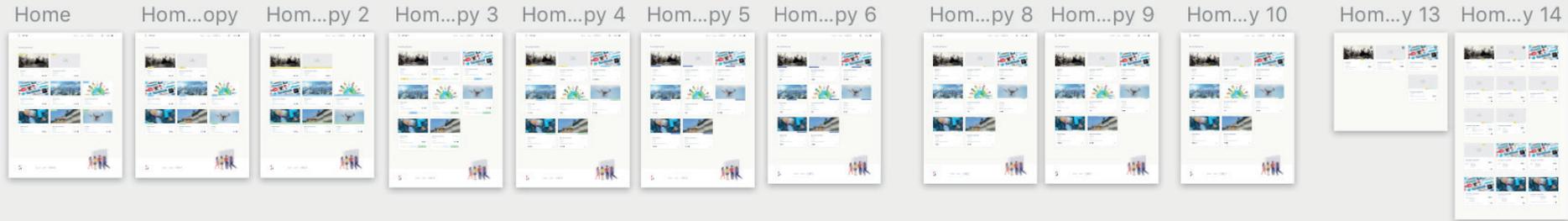
Is there different sizes of cards, allowing a more dynamic layout?

Can there be several images?

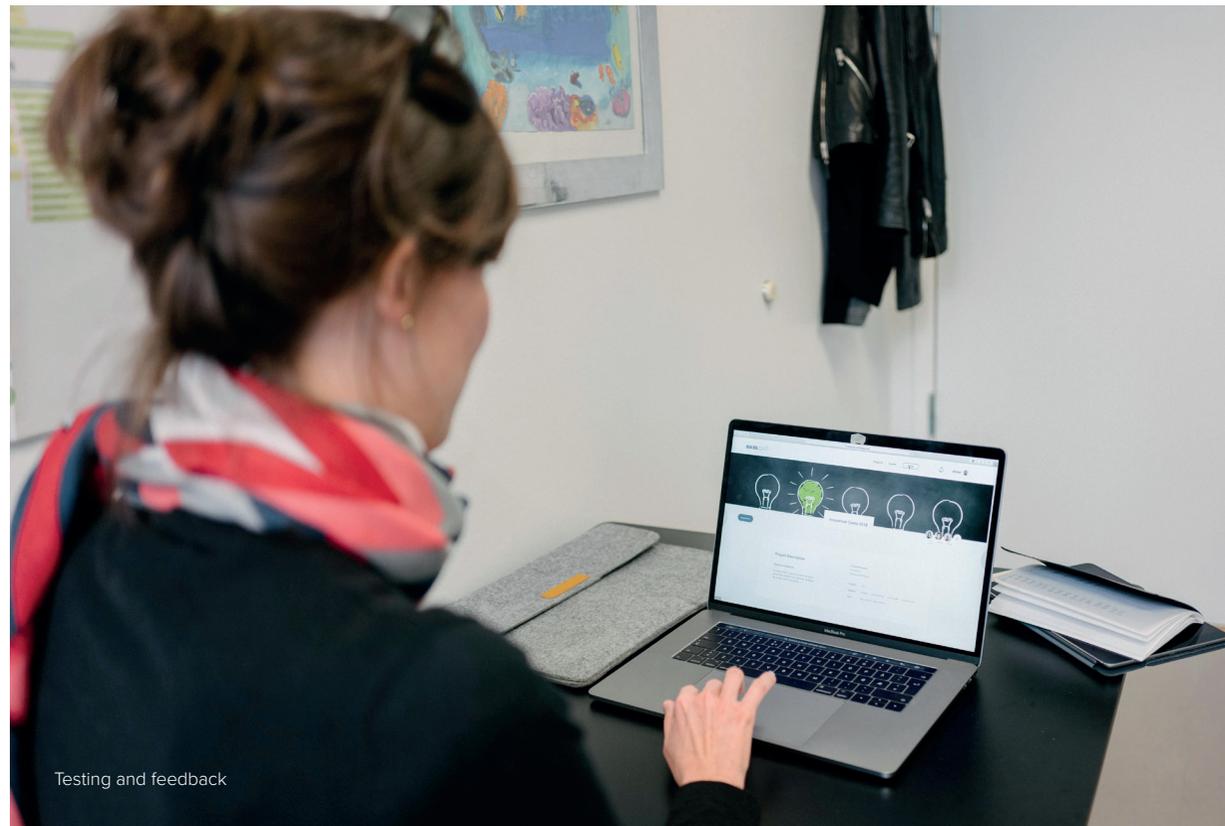
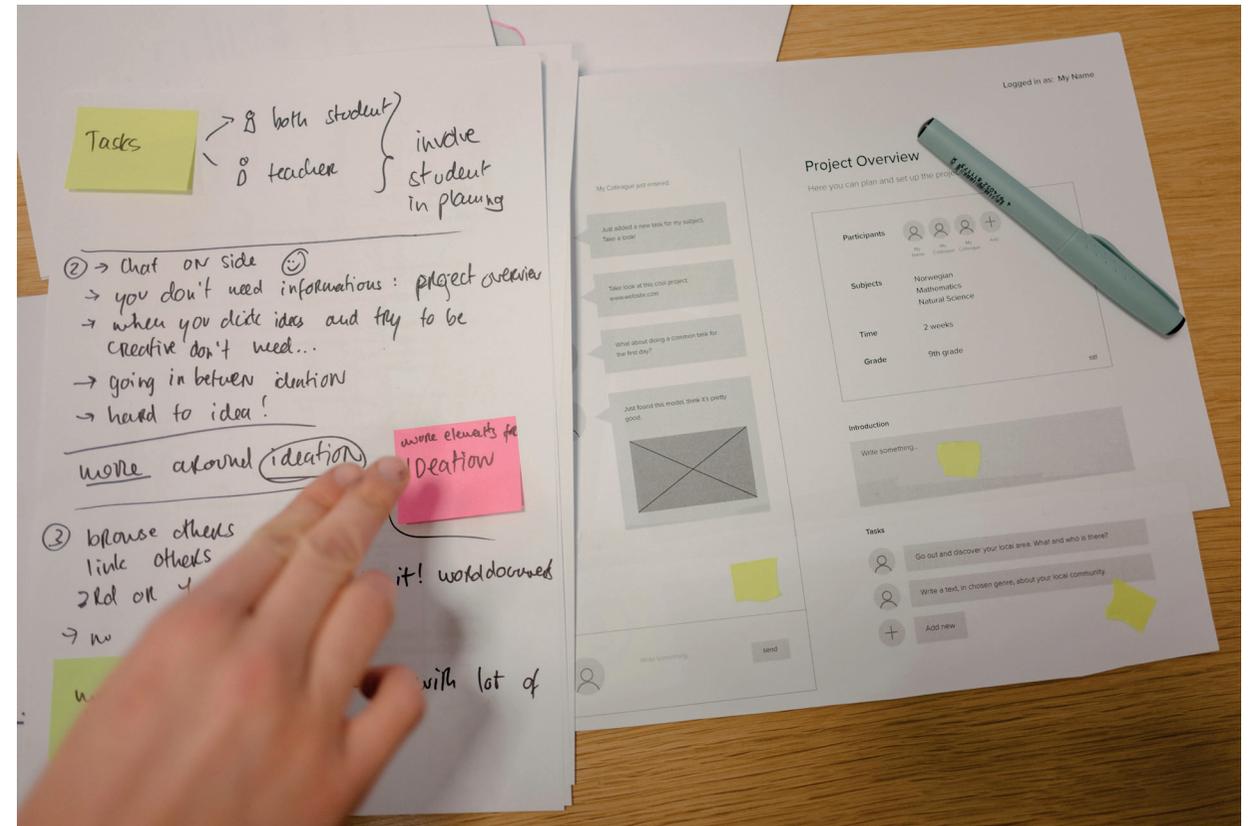
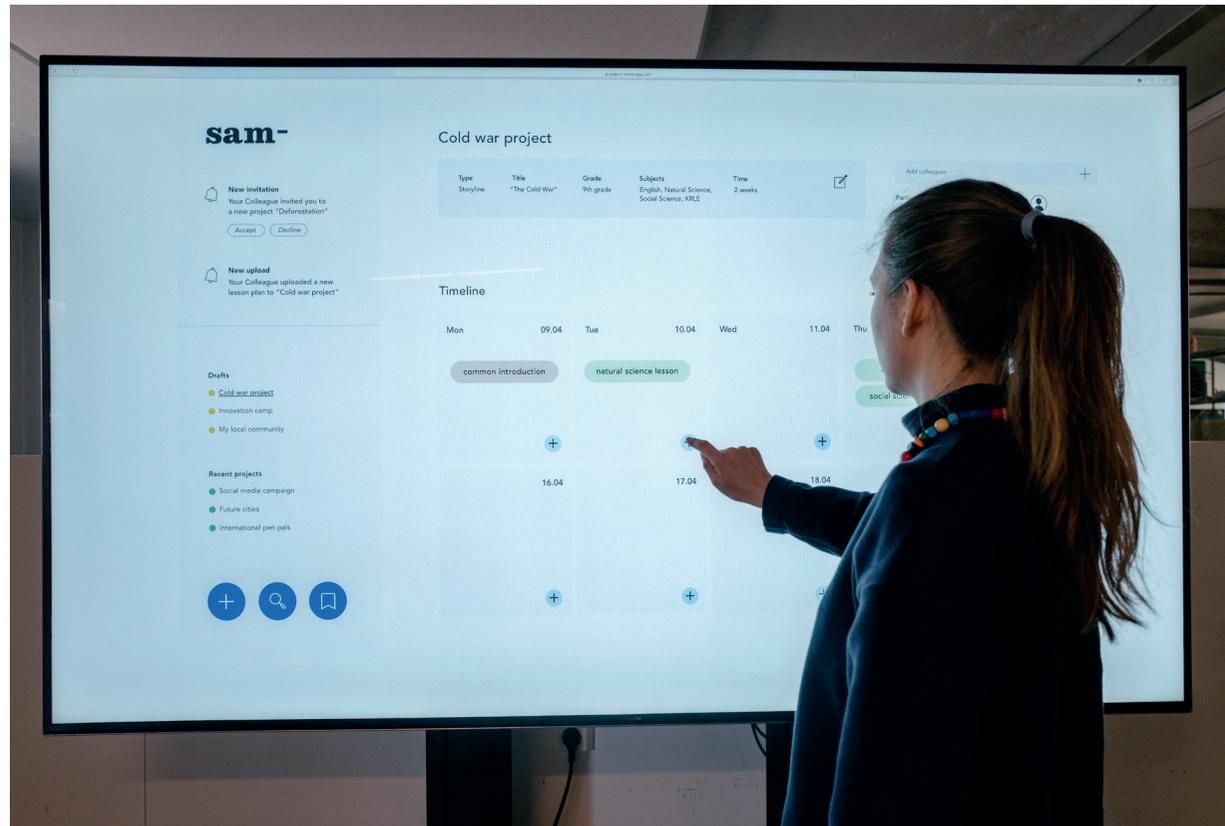


Could there be a hover effect?

concept & prototyping



Some of the finalising prototypes



Testing and feedback



“Your project is valuable and could help the non-idealistic teachers to be motivated, because they think they might have more work in planning interdisciplinary. This would rise the motivation if they can save time.”

Teacher

“This has a very clear focus on collaboration, and we don’t need to sit in the same room. It is across subjects. And we can much easier look back at what we did.”

Teacher

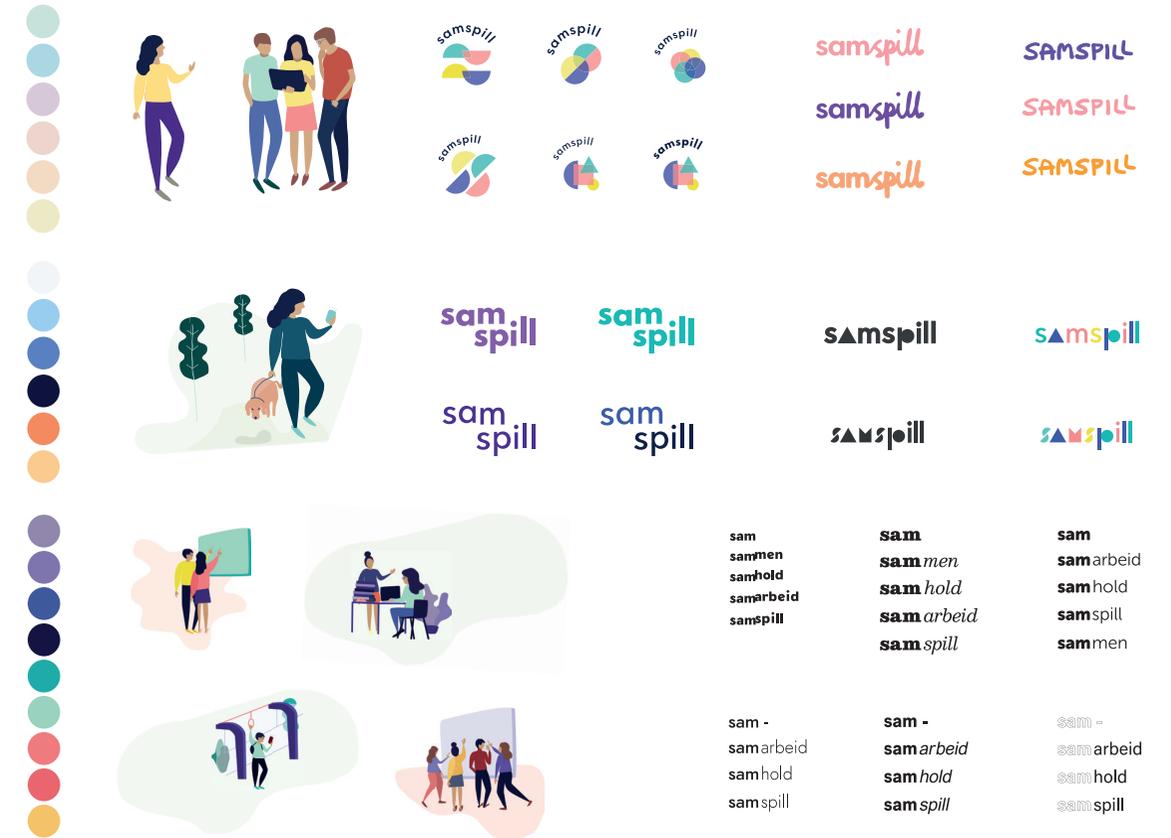
“This solution is good because things are in the same place! Who is going to participate, what we are going to do, and we can work on it together and look back on what we did”

Teacher student

This tool would save me a lot of time. It would be easier to sell ideas to co-workers .”

