IMAGINING A FUTURE CAMPUS

H+Forest:
Co-Designing Knowledge
For A Sustainable Future

H+Forest: project partners

Academic Partners:
Lund University
Chalmers University of Technology
KTH Royal Institute of Technology

Industrial Partners:
Akademiska Hus
Volvo Cars

Design and Architecture partners:
Arkitekturinstitutet
Boiler

Consultants:
Sustain Lab

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Melpomeni Petrou (Akademiska Hus) - General Support / Report Contributor

Welcome to the campus of the future

Are you unsure where you have ended up and how to find your way? Don't worry. Before you know it, someone will come up to you and offer some guidance.
Maybe you want to grab a bite to eat in the collective kitchen? Or sit down in the garden where some of the ingredients for the kitchen are grown, catch your breath, and enjoy the floral splendor? Or maybe you are one of the participants in one of the open classes where the public can attend some of the university's lectures in the built-up amphitheater, which in the evening transforms into a concert venue.

This campus is a place characterized by flexibility, collaboration, and encouragement towards a sustainable lifestyle. Here, living environments organically merge with learning environments. Various aspects of social sustainability, the collective and the individual, strengthen each other. Here, there is an opportunity to collectively care for cooking and meal culture, experience nature integrated into physical environments, actively recover together, and create organic learning environments based on needs.

This campus environment is made possible through new ways of caring for and developing the place. This means new ways of making agreements, new ways of procurement, new ways of management, and new ways of collaborating between all the actors of a campus. A campus that has the capacity to house various types of environments, with physical spaces that support students in taking care of their mental health, and where several parts of the personal living environment can be shared with others. This is a place that inspires and educates through its very design and serves as a laboratory for the rest of society to follow and emulate.

This is the narrative-based outline of the research project H+Forest. A project that asked the question: how can the environment on a campus stimulate sustainable choices for those who stay and live there? A question explored by Lund University, Chalmers University of Technology, and The Royal Institute of Technology KTH in collaboration with Volvo Cars and Akademiska Hus, as well as over a hundred students in workshops. The result can be found here. You can skim the surface of results and suggestions or dive deeper hope is to inspire new ways of talking and collaborating, on small and large scales. Campuses are complex environments governed by many different needs and regulations. But we hope it will be an opportunity rather than an obstacle to develop campuses into environments to follow and be inspired by. We know that different actors take care of the campus environment in different ways. For greater flexibility, new types of agreements and arrangements are also required. Negotiating different wills and conditions into a common whole is, after all, something we are in strong need of in all parts of society.

Going forward, we need to move together.

The H+Forest project represents a significant step forward in the integration of sustainability, behavioural research, and design. By focusing on the co-production of knowledge and the use of cutting-edge technology, it offers a model for future initiatives aimed at creating sustainable and inclusive environments that cater to the needs and aspirations of young generations. The project highlights the potential for campuses to serve as living labs for sustainability and demonstrates the value of participatory design in achieving meaningful and lasting change.

Sustainable behaviour

A central topic within the domain of psychology has been to understand why people act in the way they do. Since the 1970's, psychologists have been interested in understanding what influences the decisions people make in relation to the environment. From this interest, the domain of environmental psychology evolved. Since psychology is concerned with individuals, and to some extent groups, focus has been on investigating which attitudes, values or interventions affect behaviour.

Most studies investigate how people score on different attitudes, such as believing that the environment is important and that humans are damaging it (bio- or ecocentric beliefs), or if they believe that humans are in control of nature and will solve environmental problems (androcentric beliefs). These values or beliefs underpin the behaviours that we engage in, since they direct us towards specific types of behaviour.

In the 1990's, a model for predicting behaviour, or rather our intent to behave in a specific way, was developed within psychology: the Theory of Planned Behaviour. This model has been used extensively – not only in relation to environmental issues – but also in other domains. In short, this model proposes that the intent to behave in a specific manner, such as recycling, buying a particular brand, or deciding on mode of transportation, depends on three things: attitudes, personal norms, and perceived behavioural control. First, attitudes determine whether we find a specific behaviour good or bad.

Most often, we are more likely to engage in behaviours that we think are good, or at least not harmful. The personal norm (or social norm) refers to what others in my social group does. If everyone in my social group gets their clothes from second hand, chances are I will too. Third, the perceived behavioural control relates to the degree that an individual can engage in a specific behaviour. If there are no recycling bins, it's difficult to recycle. Also, if organic food is more expensive, some households cannot afford it. Behaviour is also affected by habits, where we engage in behaviours that are not reflected upon but automatic. Studies suggest that between 40 and 70 % of behaviours are habits, and these are difficult to break.

The findings from psychological studies indicate that there are clusters of people, where some have high environmental values and try to engage in pro-environmental and sustainable behaviour the best they can, whereas other groups value other things, such as experiencing new cultures, traveling, or buying brand clothes. Our behaviours mirror our values but sometimes these are conflicting. Thus, it is important to be humble when studying human behaviour and being considerate of the fact that what we, as a society value –being environmentally aware and being a well-travelled citizen of the world – leaves the individual between a rock and a hard place.

This project is different, as it asks the participants to identify their own priorities and co-create solutions to the challenges they face. Listening to the desires and ambitions of our students enables us to create solutions that address their concerns, rather than prescribing behaviours to them. In this way, we are in a better position to reach sustainable solutions that will last over time and have the potential to be truly sustainable. Our hope is that the insights from H+Forest can inform the developments of other campuses, within and outside Sweden. In this way, buildings and student needs can blend in a sustainable manner.

Take away questions;

How can we reflect on the attitudes of different social group (s)?

How can we support an increased sense of responsibility for sustainable choices?

Learning

In the early 20th century, educator and women's rights advocate Ellen Key challenged the prevailing views on how children and young people should learn. She wanted schools to provide more space for individualism and not force everyone into the same mold. Around the same time, teacher and philosopher John Dewey formulated an educational philosophy that, like Ellen Key's ideas, has had a significant impact on our understanding of learning. Dewey believed that learning must include reflection to connect experience and education. It wasn't enough, according to Dewey, to just observe or have concepts presented; the learner also needs to be involved through action.

These ideas are confirmed by contemporary cognitive research, which shows how our learning increases when we interact with others, when we spend time in nature, by concretizing the abstract through hands-on activities, in using technology, and engaging in physical work. In the 1930s, John A. Rice founded Black Mountain College after leaving Rollins College amidst a series of controversies. John's principle that his courses ended "when I and the students have finished talking" did not align well with the university's views on how learning should be conducted. Instead, Black Mountain developed with the help of artists fleeing wartime Europe, into a diverse educational institution legendary for its focus on art and crafts at the heart of learning.