Teacher

Visual exploration



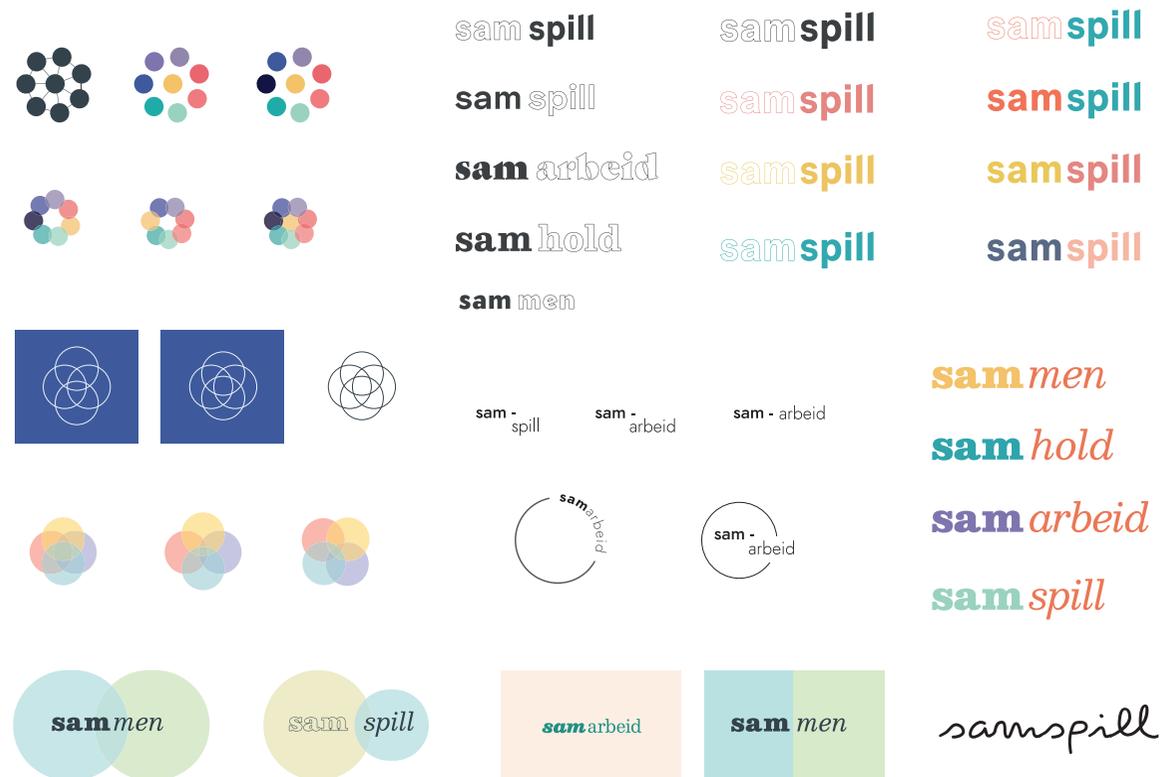
Look-and-feel

Initial grey wireframes evolved further into exploring colours, fonts, more detailed layout and an overall look-and-feel. We developed a brand for our prototype to present a more holistic look and be able to communicate the features and offerings better.

A user test of some early colour and layout explorations revealed an enthusiasm around seeing something that looked different from what he was used to. He stated that the digital tools he uses today has hard, contrasting colours, often too many features and an overload of information resulting in a long learning curve. It was appreciated that the prototype had clear features and a calm look.

A look-and-feel that will not be experienced as too intrusive to the actual focus of planning projects, became crucial. At the same time, it was found that a neutral interface could be supported by more playful, colourful details. We wanted to include elements, such as a logotype and illustrations, that can give associations to the experience of collaboration, ideation and sharing.

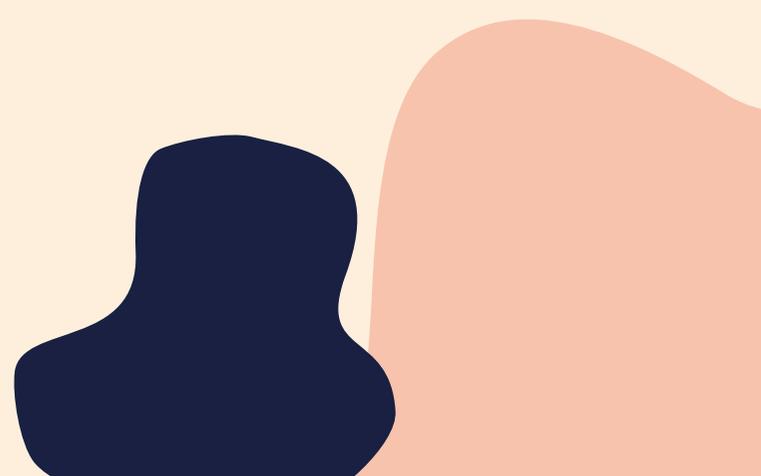
A name and logo was developed, and it was decided for the name 'Samspill'. Similar words like 'samarbeid', 'samhold' and 'sammen' was considered, but 'Samspill' captures the dynamics of collaboration and teamwork. A logotype that could communicate these associations was explored through different styles and shapes.

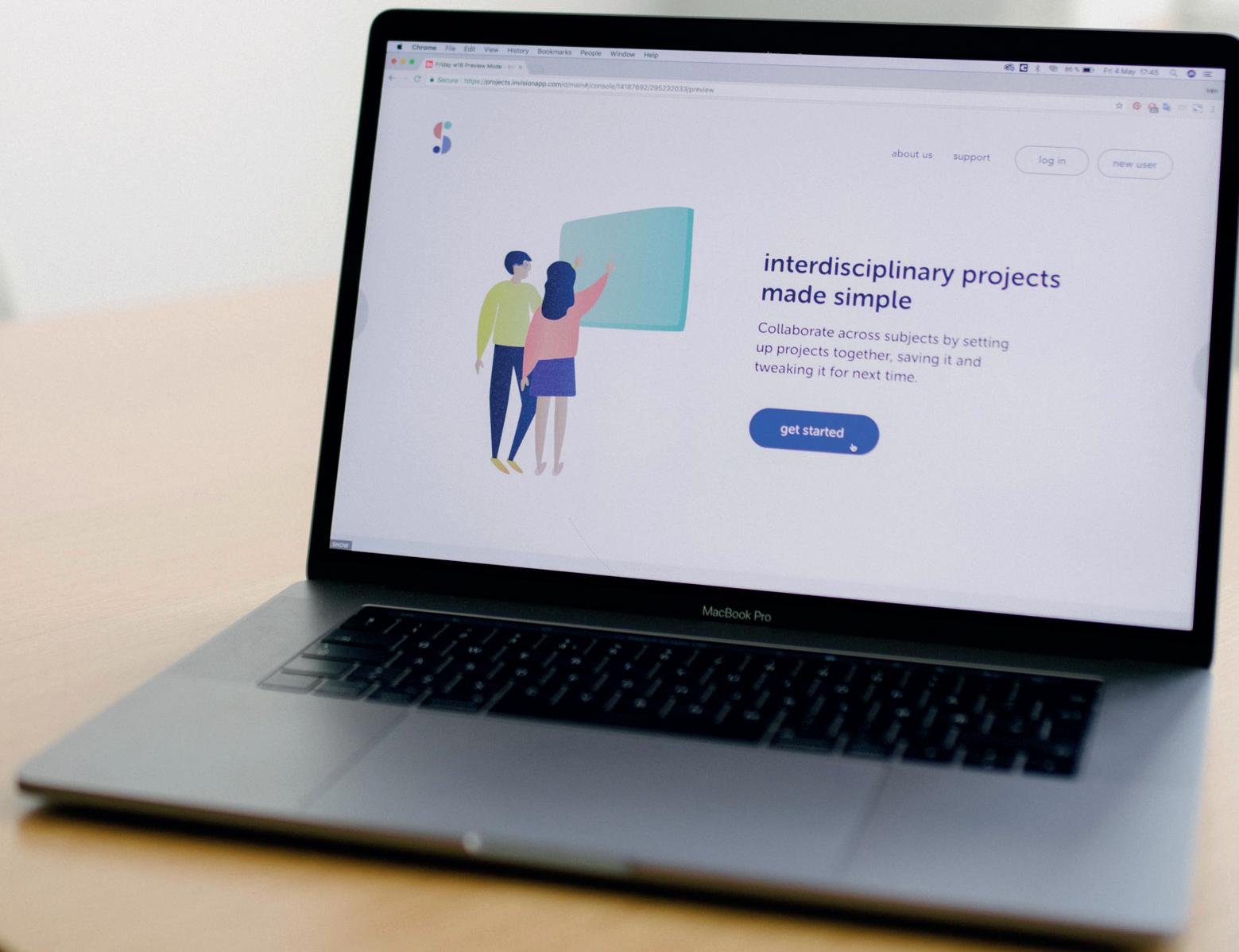




Samspill

In this chapter you will be presented with our design proposal, how it works and what it offers.





[about us](#) [support](#)

[log in](#)

[new user](#)



interdisciplinary projects made simple

Collaborate across subjects by setting up projects together, saving it and tweaking it for next time.

[get started](#)

MacBook Pro

Samspill

Samspill is a digital service concept aimed to support middle school teachers in Oslo schools in setting up and planning interdisciplinary projects together. By having a shared application to collaboratively plan across subjects, the teachers acquire the same overview, more insights into their colleagues' work and can share ideas and knowledge. They can save their finished projects, so that other teachers can access and reuse them.

Samspill acts as a driver to empower teachers with new ways of working together, building on current practices. Getting support from colleagues, bridging knowledge and feeling more confident in working together are benefits of collaborative sharing.

By supporting these aspects it can make it easier for teachers to:

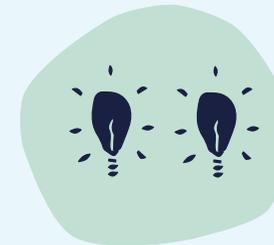
- Adapt to the renewal
- Connect their knowledge between each other and the subjects
- Share more with each other
- Build confidence over time and reduce uncertainty towards the new practises
- Save time for planning a project that can be spent on the students
- Feel more ownership and pride in the projects they create
- Set up, share and evaluate projects together



Easier adaption



Confidence



Connecting knowledge



Transparency



More time for students



Ownership



How Samspill works

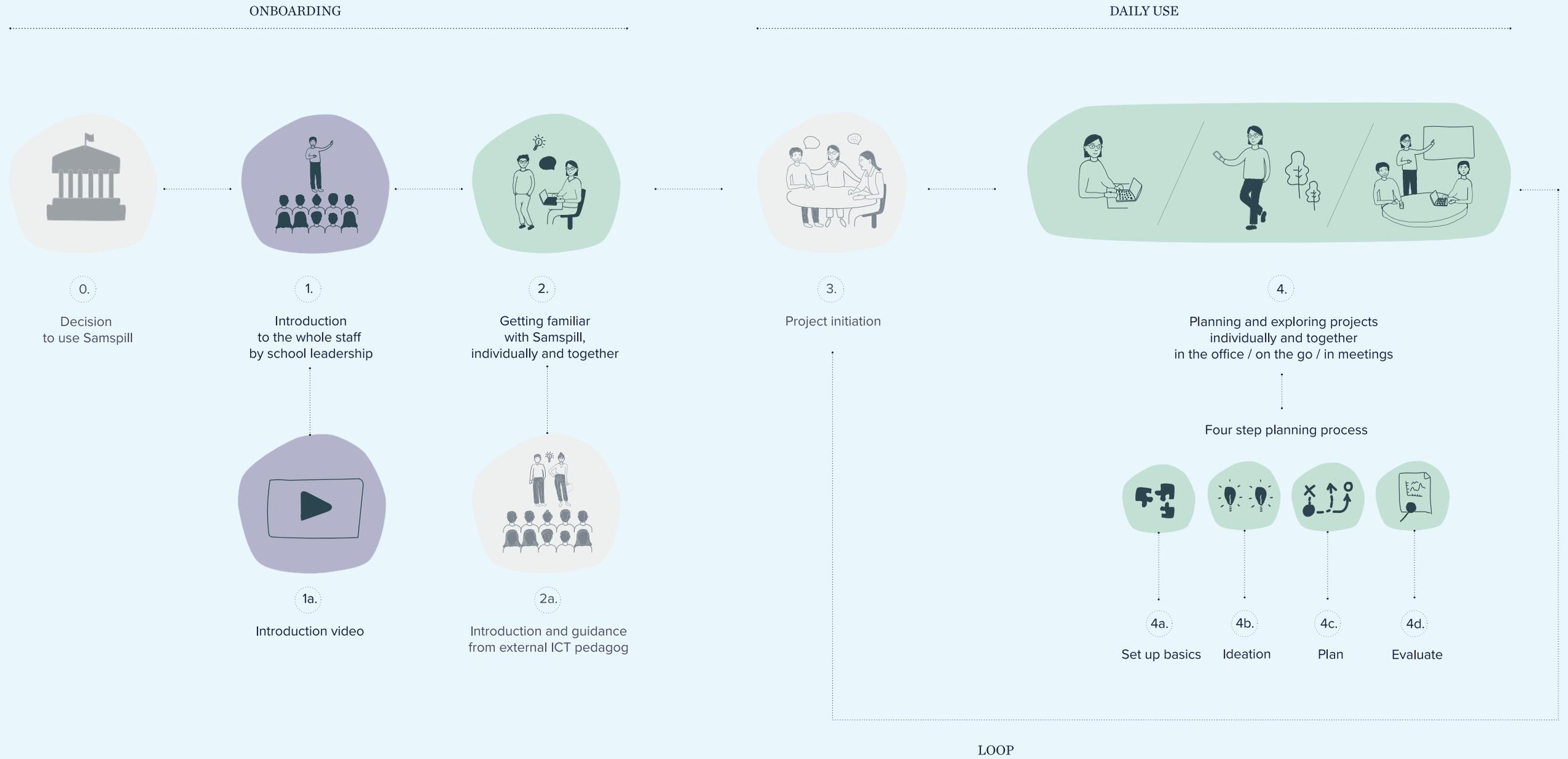
Samspill is not a final solution, but an example of how our findings could be realized. The prototype provides functionality that can be found in other solutions, but Samspill aims to be an 'all-in-one-place' solution for setting up interdisciplinary projects.

The core moments

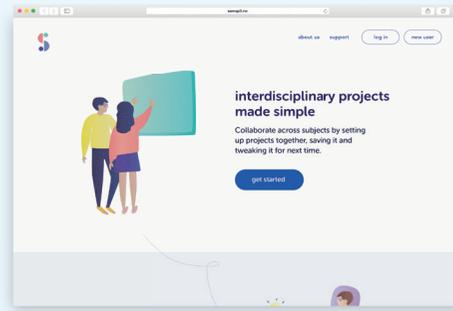
Samspill consists of a home page, an explore page, a profile and a four step process for setting up a new project. To be able to best exemplify how Samspill could work, the prototype is built on how it could look like after it has been used by a school for a while. An existing project plan from an interdisciplinary project at Majorstuen Skole was used as a realistic example to work from.

Samspill is categorized in three core moments:

- The onboarding and introduction
- The daily use with starting up, setting up and finishing projects
- A loop over time, consisting of starting up and finishing projects



ONBOARDING



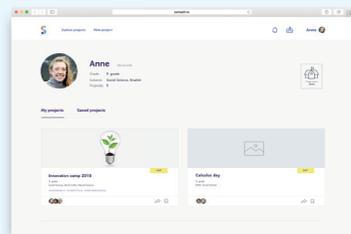
Landing page



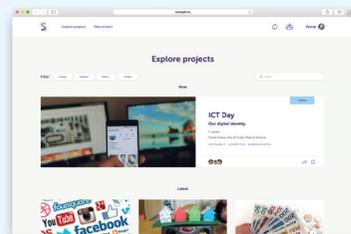
Animation video



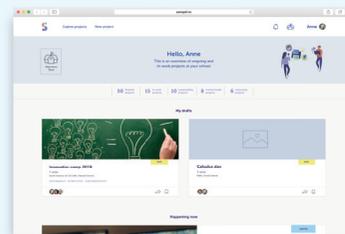
DAILY USE



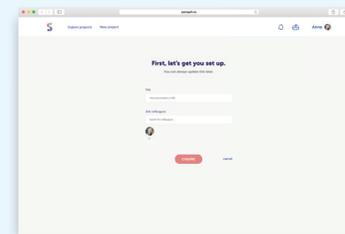
Profile



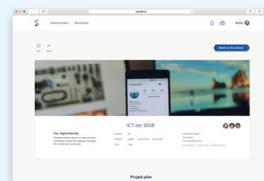
Explore



Home



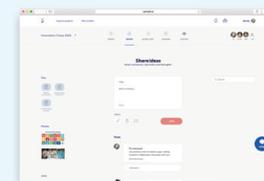
New



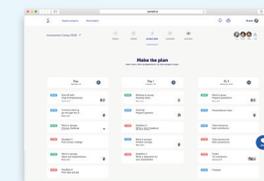
Project page



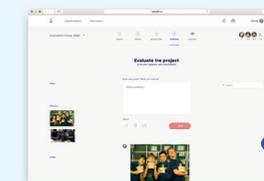
Basics



Ideation



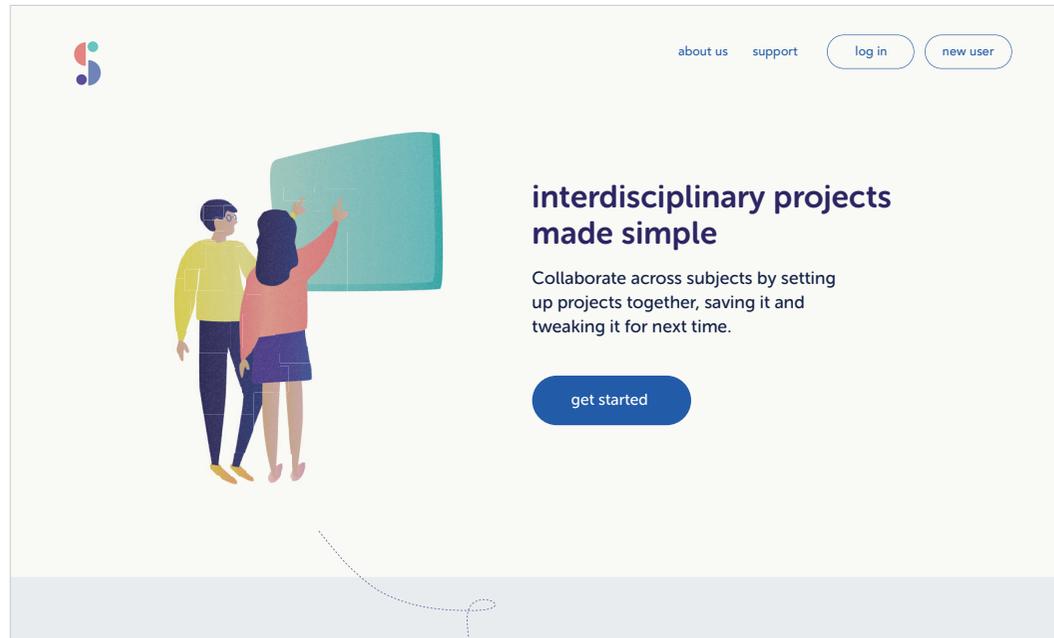
Plan



Evaluate



Project page



ONBOARDING

Landing page

The landing page is for the first time use, when the user enters Samspill for the first time, or if the user has been logged out and has to log in again. It has a playful look with focus on illustrations to give the user an association to the context and benefits. The users scrolls down and they get some short information on what Samspill

provides. It is meant as an easy introduction, giving the user an overview of the core features. From this page the user can click log in to start using Samspill. The login has not been design, but log-in could be used through Feide, the Joint Electronic Identity for secure identification in the education sector (Feide, 2018).



Explore projects New project

Hello, Anne
This is an overview of ongoing and in-work projects at your school

50 finished projects 15 in-progress projects 10 in-planning projects 8 mental health projects 6 other projects

My drafts

Innovation camp 2018
8. grade
Social Science, Arts & Crafts, Natural Science
#MULTIDISCIPLINARY #COMPETITION #INNOVATION

Calculus day
8. grade
Math, Social Science

Happening now

ICT Day
Our digital identity
9. grade
Social Science, Arts & Crafts, Natural Science
#MULTIDISCIPLINARY #COMPETITION #INNOVATION

What others are working on

Plant a tree
8. grade

Life by the shoreline
8. grade

International day 2018
8. grade
Natural Science, Norwegian, Arts & Craft

Literature Day
8. grade

New to Samspill?
Use Samspill in your next project meeting to easily discuss and set up your plan!

Latest

Social Media Campaign
8. 10. grade
Mathematics, Arts & Crafts, Social Science
#MULTIDISCIPLINARY #COMPETITION #INNOVATION

Future Cities
8. grade
English, Social Science, MSZ
#MULTIDISCIPLINARY #COMPETITION #INNOVATION

My private economy
8. grade
English, Social Science, MSZ
#MULTIDISCIPLINARY #COMPETITION #INNOVATION

support about

What others are working on

Plant a tree
8. grade

Life by the shoreline
8. grade

International day 2018
8. grade
Natural Science, Norwegian, Arts & Craft

Literature Day
8. grade

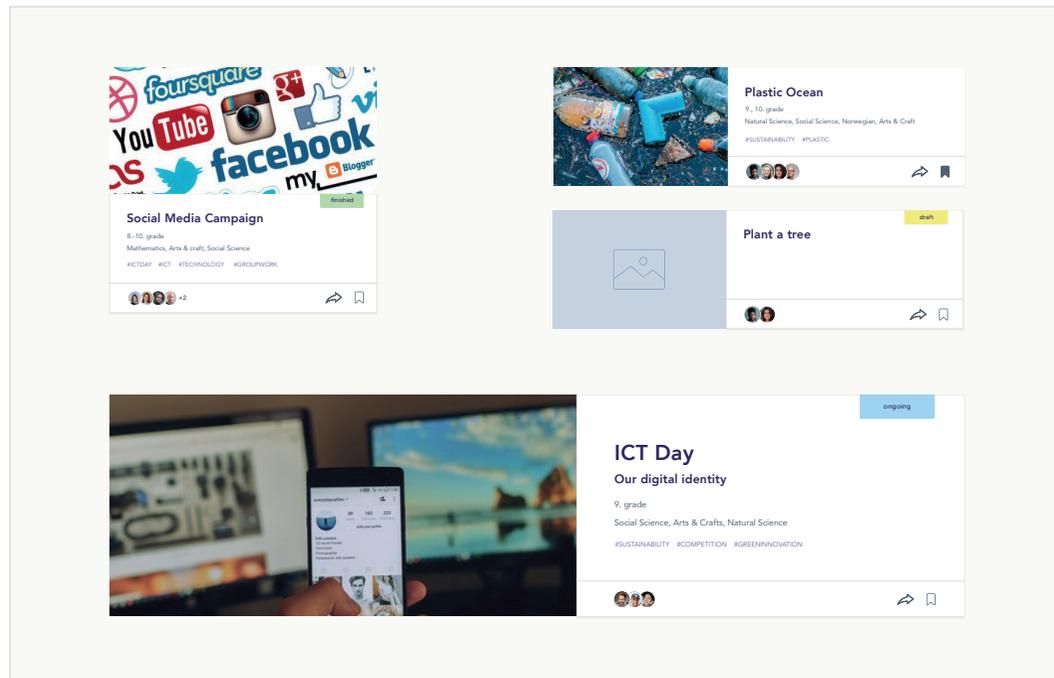
New to Samspill?
Use Samspill in your next project meeting to easily discuss and set up your plan!

DAILY USE

Home page

After users log in, they enter the home page. The home page presents them with a personal overview for easy access to the user's own ongoing or in-the-making projects. The top bar gives a personal 'hello' to the user, and shows the name of their school. Below is a counter for how many projects the school has done, how many is in progress, and how many they have done

in relation to the three topics introduced with the renewal. The home page also includes what colleagues are working on and other currently ongoing projects at the school. In this way the teachers can have an overview of both what their colleagues and the students are working on.



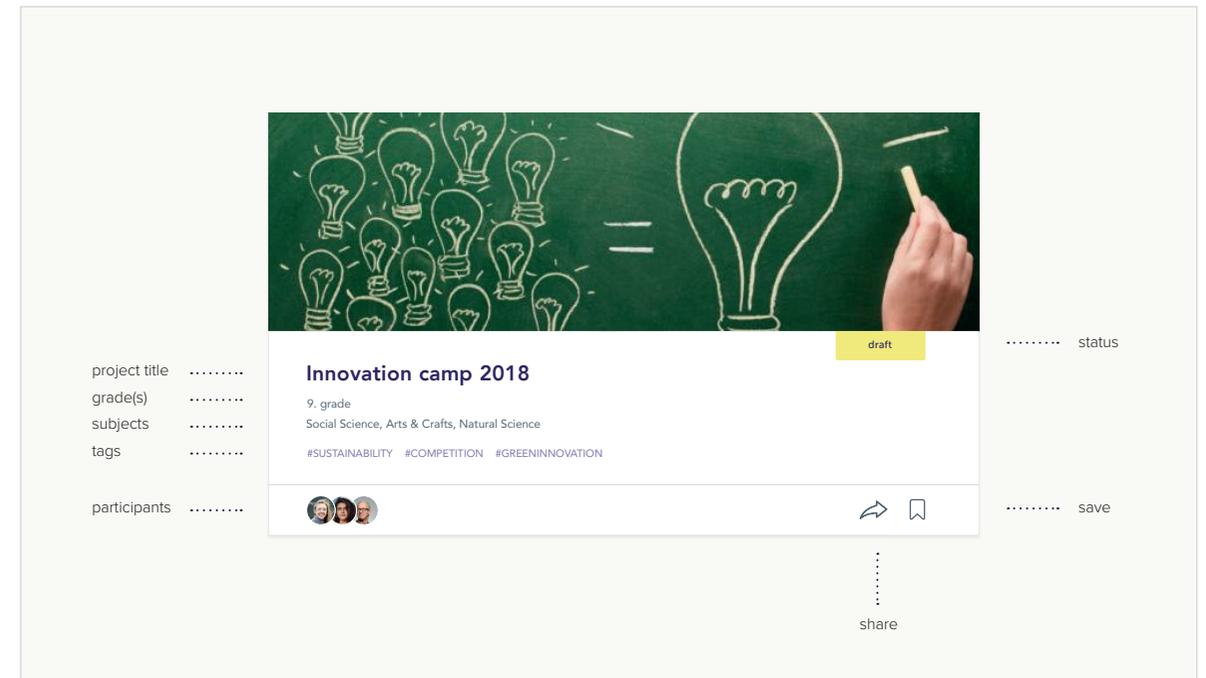
Project cards

Projects are presented by cards showing a photo, title, grade(s), subjects, participants and the current status of the project; if it is in draft, ongoing or finished. It is also possible to share a project with someone and save projects, so it is easy to find favourites again. Cards are in different sizes, so they can be used and mixed to create hierarchy.

The information on the cards gives the user an overview of what and who. If the user clicks on a card, they enter a page with a full overview of the project plan. When a project is still 'under construction' and not all information is filled out yet, the cards are shown only with the information that is provided.

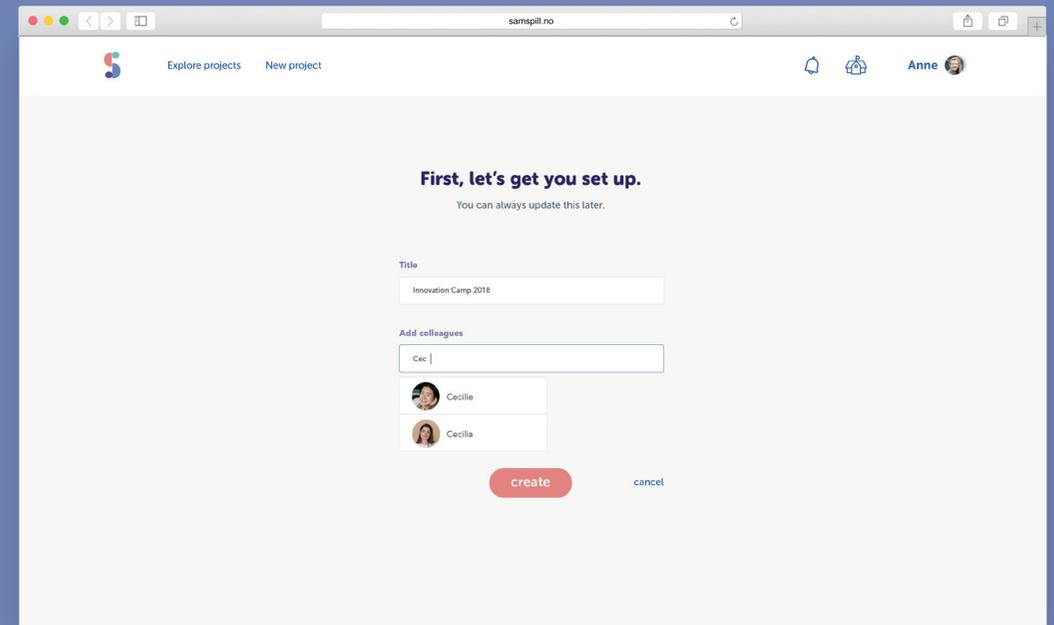
Status

Projects have different statuses according to where the project is in the process. Draft is when the teachers still is working on the project, and this is marked by a yellow tag. Ongoing is when the project is happening in the school, when the students are working on the project, and this is marked with a blue tag. Finished is when the project has been done, and this is marked with a green tag. No status tag also mean that the project has been finished for some time. This is used in the explore page where there will be a lot of finished projects, and the tag is not needed in the same way.