In our time, Gert Biesta, a professor of education, has written about the importance of the inspired educator's presence for students to develop and understand their learning process. At the same time students own influence in how their learning should be conducted is increasing in many places, One challenge is how the school supports student reflection. It's not always clear what I, as a student need to develop to deepen my knowledge. Sometimes, I have to move away from or towards things I resist, and experiment to figure out what I need. We need to expand our learning beyond our primary field. While we may specialize in economics, we also need to delve into areas such as sustainability, art, history, psychology, and group dynamics. This diverse knowledge is vital for navigating through diverse and interdisciplinary work environments and for contributing to essential transformations toward a more sustainable world..

Learning doesn't stop within educational institutions; it happens all the time and almost regardless of whether our intention is to learn or not. We learn simply by being in the world and observing how others approach it. The contexts we find ourselves in have the potential to support us in how we act and make choices in our daily lives. H+Forest has explored how a campus environment can stimulate more sustainable choices.

In Sweden, we have had universities since the late 1400s. It has been a long and profound educational journey where universities have acted as relatively autonomous places for research and education. A campus is a hybrid of living, socializing, and being a student. It is a place where learning occurs in many ways, and where the personal mixes with the collective. This can be challenging, but it also offers opportunities to support each other create real communities.

In H+Forest, we have seen how students desire flexibility and connection in their learning environment. This means they want to influence the functionality of different spaces in their learning environment. They also desire connection through more integrated natural elements, greater influence over meal choices and how they are consumed, and more spaces for communal relaxation. Social sustainability is what supports and underlines other sustainable behaviors. Knowledge sustains knowledge. The campus can be a learning place that inspires new ways of learning together.

Take away questions:

How do we discuss practices of learning?

How do we support reflection?

Learning Environments

Describing the learning environment as an interplay between different dimensions—pedagogical, social, and spatial—is one way to understand the various perspectives that affect learning and the learning process. From this standpoint, the physical environment alone does not constitute a learning environment; it needs to be managed from a holistic perspective where both pedagogy and social interaction are important components.

The physical environments for learning need to be flexible and offer a wide range of possibilities. The design of the room can either enhance or hinder the learning process. Since there is scientific evidence that student-active learning enhances learning and leads to better academic results on a group level, there is increasing demand for rooms and environments tailored to this type of pedagogy.

While not always possible, starting with an empty room can inspire both teachers and students to think about how spatial and technical design affects learning conditions. The empty classroom with an adjacent storage space can be likened to a gymnasium for learning. The basic idea is that the room should be adapted to the learning activity—not the other way around. With the help of furniture, sound, and lighting, the room can be designed to support, for example, a workshop or a learning activity that includes a combination of different elements like brief lectures, group work, and presentations. Students can also be involved in creating the best environment for the current situation, thereby gaining awareness of the connection between pedagogy, social interaction, space, and technology.

Increased awareness of how the physical environment can support, or hinder, various activities makes it easier to plan for an optimal learning environment and make use of the varied offerings of learning spaces. Not only the room's size, shape, volume, natural light, lighting, acoustics, and ventilation affect the conditions for learning, but also the furniture, technology, and other equipment. The room's design both guides and influences behaviors and thereby also the learning process. With this knowledge, a holistic approach where pedagogy, space, and systems are integrated is naturally desirable.

To inspire the adoption of new types of learning environments, it is valuable to have personnel resources connected to the environment. Many teachers can attest that pedagogical and technical support creates a sense of security and lowers the threshold for trying something new. Getting help planning learning activities and designing rooms and technology is often crucial for teachers to have the energy and courage to tackle a new type of learning environment

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Take away questions;

What kind of pilots for new spaces and new ways of using space do we have/ could we initiate?

How can we better support the spaces we have?

Living

Today a student inhabits a 16kvm living-environment at a campus. On these square meters you need to fit in all aspects of living. Increased possibilities to study almost anywhere and anytime change how we understand the various spaces at the campus.

Designing the future might not be about designing new buildings. In fact, we already have an abundance of space. Spaces at Swedish universities are in use a fraction of the time. A new perspective on space – based on access – could increase space usage radically, thus reducing the need for new spaces, energy and resources.

Sustainability should start with increased access to the different types of spaces at hand. To unlock this space potential, it is necessary to change the way we design, to go from "housing" to "living environments" and to embrace sharing.

Imagine the future campus as a place for living, playing, supplying and caring, as well as for learning and working. Imagine spaces being used at day, night, weekends and holidays. Imagine the future campus as a thriving neighbourhood or village, connected to the world.

Students participating in H+Forest workshops propose future campuses to be living labs for sustainability. They believe being part of a campus community is important, as well as having the mandate to participate, influence and change spaces.

Students in the workshops were asked to come up with new ideas for basic living functions like resting, staying clean, cooking, eating and socializing. Students from three different universities in Sweden were able to design shared spaces with the potential to move aspects of everyday life from a private to a common sphere, adding to a sense of community.

Take away questions:

How do we cater for multimodality?

How can we discuss and explore new ways to facilitate private respectively

shared spaces?

Sustainable Behaviour Goals

To fit the needs of the project, we modified a model proposed by Spaargaren, where specific practises, to develop behaviours that were relevant in our context. This resulted in six separate clusters in which the academic articles were sorted: Consumption, Energy use, Food, Mobility, Digital space, and Waste. From these, the architects identified three different spaces that the students were then involved in co-designing as a possible development on the future campus. By combining what the students themselves had identified as goals for their behavioural changes, with a perspective on how to best use the built environment to lessen the environmental impact, we extracted Sustainable Behavioural Goals (SBGs). These goals combine qualitative aspirations with quantifiable emissions and can aid developing future strategies to increase sustainability. Rather than providing top-down interventions, a bottom-up driven process where users' own goals can be combined with design solutions that make the best use of the built environment.

SBGs offer a structured approach to address the multifaceted and interconnected challenges associated with sustainability, with a particular emphasis on the actions and choices made by individuals, communities, and organisations in their daily lives. Sustainable Behaviour Goals can be elucidated as precise, actionable, and quantifiable objectives established by individuals or collectives, aimed at the adoption of more sustainable practices and lifestyles. These objectives encompass a broad spectrum of behaviours contributing to the realms of environmental, social, and economic sustainability.

Our ambition is that SBGs will increase a sense of personal responsibility that will empower individuals to tailor their sustainability pursuits in accordance with their personal values and predilections, thereby endowing the goals with a heightened degree of personal significance. In addition, setting concrete goals can enable individuals and other stakeholders to systematically monitor their progress, affording them the opportunity to tangibly observe the salutary effects of their endeavours, thus acting as a source of intrinsic motivation.