Photos

All project cards are represented with a photo. This is added when the teachers set up the project. If they choose not to put in a photo, the card will show an image icon. The use of photos can contribute to a new photo culture, where the quality of the photos can increase over time, and the whole look-and-feel of their projects can improve. It was found through research that teachers mostly use google to find photos to put in their plan. Giving a new focus on photos can perhaps motivate them to take more photos themselves, maybe of the students working on the project or just spending a bit more time choosing a good photo. This can all in all give a sense of pride in producing a 'good-looking' project bank.



New project

Initiate and invite

A group of teachers agrees to create a new project together. One teacher takes or is given the responsibility to start a new project and invite the others. This teacher gives the new project a title, that can be changed later, and search for colleagues to invite. He or she then clicks 'create' and they all can start setting up the project together.

Notification

Invited teachers get a notification that they are invited to a new project, through a notification symbol in the menu bar. They can choose to go directly to the draft and start collaborating. The notification can also be combined with an email, so that if some teachers do not check Samspill that often, they get an email notification saying that they are invited to the project.

Explore projects New project

Innovation Camp 2018

basics ideate project plan evaluate preview

Set up the basics

You can always go back and fill in more later.

Add photo

Subtitle
Green and Genius

Description
Students works in groups of six to come up with a sustainable solution for a greener everyday life in their local community.

Timeframe
16.04.18 - 18.04.18

Choose grade(s)
8th 9th 10th

Choose subjects
norwegian english natural sciences social sciences K12L1 art and crafts mathematics food and health

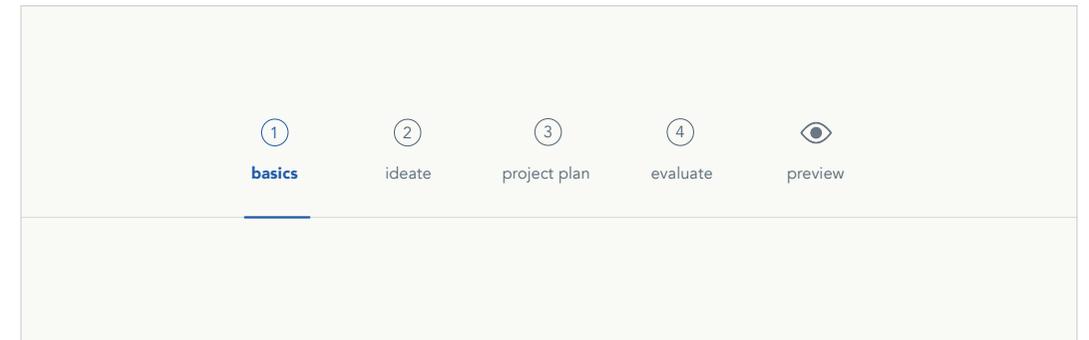
Competence goals
The Explorer
The integrated human

Tag the project
#sustainability #competition #greeninnovation

next >

save

support about



A four step process

After a teacher initiates a new project and has invited the others, they are introduced to the four step process. This consists of setting up the basics of the project, ideating and communicating, setting up the specific project plan and in the end evaluating the project. After these steps there is a preview button to see the finished project content and save the plan.

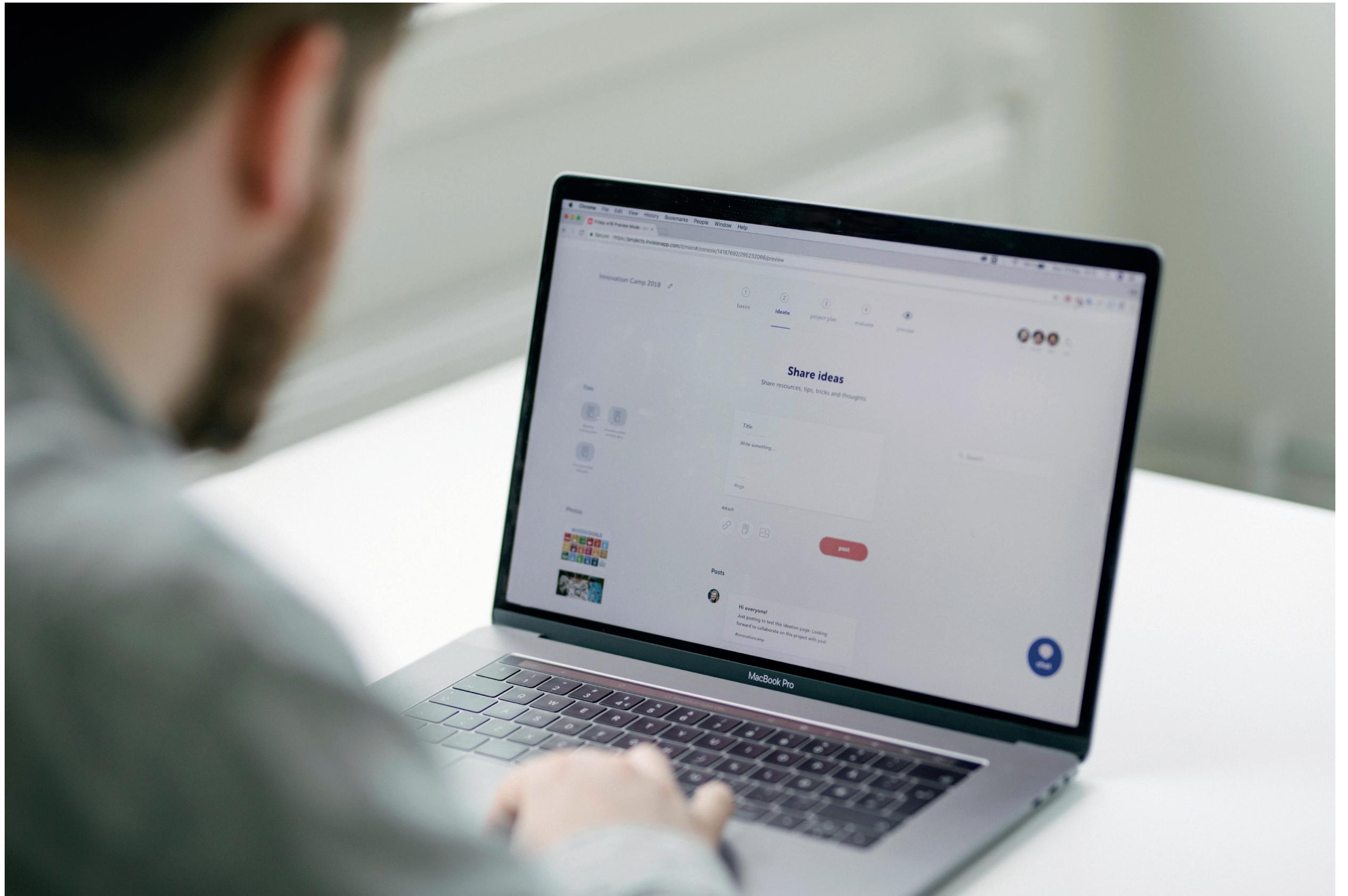
The user does not have to follow this step by step from one to four, but can also jump in between them, for example going back and forth from plan to ideation. Everything in one step does not have to be filled out to be able to go to the next step, in this way the different steps can be filled out over time.

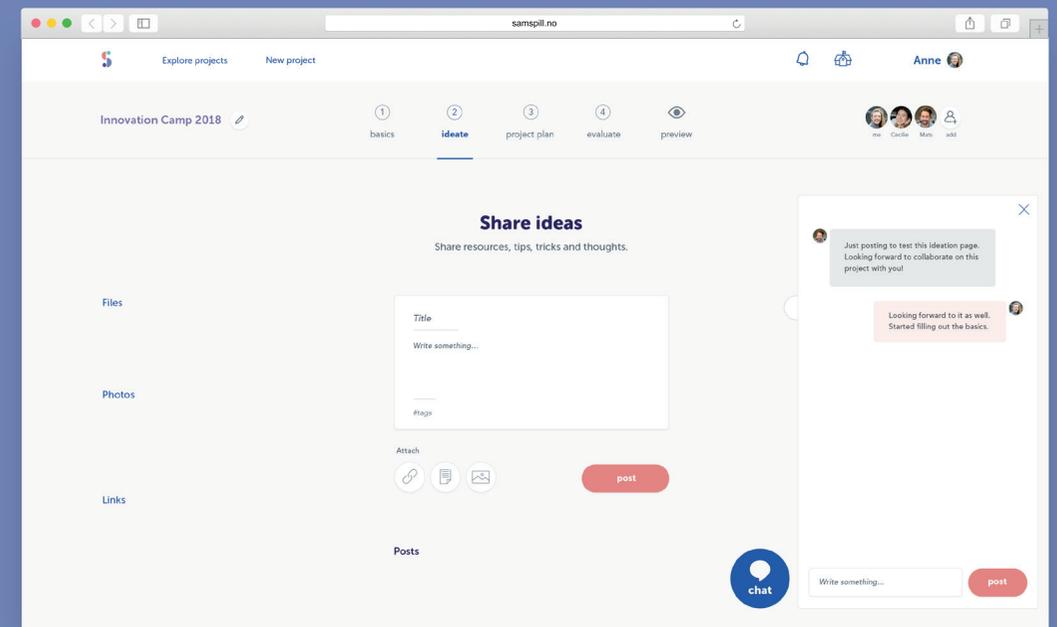
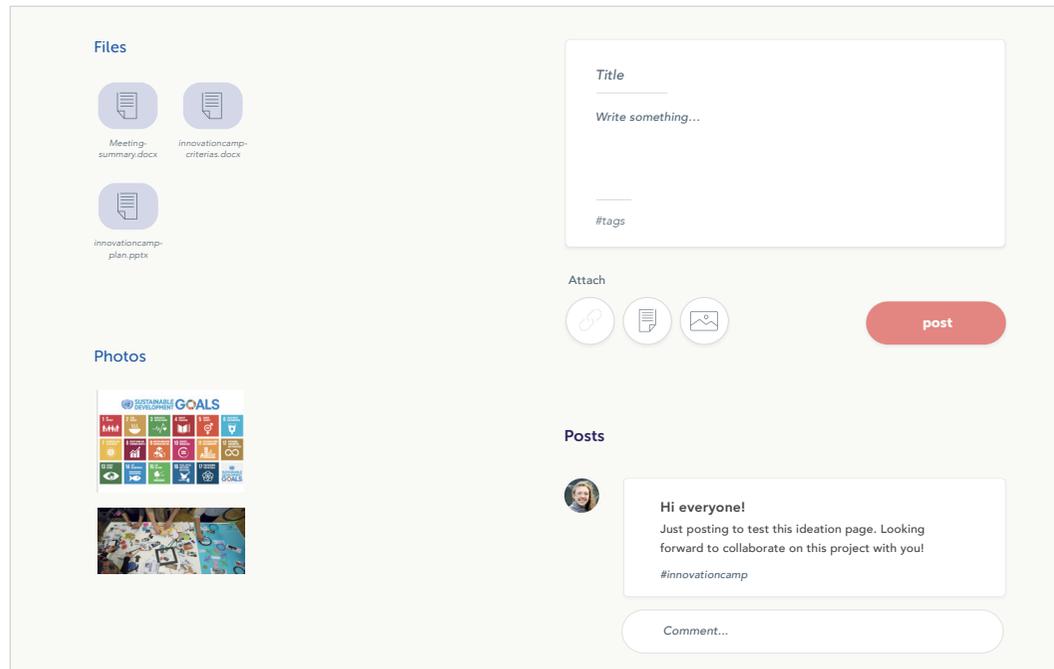
1. Set up the basics

Setting up the basics of the project is presented in a form that the teachers can fill out manually. It includes adding a photo, a project description, choosing what grade(s) are involved, what subjects are involved, the dates and time frame, the overarching competence goals and the possibility to tag the project. The form keeps it precise and settles the basic frame of the project.

Project tags

Tagging the project makes it easy for others to search for the project. It also gives others a gist of what the project is about, as the tags are shown on the project cards. Tags can for example be topics like “sustainable development”, or it can be type of projects like “group work” or “excursion”, or type of skills that the students will be using like “reflection” or “writing”, or anything else relevant.



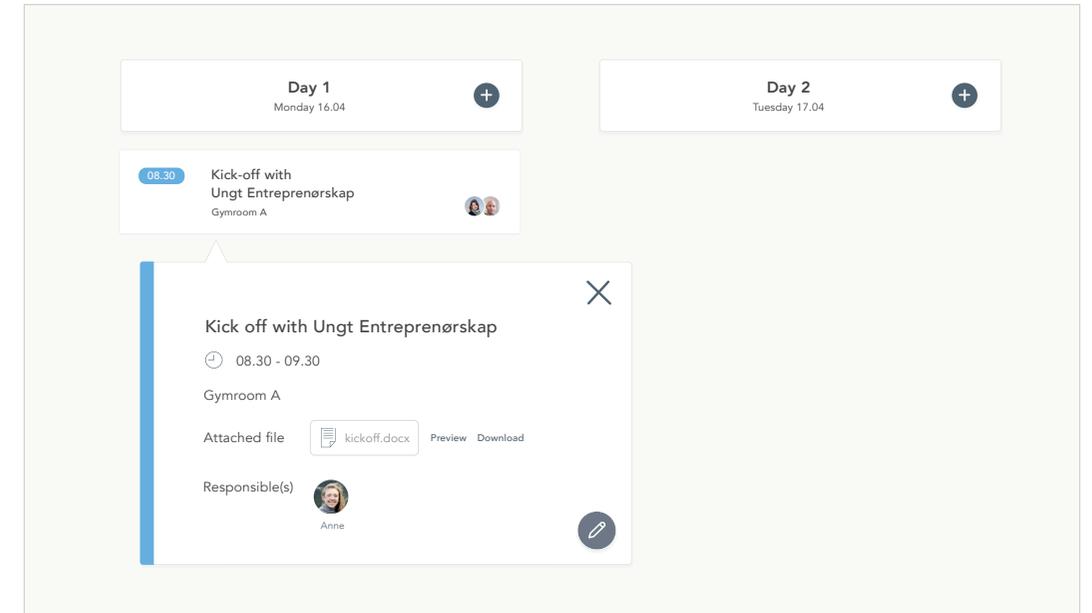
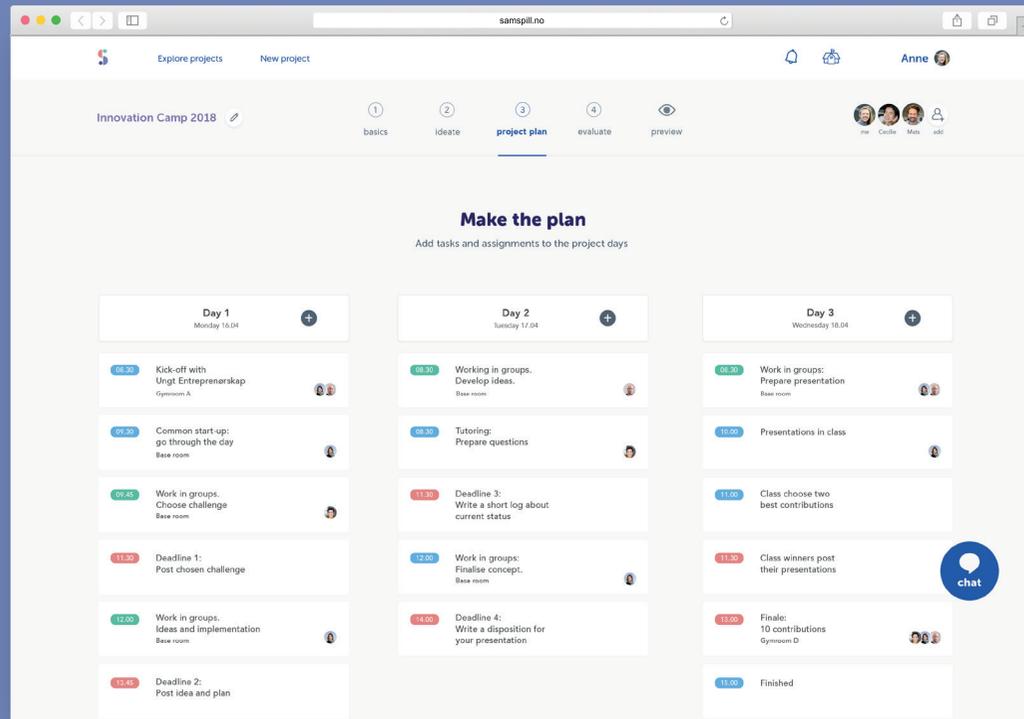


2. Ideate

In ideation the user can post text, links, files, photos and share it with the other participants of the project. The user can tag a post so that it is searchable later. A search bar is provided. When a file, photo or link is posted, this also appears on the side for quicker access.

Communication

The user can comment directly to a post or talk in the chat. In the chat the users can talk more informally about decisions, progresses and problems that come up. The chat bubble is meant to be 'sticky' in the bottom of the pages, following all steps of the process, so it is easy accessible at any time. The chat is a shared communication, to keep the principles of transparency and team spirit of Samspill.



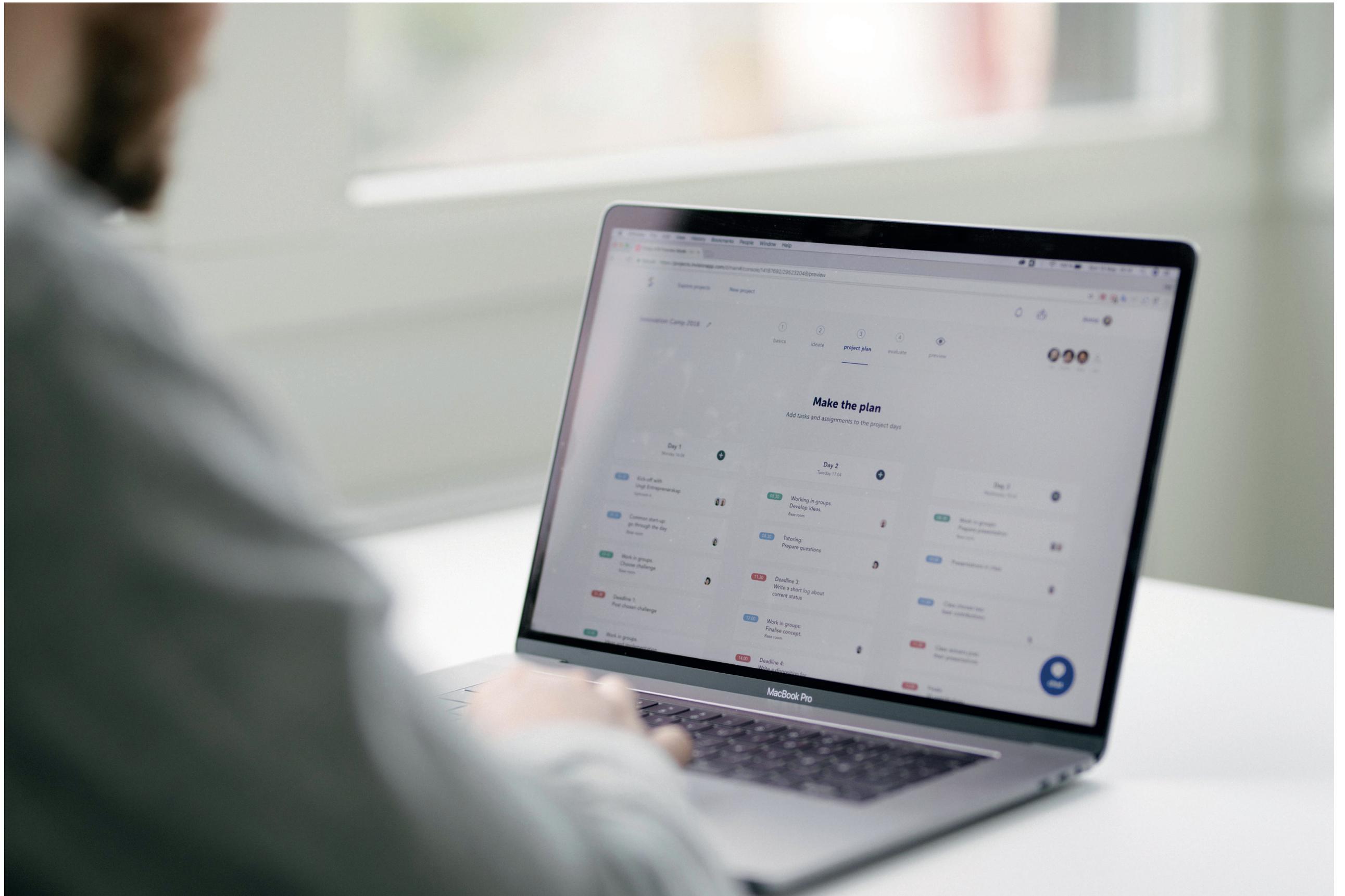
3. Project plan

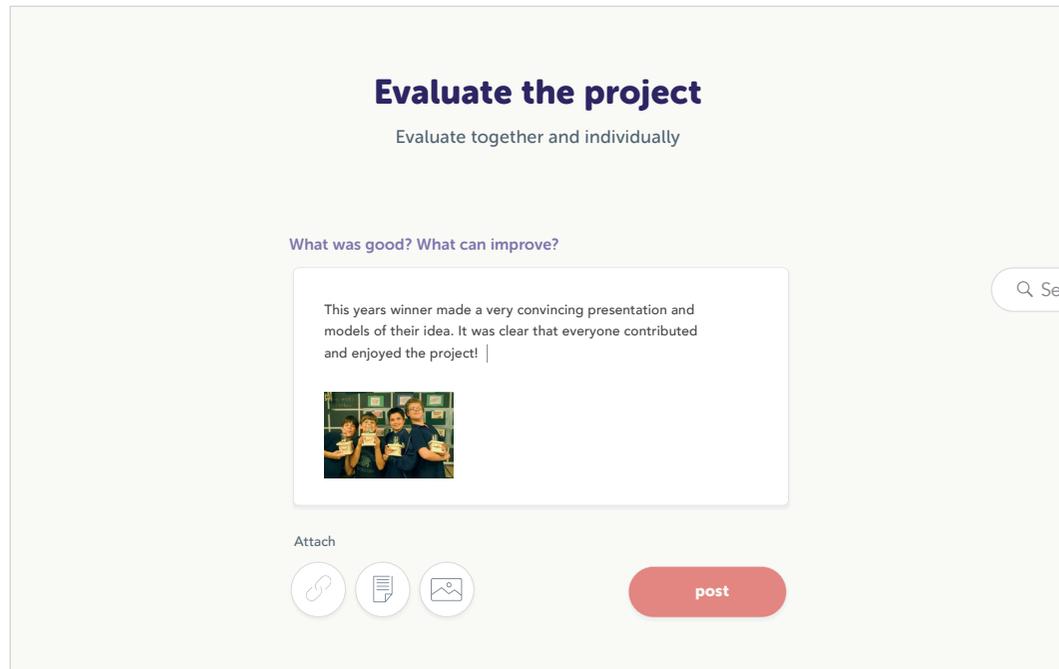
In the project plan the users can become more specific with their ideas and start filling out concrete activities, assignments, lessons or tasks. When the users choose to add to one of the project days, they fill out a description, set a date and a place or room. They can add a file, link or photo that is relevant for what they are adding. They can set responsible teacher(s) and there is also the opportunity to colour code the addition.

When something is added this is shown in the plan as cards, presenting the time and description, the colour and the responsible(s). Anyone can click on these cards to see more information and to open possible files or photos that is added to it.

Colour coding

The colour coding of the plan does not have a preset system other than that it is possible for the teachers themselves to make their own colour coding if they want. They can for example choose to mark common tasks in blue or deadlines in red. If there is not a specific meaning to the colour, they could also simply be used to separate days or tasks from each other.





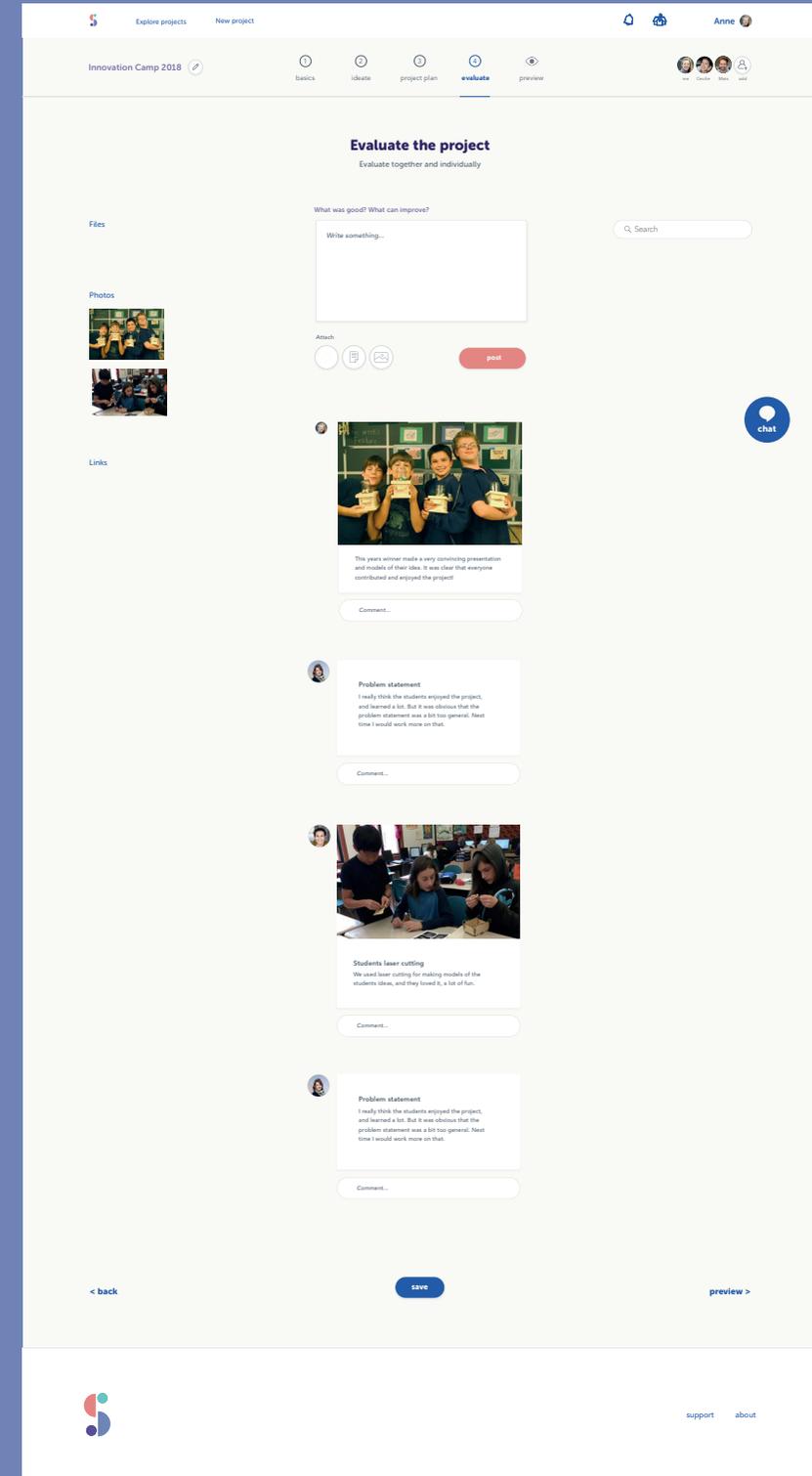
4. Evaluation

After the project has happened and is finished, the teachers can evaluate the project. This step looks similar to ideation, but the users are provided with the leading questions of 'What was good? What can improve?'. They can also post photos and documents here, so that they have the possibility to show examples of student's work and outcomes of the project and give a more concrete look into how it went.

The teachers can add evaluations to the project individually or together in a meeting. They can also discuss through the chat.

“What about showing student work here? It's often more efficient to show solutions, texts or products that students have made. Nice to see for the next time. Can give a better understanding by showing examples.”