Process

The process of exploring the future of campus life commenced with a series of workshops where groups of students were given creative assignments connected to Sustainable Behaviour Goals. In total, nine workshops took place at universities in Lund (LU), Stockholm (KTH) and Göteborg (CTH).

In the first round of workshops, students mapped their everyday behaviours from an environmental perspective. They also ideated around chosen Sustainable Behaviour Goals by designing spatial prototypes that could prompt behaviour changes. In a second round of workshops, the Sustainable Behaviour Goals were revisited, and students reflected on personal sustainable goals and identified barriers and enablers of them. In a third round of workshops the students were invited into a speculative fiction exercise building prototypes of future environments. The brief was based on the previous workshop:

The Kitchen, The Retreat and The Gym

Testing spatial concepts in VR and getting the feedback

In the H+Forest project at the Kräftriket Campus, virtual reality (VR) is being used to test innovative spatial concepts aimed at creating a more sustainable and inclusive campus environment. By simulating both current and proposed designs, VR allows students to immerse themselves in these spaces, providing a unique opportunity for feedback before any physical changes are made. The students' reactions are gathered through surveys and interviews, capturing their experiences and suggestions for improvement. This feedback loop, facilitated by the immersive VR experience, plays a crucial role in refining the campus designs, ensuring that the final spaces reflect the needs and preferences of the university community. This approach highlights how VR can revolutionize participatory design by actively involving users in the creation of future spaces.

Evaluating different everyday behaviours from Scope 1,2 and 3 perspectives

In this project, everyday behaviors were evaluated using Scope 1, 2, and 3 emissions frameworks to capture the full environmental impact of daily activities. Scope 1 emissions represented direct emissions from activities under individual control, such as heating and cooking. Scope 2 included indirect emissions from energy consumption, like electricity usage for household appliances. Finally, Scope 3 encompassed a broader range of indirect emissions related to the production and transportation of goods and services, such as food and clothing.

This multi-scope approach enabled a comprehensive understanding of how different daily behaviors contribute to overall carbon footprints, helping participants to identify which actions had the most significant impact and where they could make the most effective changes.

Workshop at HSB Living Lab.
Foto: Arkitekturinstitutet

Process Map

Paper 01
Sustainable Behaviour Goals for the Future Campus

Sustainable
- Leisure
- Eating
- Mobility
- work practices
- Hygine practices
- Waste management

Workshop 1	**Workshop 2**	**Workshop**
Mapping Everyday Behaviours	Co-creation of SBGs	Co-creation of Campus related to SB

1

TEAM & RESEARCH BASE

students research team architects industry partners

2

CO-DESIGN *with the students*

students research team architects

1.1 Research background

1.2 Team formulation

1.3 Methods & Tools selection

3.1 Everyday narratives applied to the spatial ideas (Everyday utopias)

Skills
Meanings Practice
Materials

Outcome:
Detailed project plan and methodology

Paper 03
'A new system - beliefs usage and the campus spaces'

THE GYM

THE RETREAT

THE KITCHEN

3

spatial ideas
GGs

4.1 Playbook
H+Forest PLAYBOOK

4.2 Festival
H+Forest Festival

4.3 Scale-up Strategy
H+Forest Research Day, Co
development with AH sustanible
strategies of Kräftriket

**4.4 Research
papers and final
report**

3

**CO-
DEVELOPMENT**
with the experts

4

**RESULTS
DISSEMINATION**

research
team

architects

industry
partners

general
public

research
team

architects

industry
partners
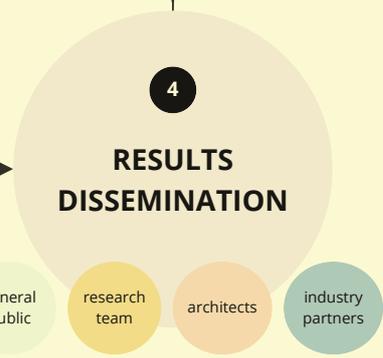
**3.2 Co-development of innovative
spatial solutions that incorporate
sustainable behaviour goals.**

**3.3 Test the co-developed spatial
concepts using Virtual Reality.
Gathering feedback and refine
designs for promoting
sustainable behaviors.**

VR

Paper 02
*'Testing Spatial
concepts in VR'*

"The Vegan Kitchen"
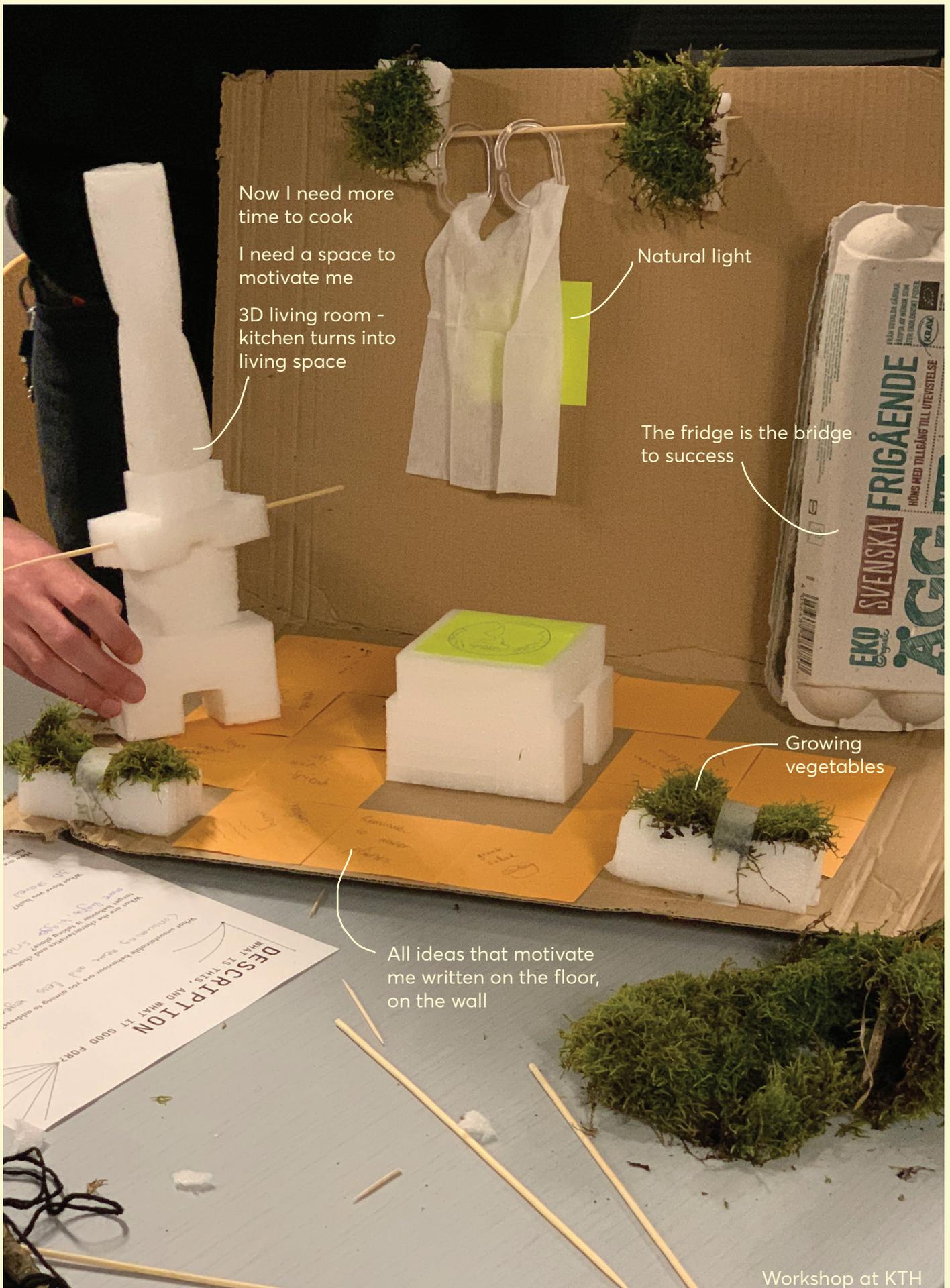
Now I need more time to cook