Teacher



Project presentation

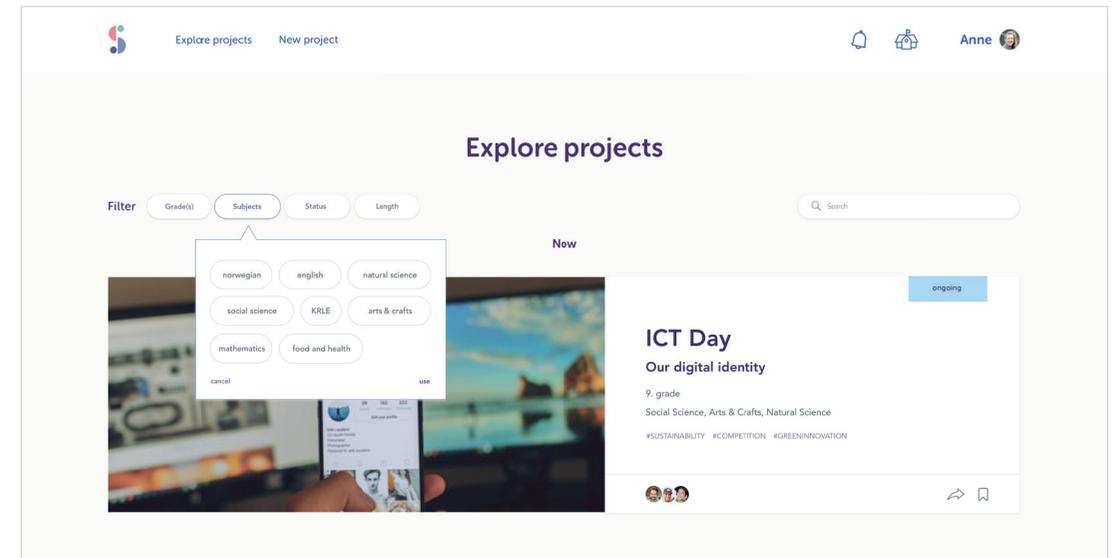
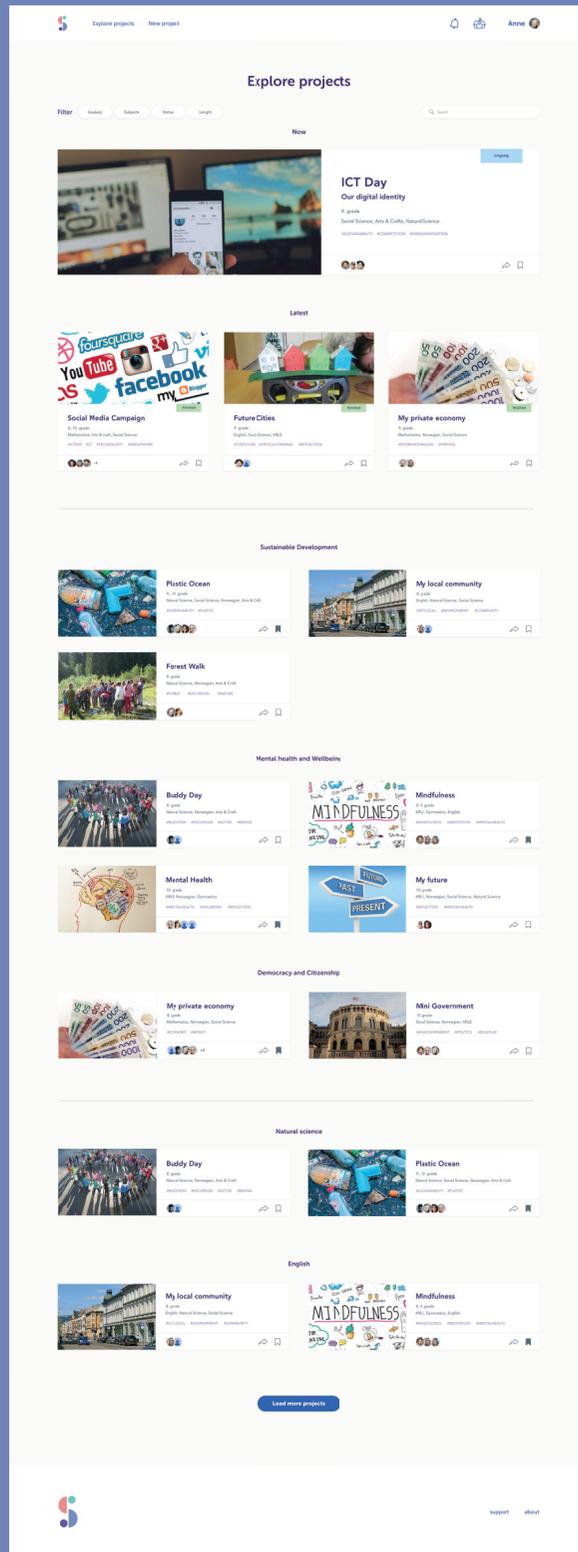
When the four steps are finished, the project can be previewed in a project presentation, where the user gets an overview of the project plan. The project is presented with the photo and the basic information on top. Below comes the project plan and at the bottom the evaluation. In top there are the options of sharing or printing this project presentation. When you click on any project, this is how all of them are presented, and in this way the school is provided with a coherent style for all their projects.

Tweak previous projects

If users want to reuse a finished project, they click into a project card and see the project presentation. They can click 'reuse' to use this plan and customise it. They then come into editing mode where they can start changing things. The user that clicks reuse has to invite colleagues in by clicking 'add' in the top bar.

Loop

After a group of teachers is finished with a project, the whole experience starts over again in a loop, where new groups of teachers are formed to collaborate in planning new projects. After Samspill has been used for a while, the teachers can select from their own bank of previous projects, customise them to their situation or still choose to create new ones from scratch.



Explore

After Samspill has been used over time, the school will have a bank of their own projects accessible. The explore page is a way to search and browse previous projects that have been done at the school. If there are ongoing projects happening in the current moment, this shows up on top. This is followed by the latest projects that have been done. Scrolling down, there are different categorisations that can be dynamic and change over time according to tags, subjects and grades. In this example the projects are shown categorised by the three interdisciplinary topics that will be introduced in the Subject Renewal: sustainable development, democracy and citizenship and mental health and well-being.

Filter and search

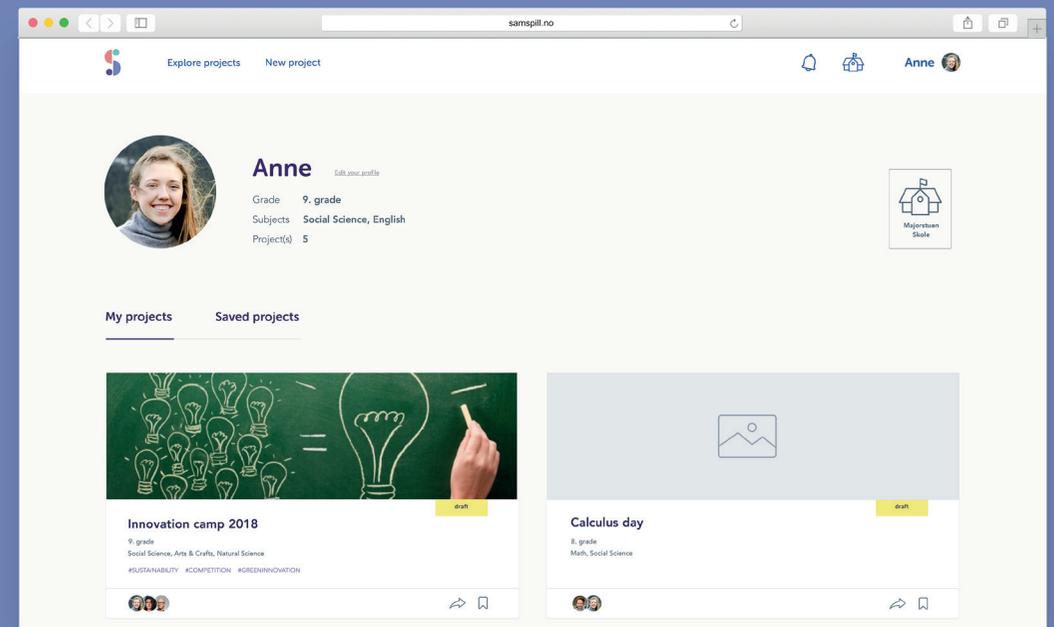
The user can filter and search for a quicker access to the projects. It is possible to filter by grade(s), subject(s), the status of the project and length. The search bar can be used for searching for keywords like titles, tags, the year or date and so forth.

Profile

Every teacher in the school has an own profile page. In their profile they can see their own projects and their saved projects. They can add information to their profile, such as what grade(s) and subject(s) they teach. Teachers at the school can enter their colleagues profile to see what they are or have been working on, again to provide transparency, but also a sense of community.

School page

In the menu bar there is also an icon formed as a school building. This represents the school page, where teachers can acquire an overview of all the teachers in the school. From here they could access each other profile pages or even initiate collaborations with each other. This page has not been included in the prototype, but is a possibility for the way further.



Versions

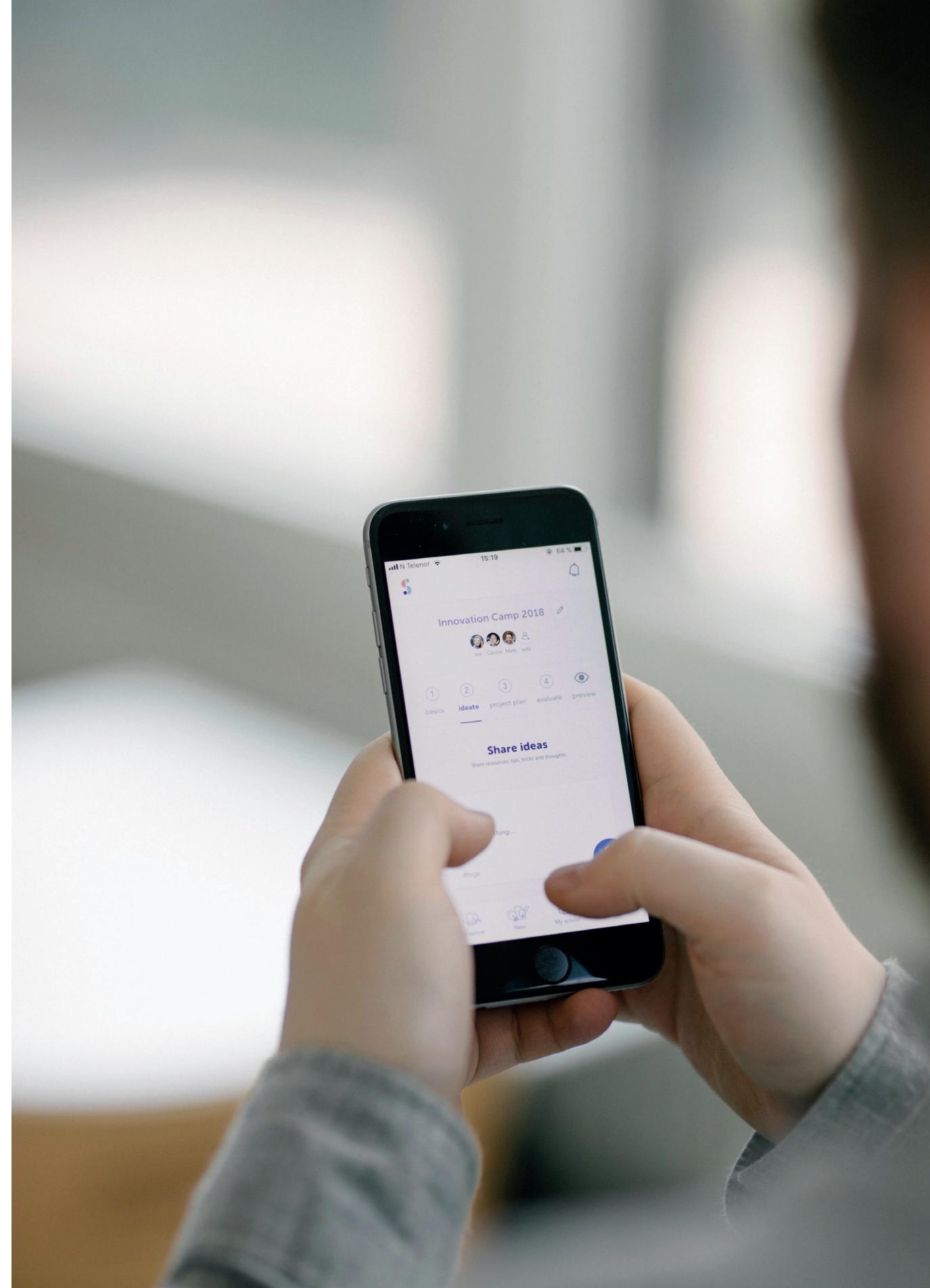
Samspill should be available on several devices, so that teachers can be flexible in their use of it. Including the desktop version, Samspill can also be used on mobile and on a SMART screen. These two additional devices have however not been a priority to prototype, but we wanted to exemplify the opportunity and what value it could provide.

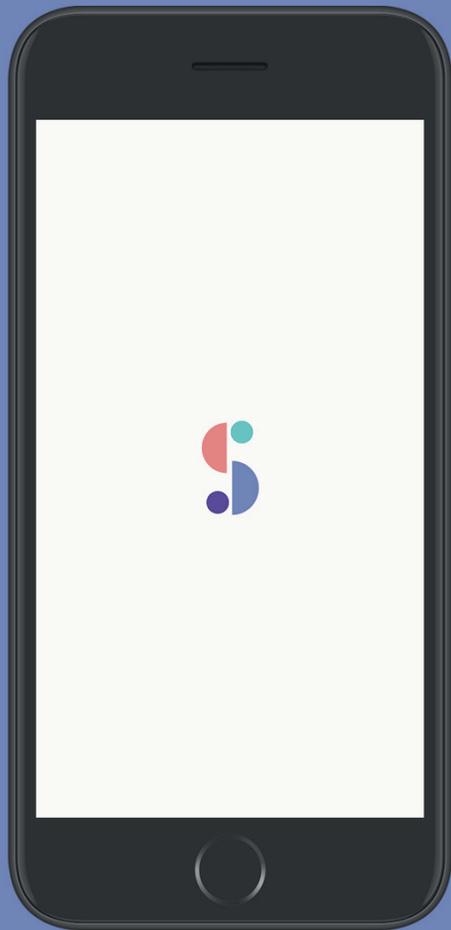
Mobile

The mobile version offers the opportunity to use Samspill anywhere. It enables teachers to quickly share, ideate and add to the project plan.

“This recognises that we never get enough time. When it is ‘on-the-go’, teachers could just type ideas down. That’s a huge support.”

Teacher





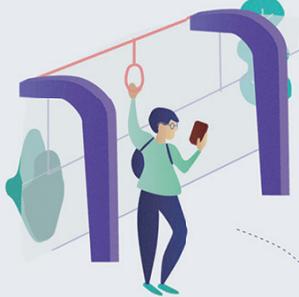
With Samspill it's easy to set-up and plan exciting projects across subject.

● ○ ○ ○



Find back to last years projects and tweak them for this year.

○ ● ○ ○



Use Samspill in your office, in meetings and on the go.

○ ○ ● ○



Enhance student's learning experiences with easier collaboration across subjects.

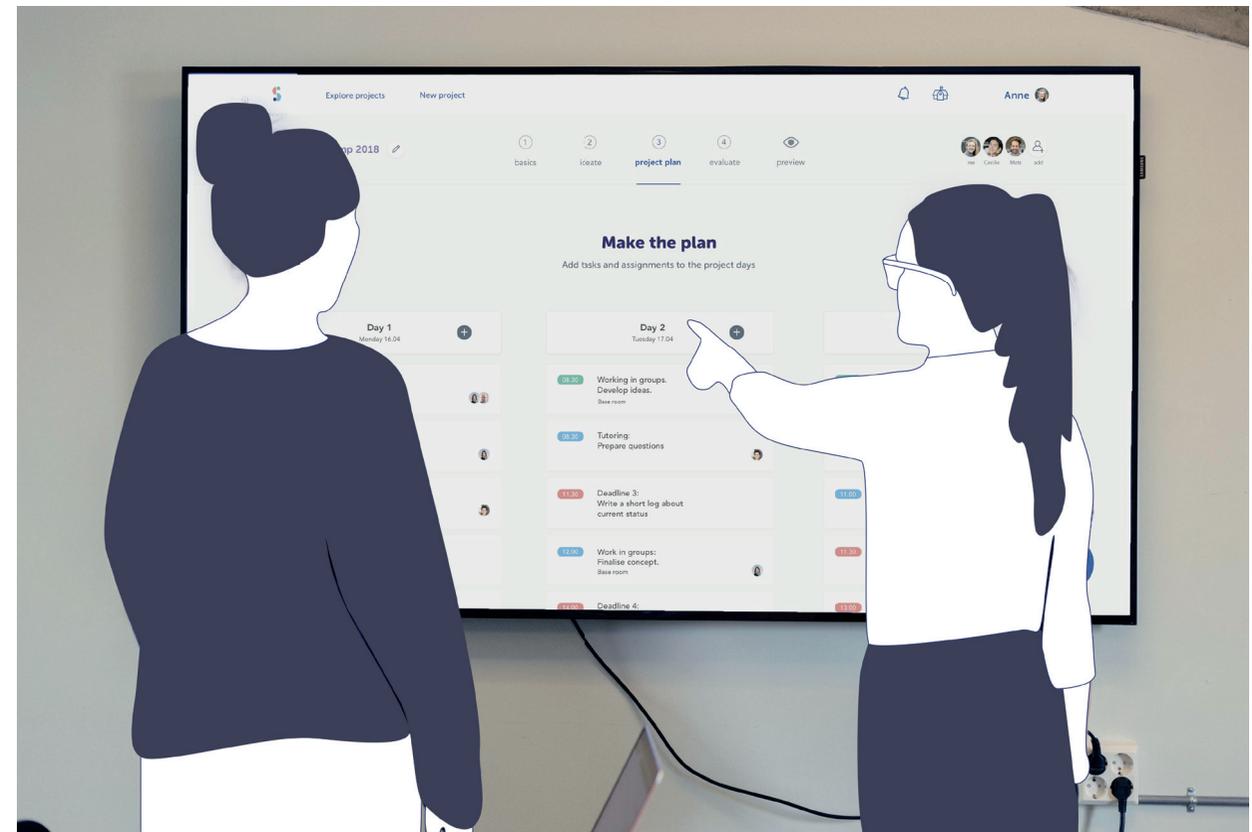
[get started](#)

Touch screen

An opportunity we identified for Samspill was to make it compatible with the SMART screens that most schools in Oslo are provided with from the municipality.

The touch screen could be a part of bridging the digital and physical world. The teachers could come together in front of the screen and collaborate directly in person. It could open up the discussion and ideation phase, and they could add to their plan as they discuss.

Another way of doing this could be by projector or by cable to a screen, but if Samspill was adjusted to a touch screen, the functions that come with it could be exploited. There could be the possibility to use the pen and move elements around, write notes and ideas by hand and so forth.



Brand elements

Logo variations



Typography

Titles - Museo Sans Rounded

Subtitles - Avenir Black

Text - Avenir Book

Primary colours



Secondary colours



Illustration style



Identity

Samspill has a playful and colourful look that creates associations to the meaning of the name and the solution; team spirit, collaboration, a positive and an easy-going group dynamic. It should give the feeling of interdisciplinary collaboration being easygoing and fun. Illustrations are abstracted and simplified, but still represent the different contexts and dynamics of working in the office and on-the-go. The grainy texture of the illustrations can be associated

with drawings and paper. The logo is built up of shapes in different colours coming together forming into the S-form from the name Samspill. Colours are bright and complimentary. With the more neutral colours and layout of the interface itself, these elements give a nice add-on to the whole look-and-feel.

An onboarding scenario

In connecting to the barriers towards the renewal that was mentioned earlier, there is a fear of change among teachers, involving a fear of new solutions. Consequently, the introduction of Samspill is an important touchpoint in lowering the threshold of learning a new tool. Therefore, we created a possible onboarding scenario.

Onboarding

One possible scenario could be that the educational institutions, such as Utdanningsdirektoratet and Utdanningsetaten, decide to introduce Samspill to all Norwegian middle schools. The reasons for this scenario, are the following possible benefits.

In a phone talk with Utdanningsetaten we found that the government currently is doing research on finding ways to support teachers during and after the implementation of the Subject Renewal.

Samspill would provide support towards working across subjects. Implementing a tool like Samspill leads to a smoother implementation of the renewal, and in effect more satisfied teachers.

Further, the possible enhanced engagement of teachers might empower them in long term. This could have a ripple effect on the whole school system.

After a centralised decision to use Samspill, the schools would be informed. The government could provide ICT-pedagogue or other experts that could come to schools to help teachers to further ease the introduction phase. There could be set up pilots at some schools to provide experience among teachers that can further teach it to others or spread confidence towards its use.

“A lot of teachers are scared! We have to use a bit of time to introduce this new solution and inform them. We have to show the solution to them, how it works and how we can use it. Have to be patient, and give them a soft start.”

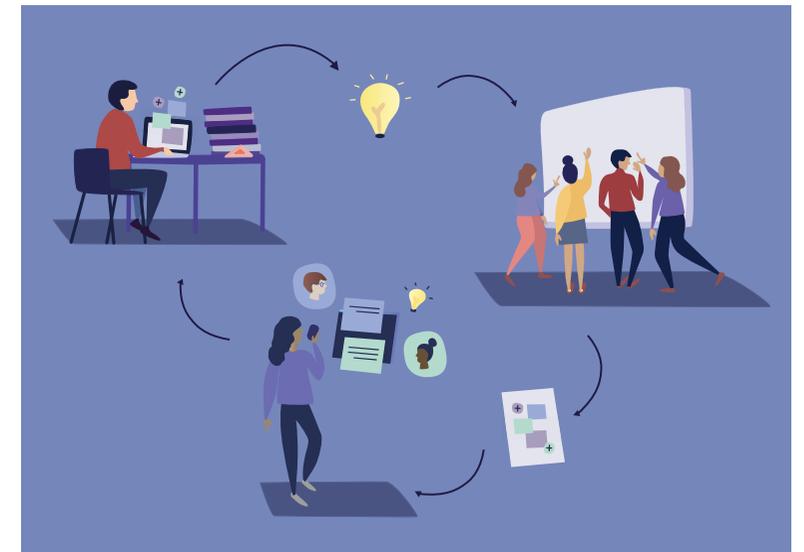
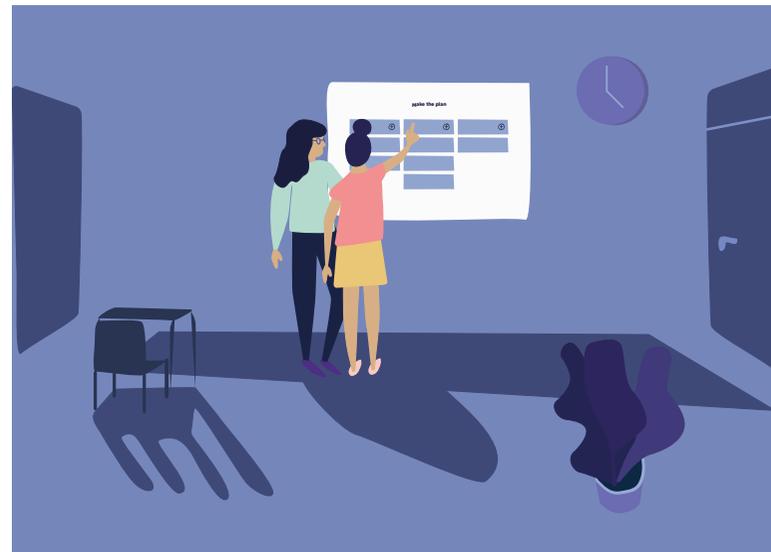
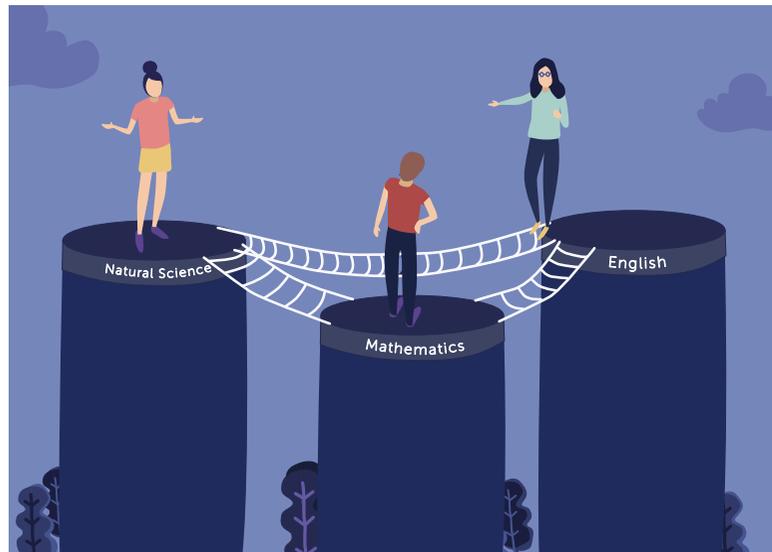
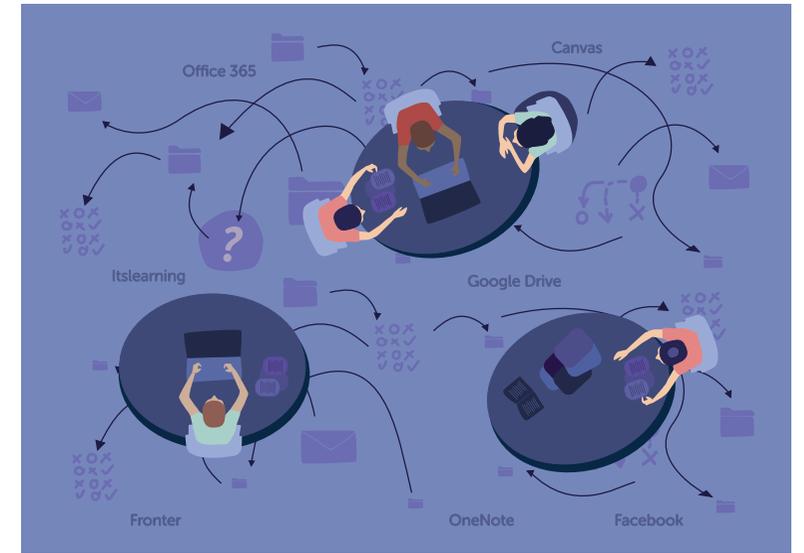
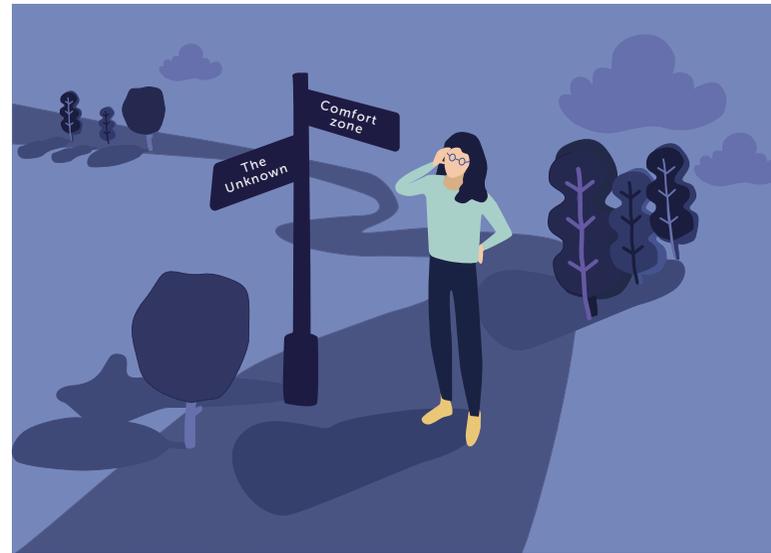
Teacher

Animation

An animation video is developed to support and strengthen the onboarding phase. This type of animation can smooth the introduction of Samspill by lowering scepticism and worries among teachers towards a new solution. It shows why Samspill is introduced and what it contributes to by working across subjects. The animation is less than two minutes long with a voice-over explaining the benefits and offerings.

“If you want to convince teacher to use a new solution it has to be simple. You have to work pedagogical with teachers, so start slow and take them by the hand.”

Teacher



Final evaluation

Project-focused

In a final evaluation with the assistant principal and teacher at Majorstuen skole, he stated that he likes the project-focused approach of Samspill: "It leads us to think interdisciplinary and project-based". He stated that seeing other projects from colleagues triggers his creative mode. The possibility to share with colleagues can lead to more actively and open collaboration. He describes Samspill as having a "collaborative vibe".

He continues by stating that Samspill gives value in the way it communicates with him as a teacher: "It invites to more easily planning, structuring and storing projects, that are visible to everyone". In comparison to existing tools, Samspill would be more holistic and would give meaning to a project itself instead of starting with focusing on competence goals.

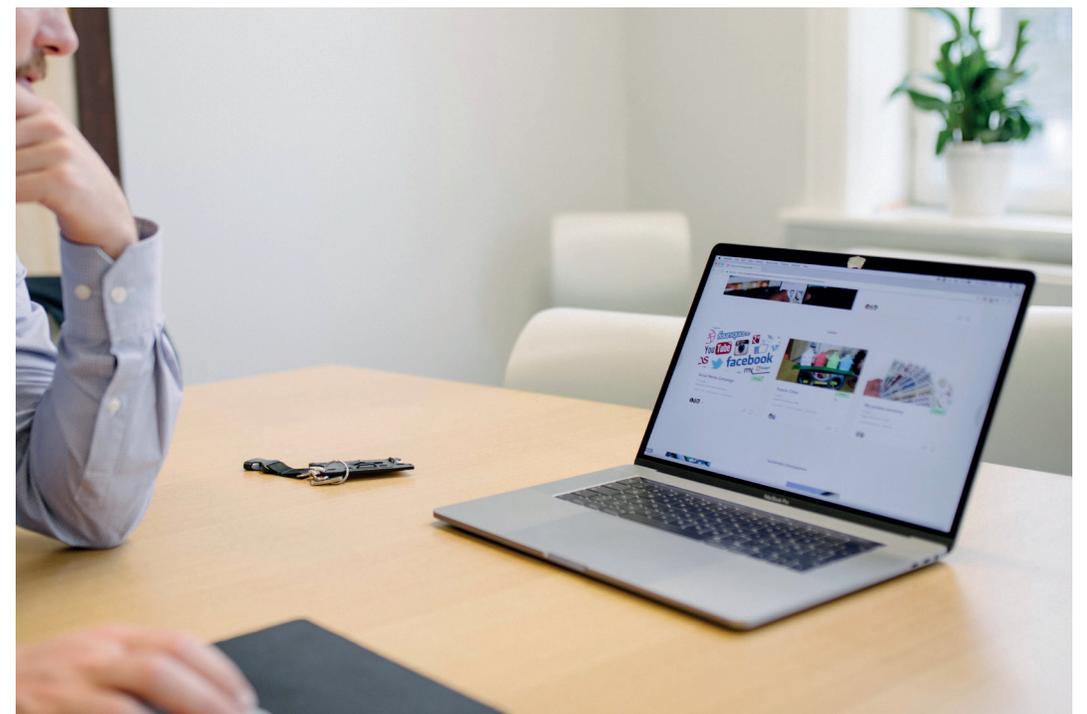
Ideation

He stated that ideation is his favourite part: "With the ideation, we get a shared understanding of what we want to achieve. The challenge

in current projects is, that there often is not a common understanding of the plan among the involved teachers." He states that teachers spend too little time on ideation now. Further he describes: "I would use this in team meetings. Sit down together and focus on the ideation and use Samspill for it. It helps us to examine opportunities."