I need a space to motivate me

3D living room - kitchen turns into living space

Natural light

The fridge is the bridge to success

Growing vegetables

All ideas that motivate me written on the floor, on the wall

"The Shoppingcenter For Reused Goods And Reversed Consumption"

A "Don't buy mall", where you cannot easily access stuff

You have to be part of production

Find materials, work in workshop

receptionist

very high shelves

Exit 1

A lot of exits, easy to leave

A maze to get in

"The Public Space For Green Mobility"

Many green spaces, more appealing for pedestrians and bicyclists

future space will have more greenery, to take space from road traffic

beautiful night lights, a purple light line in the ground

Workshop at KTH

2. **The Future Campus Workshop Series**

In a set of three workshops, we explored the future with the students. They built and explained their ideas, we listened, documented and asked questions to grasp the concepts.

The excercise given was:

"The future campus has an abundance of physical and digital space. Student housing that used to be cramped up is now expanded and the idea of a home has grown and taken new shapes. Here we look at living and learning environments, where previous boundaries have been dissolved to enable new spaces. Spaces have moved from single functions to a multitude of usages. Timeframes change, forget nine to five, living and learning is in progress!

This new future campus is extraordinary in all aspects. In fact, it is fantastic!"

"The Gym"

A flexible space, not a rigid space

A disco ball for friday nights

Change your perspective, maybe different platforms where you can go

plant something together, one tiny responsibility you have

OUR LITTLE GARDENING CORNER

Element of height

FREE WIFI

Lets walk/bike together!

- Breaking the rigidity of the gym. Openness and closeness
- One space leads to another
- Socializing aspects, you need partners. Gym tinder, meet partners
- Playfulness - it doesn't have to be about machines

- Motivating
- A place you want to be at
- Taking care of your body, recreation
- Get to know your body
- Beyond machines
- More of a playground

Workshop at CTH

"The Gym"
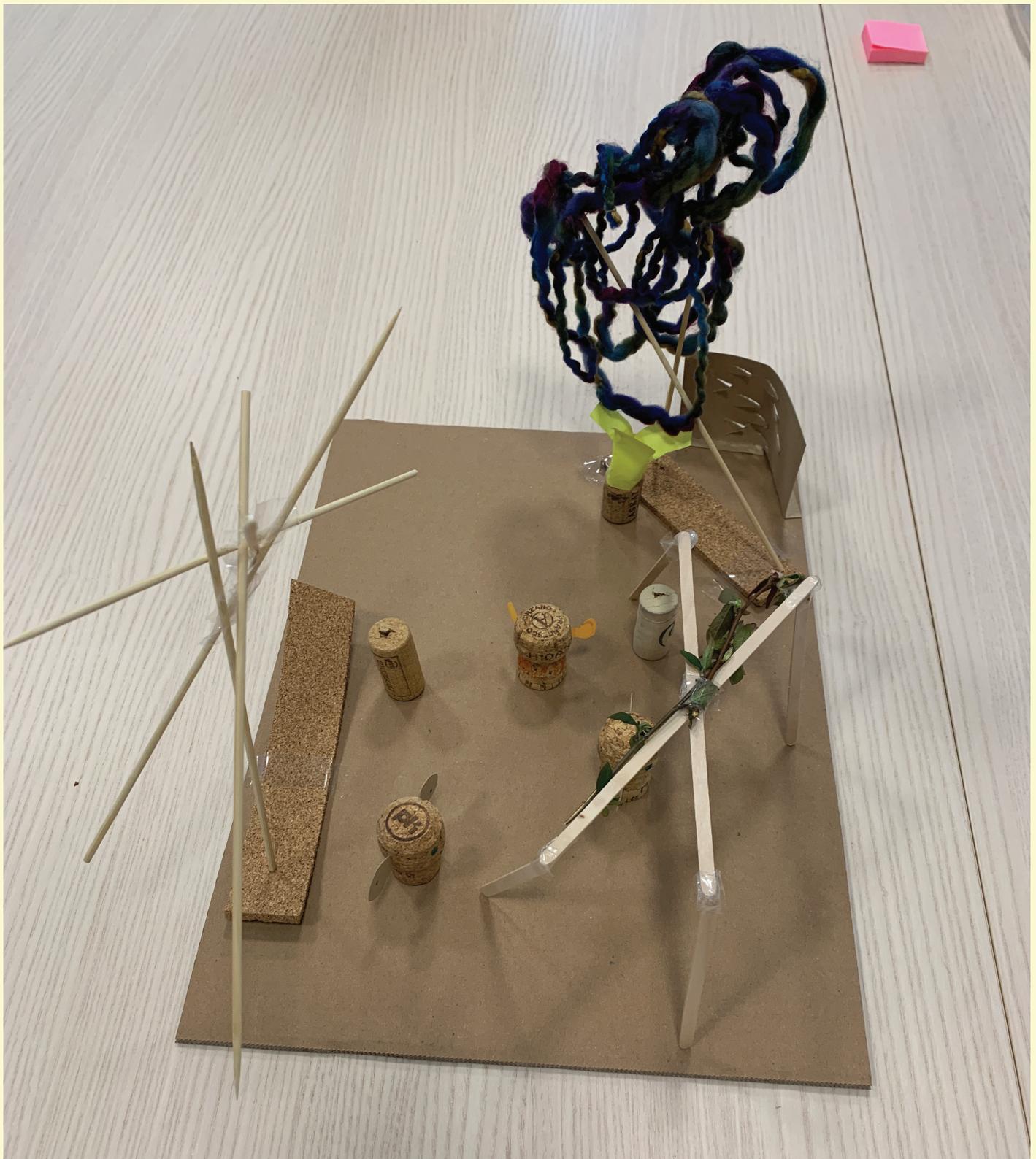
- Focus on senses, a dark room where you focus on the sense of hearing