Flexible working environment

"With Samspill, teachers can see who they collaborate with and who is responsible for different tasks, no matter where they are. The teachers are sitting in different locations during school, so this would really help the communication." He continued that this could save time because it has the possibility to engage the whole school community. He finalized that Samspill would solve some key issues, being a 'go-to-page for planning', and that the solution is inviting and pleasant.



Samspill's offerings

Samspill enables teachers to collaborate across subjects. Today, existing solutions such as Itslearning are primarily subject oriented, making interdisciplinary collaboration challenging. Samspill provides the possibility to create interdisciplinary projects in a simple and clear way. The workflow in Samspill consists of clear choices and steps. It is precise in its core offering and does not bring new complexity by trying to solve everything.

Teachers can develop more ownership to their projects when setting it up in a shared place and when they are provided with a structured overview of their work. In each project they are provided with an overview of who is going to participate, what steps they have to go through and what they are going to work on. Holistically, they are provided with a coherent overview of all the projects of their school, still in progress or finished.

Ideas, inspiration and knowledge can be gathered and shared in the same place. Resources in form of short messages, but also photos, files and links can be traced back easily through search. Subject silos are opened up with transparency through sharing, not only in each project group, but also by having access to what other groups of teachers are working on.

Teachers can learn and share knowledge with the opportunity to explore and customize previous projects. This provides the teachers with their own project bank that they develop over time. This can empower them to feel proud and inspired by their own work.

Samspill aims to inspire and visualise how the renewal and interdisciplinary planning could work in practice. It has a goal of reducing steps in project planning and speed up communication, making the work of teachers more efficient, less time-consuming and perhaps more fun.

Impact

Samspill aims to be a driver to enable project planning moving from the current practice of more subject identified teaching to new practices of planning across subjects in the close future. It was a conscious decision to look at realistic frames for the solution, and not look into more extreme future scenarios.

“School reforms are like pendulums. We very quickly identify the changes but then bounce back. To increase impact we have to change less.”

Assistant principal,
Majorstuen Skole

Samspill is a starting point for empowering teachers because of..

- Ownership of the project planning process
- Reducing uncertainty and discomfort around the change in teaching practise
- Better teamwork through bridging knowledge
- Building trust in the own practise of planning and in colleagues' work through creating transparency in sharing knowledge and expertise
- Trust in leadership of teachers because of their higher level of independence, which might lead to a cultural change in the whole school organization.
- More motivation and engagement in preparing projects for students
- Flexible access to Samspill on different locations and devices

Possible implementation in Portal Skoleplattform Oslo

Position

Position towards other existing solutions

We identified two core arguments to introduce a new tool instead of using existing solutions. Samspill aims to reduce the current complex planning in a clear four-step process: set up basics, ideation, planning and evaluation. Instead of providing a 'all-in-one-place' tool for teachers, the digital service concept contributes with a different angle because it focuses on interdisciplinary specifically.

A way further

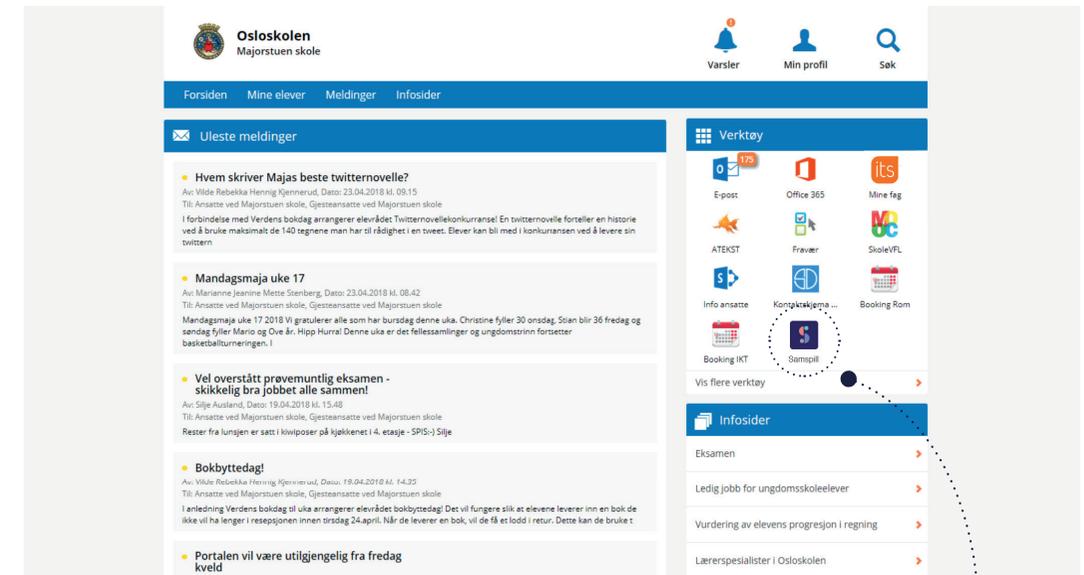
Samspill is a prototype in progress and not a finished solution, resulting in a range of possible steps further for Samspill to be able to sustain long-term. This however extends beyond the scope of this project.

Future work towards a possible implementation could include:

- More exploration of the four steps, with focus on ideation and evaluation
- Rigorous user testing to debug the robustness of use in everyday life
- Launching a pilot at an Oslo school
- An ICT-pedagog or an 'organizational change expert' supporting the onboarding phase
- Developing a business strategy towards a centralised implementation

Other discovered possibilities has been:

- Including gamification elements to motivate, such as badges or other types of achievements
- Enabling collaboration with external schools, so all schools in Norway could share projects
- Inviting the students into the planning process



Possible implementation

There was a wish from teachers to integrate Samspill to "Portal Skoleplattform Oslo" (Feide, 2018) where Oslo schools have an overview of the tools they have access to. If Samspill was included in this overview, the teachers would have quick access to it.







Reflection

This chapter provides you reflection on the design proposal, on the process and on the main contribution of this project.



The design process

When starting this project, we had an open scope and discovered opportunity areas where we could support the system, the teachers and the students. We had a goal of understanding the complexity and richness of the Norwegian education system, the Subject Renewal, the students' experience, the daily, weekly, monthly and yearly working and planning routines of teachers and their obstacles.

Throughout the process, we learned that there is a need among teachers to be empowered in planning interdisciplinary projects in order to create engaging experiences for students. It was a conscious decision to support teachers, which involved many iterations, discussions and challenging moments in scoping and framing the project.

Immersed in the field

In conversations with teachers, they shared their concerns and questions about the introduction of the Subject Renewal. Through this co-creative situation, they reflected on their way of working, and we were provided with new ways of seeing opportunities.

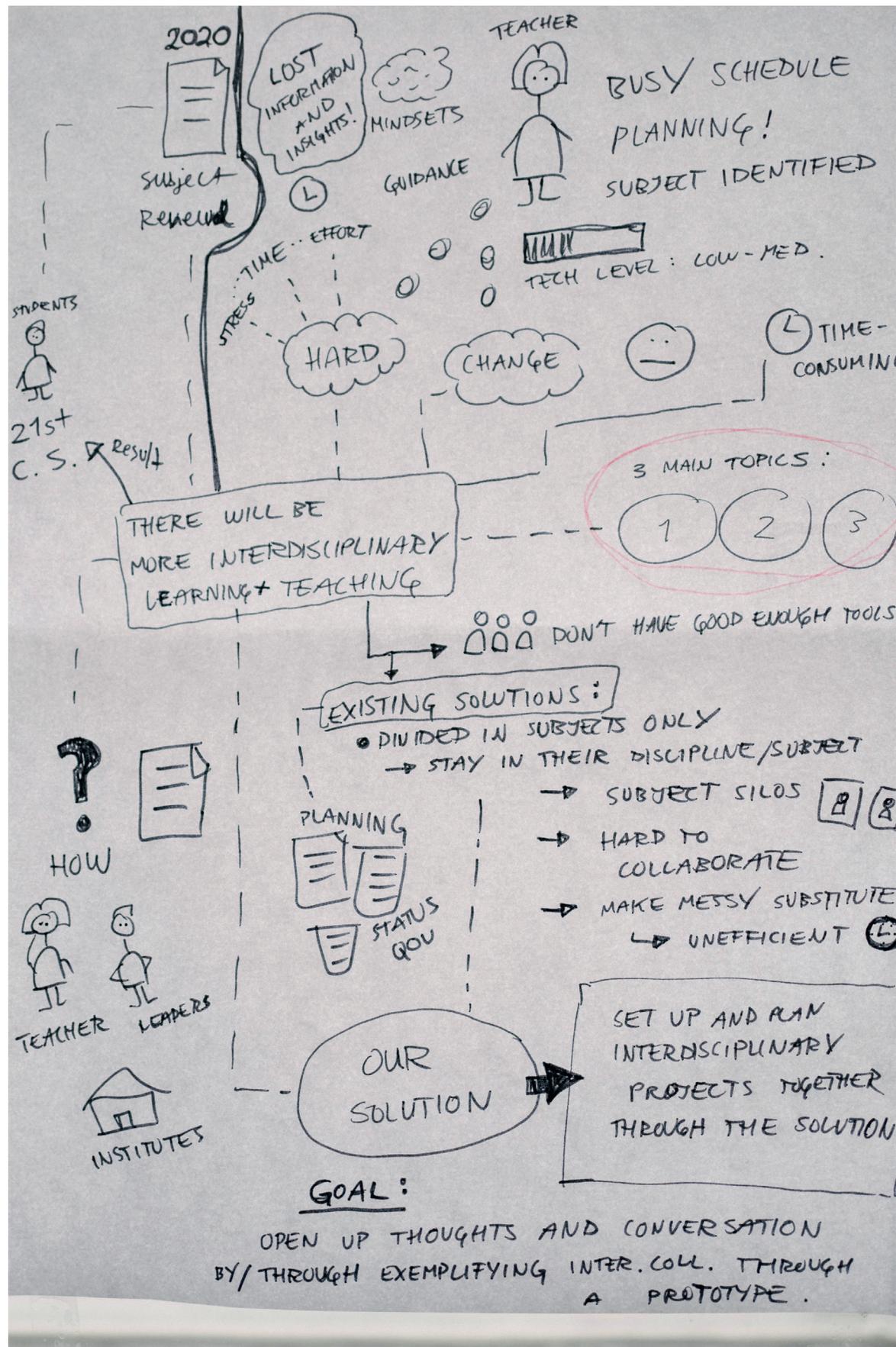
Looking behind the scenes, we discovered the educational field with its enormous effort involved by leaders and teachers in order to create good students projects. We think that there were interesting exchanges of perspectives, methods and techniques between us, as designers, and the leaders and teachers who were bringing all their expertise, knowledge and thoughts about how project planning works and could work.

Challenges

We often struggled to get in touch with the target group, as early found that teachers are extremely busy people. This led to cancellations of co-creative feedback sessions and a scheduled workshop. Thanks to the assistant principal, we managed to establish contacts with teachers who were able to participate in individual interviews and user testing. In hindsight, we could have taken more direct action, and not depend so much on others to connect us further. This might have speeded up building trust and ended in more co-creative situations.

One of the main challenges of the design process, was to scope down. In the first explorative phase of the project, the scope and goal of the solution was very broad, and ideas

became too abstract. We had to take some steps back and do more research to be able to define our final problem statement. We took our assets of methods and techniques to scope the project step by step, in an iterative approach.



The design proposal

Samspill is a prototype that aims to exemplify how teachers can be supported in collaborative project planning across subjects. It aims to trigger reflection and thoughts around the transition and implementation of the Subject Renewal in 2020.

Because of the complexity of the teachers' planning process, it was challenging understanding how teachers currently collaborate and share ideas. The assistant principal admitted: "it is really frustrating to talk to you about this because it is not easy to generalise."

The prototype is not a finished product, but has more potential to grow and develop. To design a planning tool has been challenging, with its many aspects and factors. Because planning is a process that happens over time, our prototype would also need to be tested over time.

Our aim has been to use our skills as designers to present a teaching strategy that currently is in development on paper, in a highly tangible and visual way.

The contribution of the diploma project

This diploma project has raised awareness among leaders and teachers about how they are working on a daily basis and what challenges they are confronted with when the Subject Renewal is introduced in 2020.

Because of the challenge of gathering teachers together, we have presented and discussed Samspill in individual meetings. Further we would wish to present our proposal to more teachers,

leaders and in the system level for a bigger impact.

As named in the research about organizational change, it is experienced emotionally because it taps into identity relevant issues (Kiefer, Müller, 2003). In conclusion, by exemplifying a way of new practises and trigger conversation around it, Samspill could contribute to a smoother adaptation and more confidence in the change.

“You triggered a new mindset for the whole organization and gave us new possibilities to enhance the quality of planning through introducing a new tool. It was very fascinating and inspiring how easily you detected the workflow and thinking patterns in school through immersing in the context. You can really precisely give me relevant information on how we are working based on your ideas and presented alternatives. It is really good that you challenge us because only this way we can change.”

Assistant principal,
Majorstuen Skole

Acknowledgements

Thank you

To Jonas Persson, the assistant principal at Majorstuen Skole, for being engaged, helping us get in contact with more teachers, ideating and discussing with us and taking time to meet us in a busy schedule

To our main tutors Mosse Sjaastad and Natalia Agudelo, for valuable feedback, support throughout the whole project and for taking time in your busy schedules

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To everyone we met, interviewed, talked to and tested with throughout this project,
For listening to our findings, discussing them and ideating with us

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To Vegard, for support in busy and stressful times

To our fellow students, for listening and sharing their feedback

To other friends and family, that took time for questions, feedback, proofreading and support

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