- Help to find fellows, interested in the same sounds

- Movement and soundscapes

- The concentration on one sense helps filtration, filtering information

- Clear mind, focus

- Creativity

- Exchange

- Dare to talk more to others

- Learning

Workshop at KTH

"The Gym"

This is our space, our sauna

A natural ramp to walk, hike, see all the view. Sit and enjoy the view

Meditate

Climbing wall

Soft music

Natural materials

Adaptive or integrated furniture

Dancing area

Generate energy

exercise and movement, a space for and bodily experiences
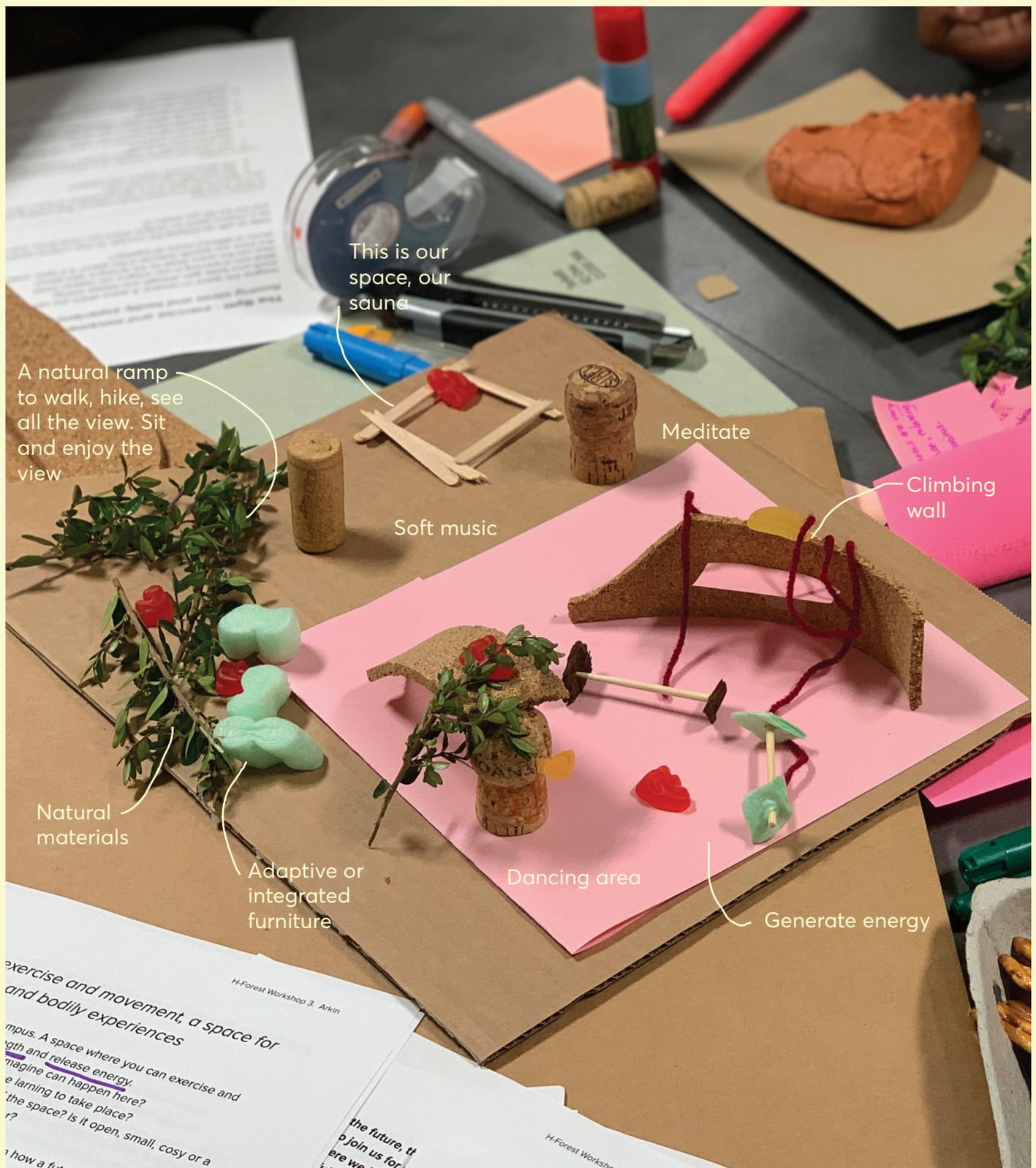
- Forest to hike and go around
- Swimming pool
- Open space and outdoor space
- No tables or chairs, just screens
- Walk, think
- Get together or be alone

- Sleeping units
- Flowing space
- Depending on your mood, I can't plan my mood
- Spontaneous
- Natural lighting

Workshop at LU

"The Retreat"
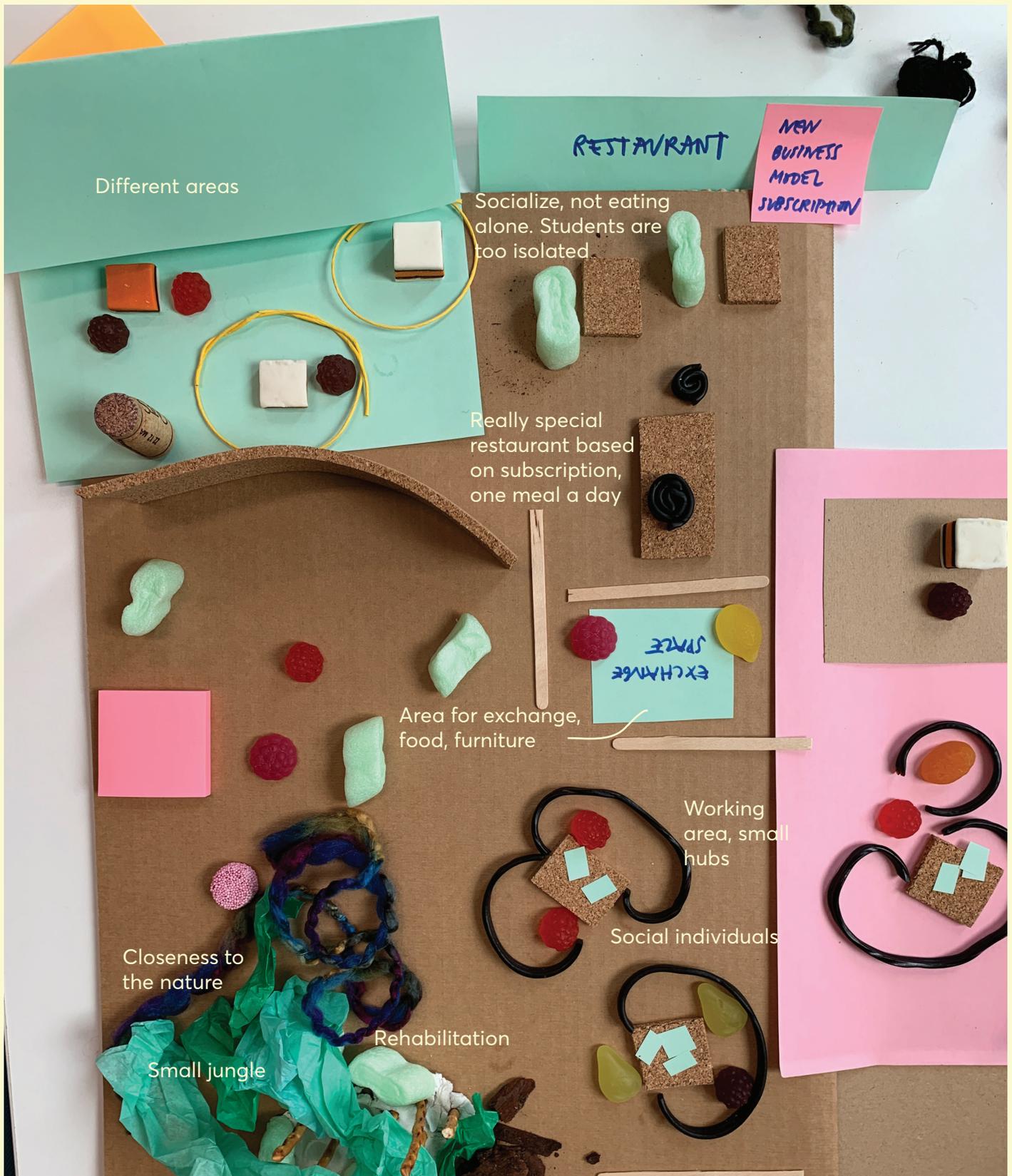
Different areas

RESTAURANT

NEW BUSINESS MODEL SUBSCRIPTION

Socialize, not eating alone. Students are too isolated

Really special restaurant based on subscription, one meal a day

Area for exchange, food, furniture

EXCHANGE SPACE

Working area, small hubs

Social individuals

Closeness to the nature

Rehabilitation

Small jungle

- Need social spaces, at the same time need own space
- Relief, feel nature
- Technologies to simulate reality
- Windy, cold, whatever

- Living, connect with people with similar habits
- Rage, stress
- What is your need? satisfy different needs
- Do you like it when there is complete silence

Workshop at CTH

"The Retreat"
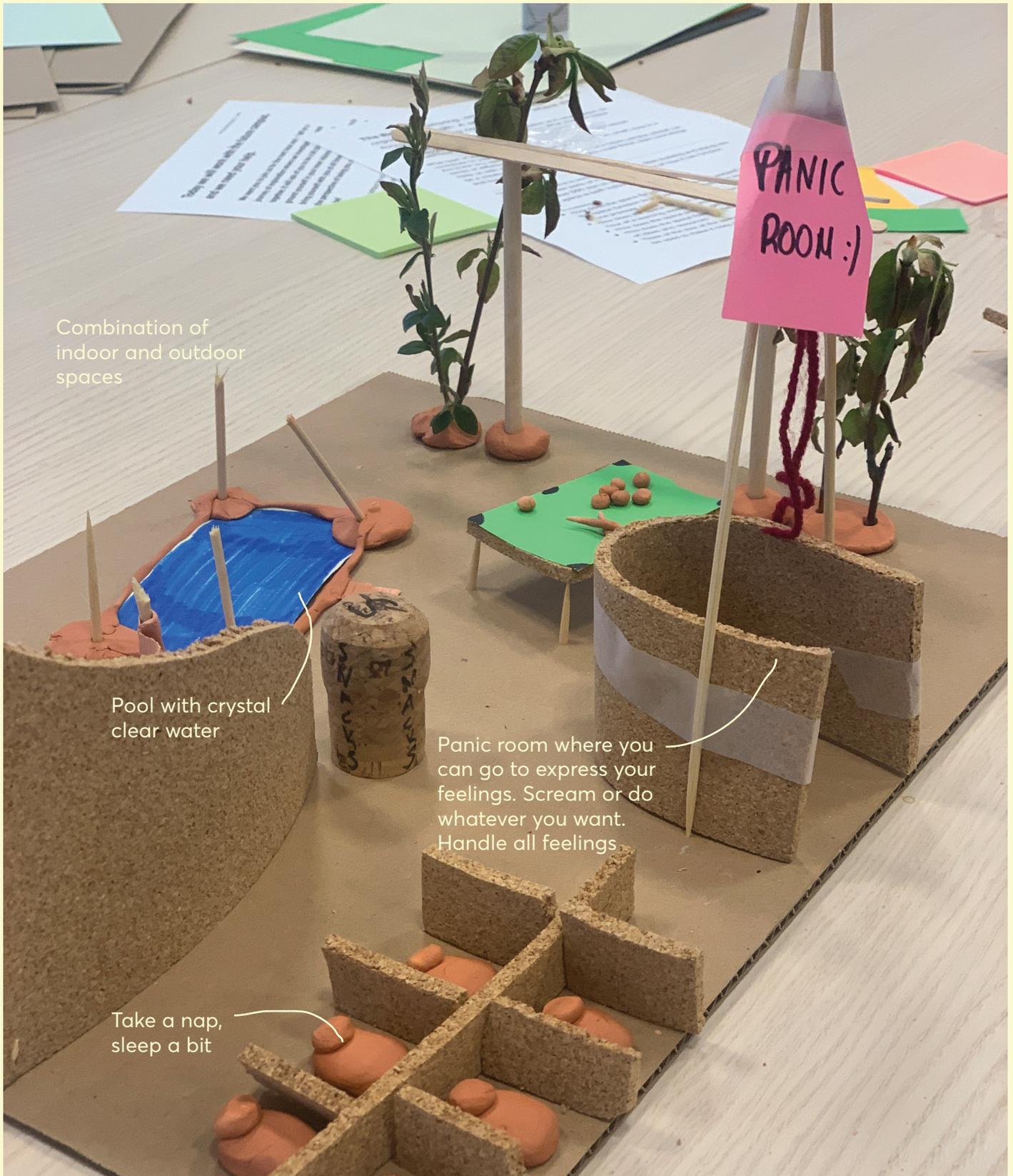
Combination of indoor and outdoor spaces

Pool with crystal clear water

PANIC ROOM :)

Panic room where you can go to express your feelings. Scream or do whatever you want. Handle all feelings

Take a nap, sleep a bit

- Create flows between different areas
- Meet with friends
- Go have a shower
- Not made for studying, more relaxation

Workshop at KTH

23

"The Retreat"
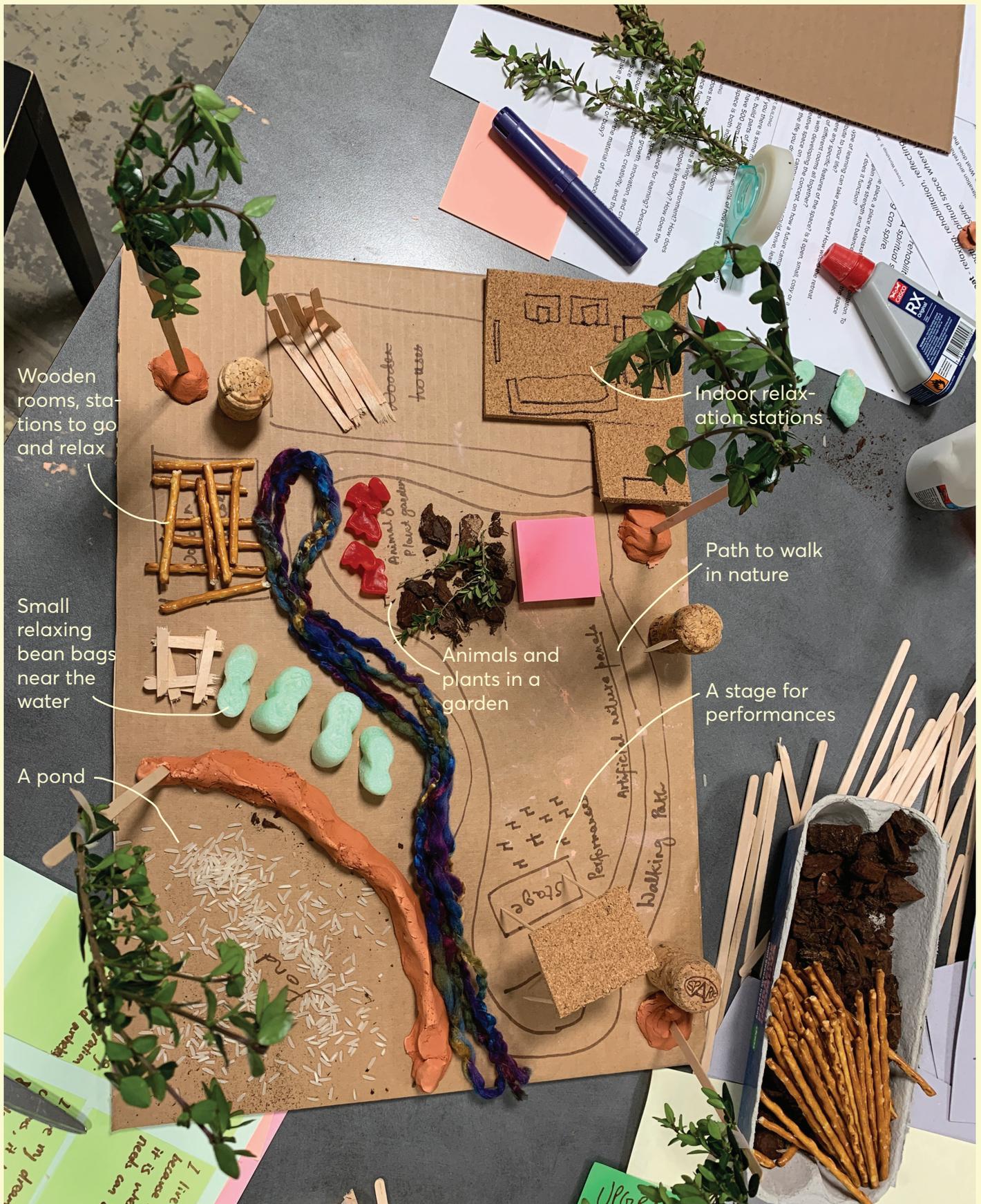
Wooden rooms, stations to go and relax

Small relaxing bean bags near the water

A pond

Indoor relaxation stations

Path to walk in nature

Animals and plants in a garden

A stage for performances

A bit far of from the city itself, more of a retreat

Painting stations

Part of a living space

Sauna

Resting room with displays, in the university buildings, book it 30 mins

Workshop at LU

"The Kitchen"
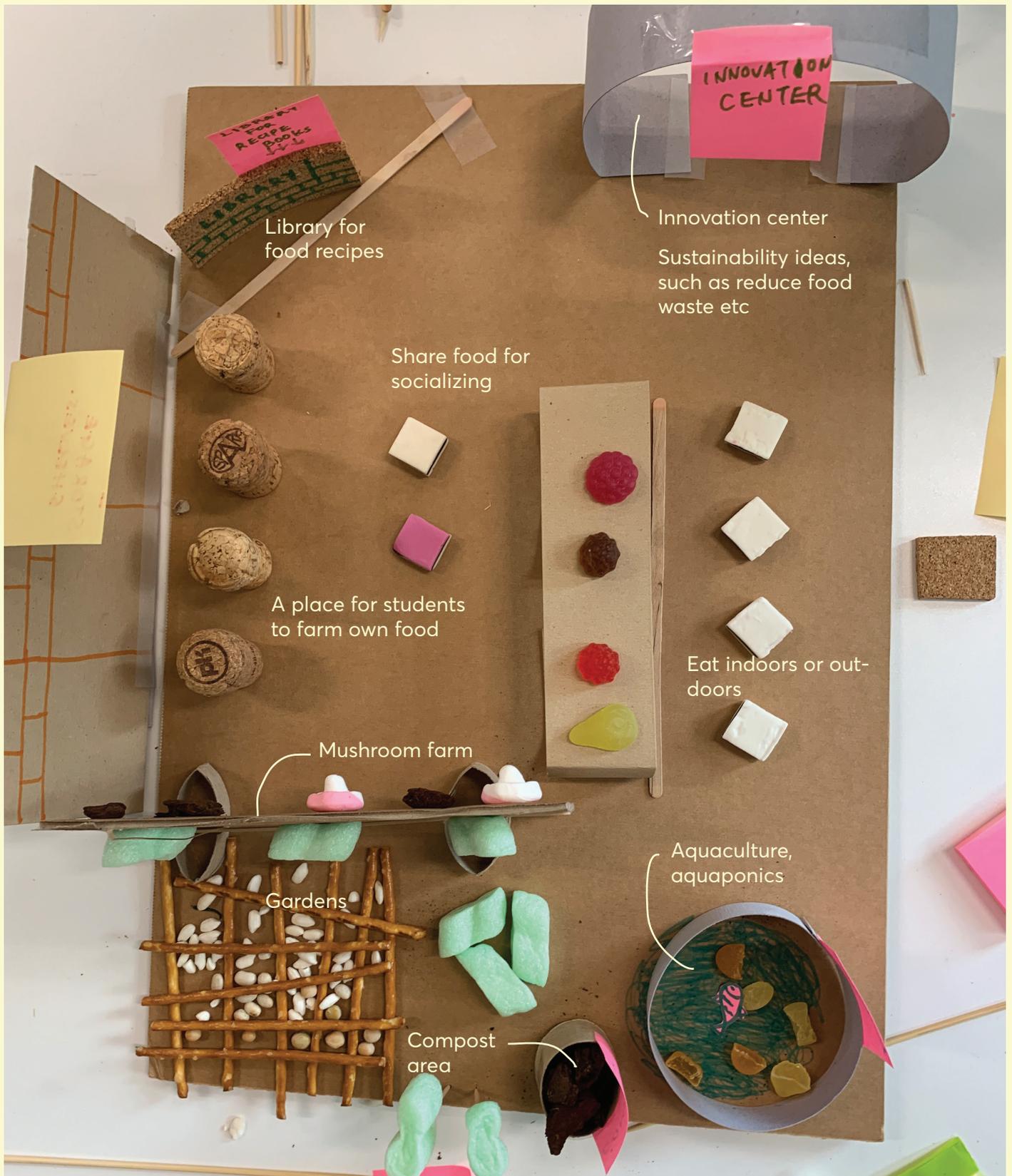
Library for food recipes

Innovation center

Sustainability ideas, such as reduce food waste etc

Share food for socializing

A place for students to farm own food

Eat indoors or outdoors

Mushroom farm

Gardens

Aquaculture, aquaponics

Compost area

- So many things happening, come up with different ideas
- Do you research and present to others
- Possibility to sell, local economy
- Book the kitchen

- App where you can see bookings and meals
- Buy meals
- Many activities, courses agriculture, engineering etc

Workshop at CTH

"The Kitchen"

The most fantastic kitchen

Good smells, tastes, visuals, music

Integrate panels, energy smart

Big common kitchen

Greenhouse, grow vegetables

Lot of green picnic areas

Ice skating during winter

A nice open space, not to intense
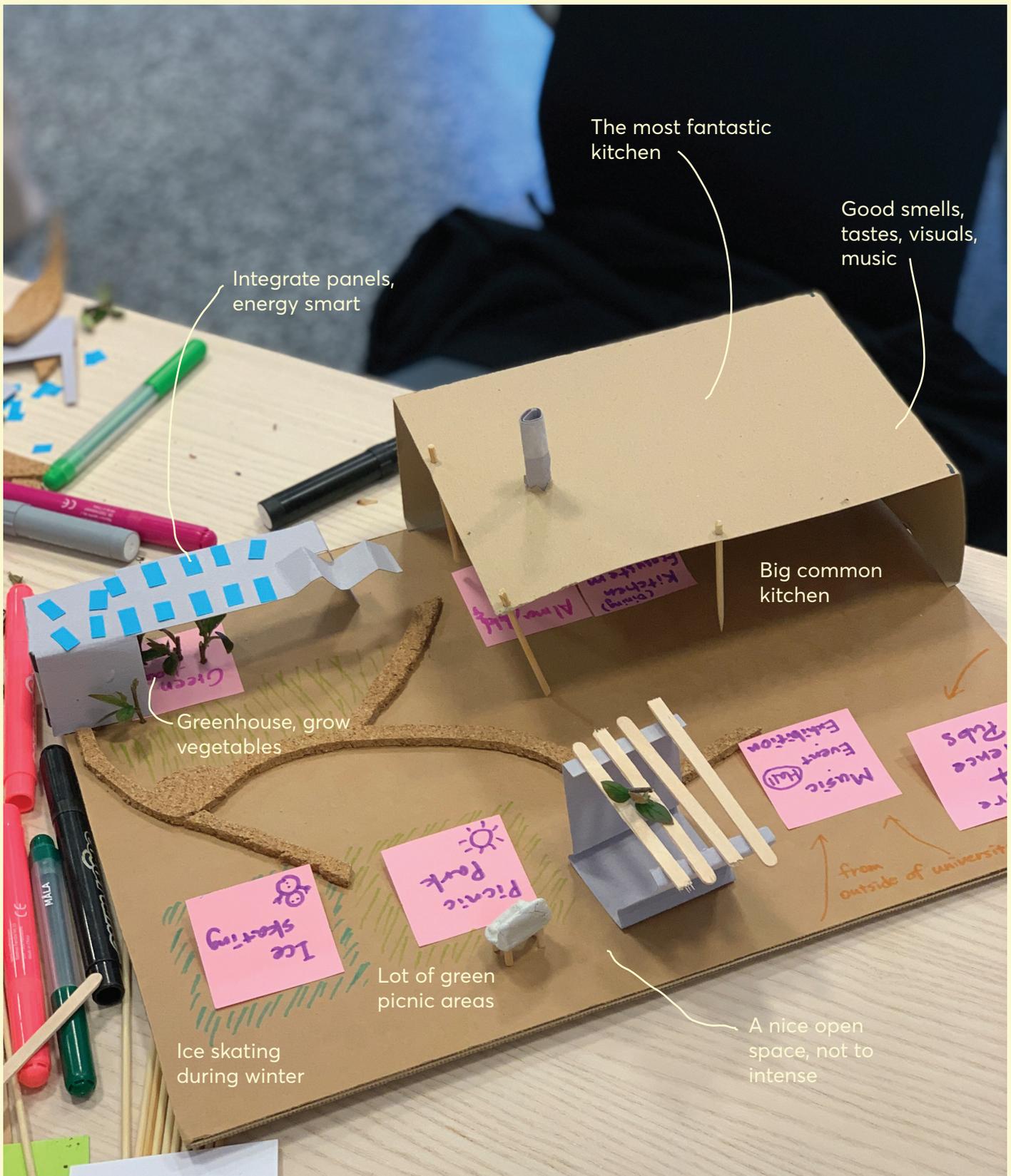
- Multifunctional culinary
- Student association for fruits, vegetables
- Cooking lessons
- Sharing moment for lunch
- Tematic weeks, different cuisines
- Student participating in development of kitchen
- Cook together, a nice experience
- Showcase, sell something

Workshop at KTH

"The Kitchen"
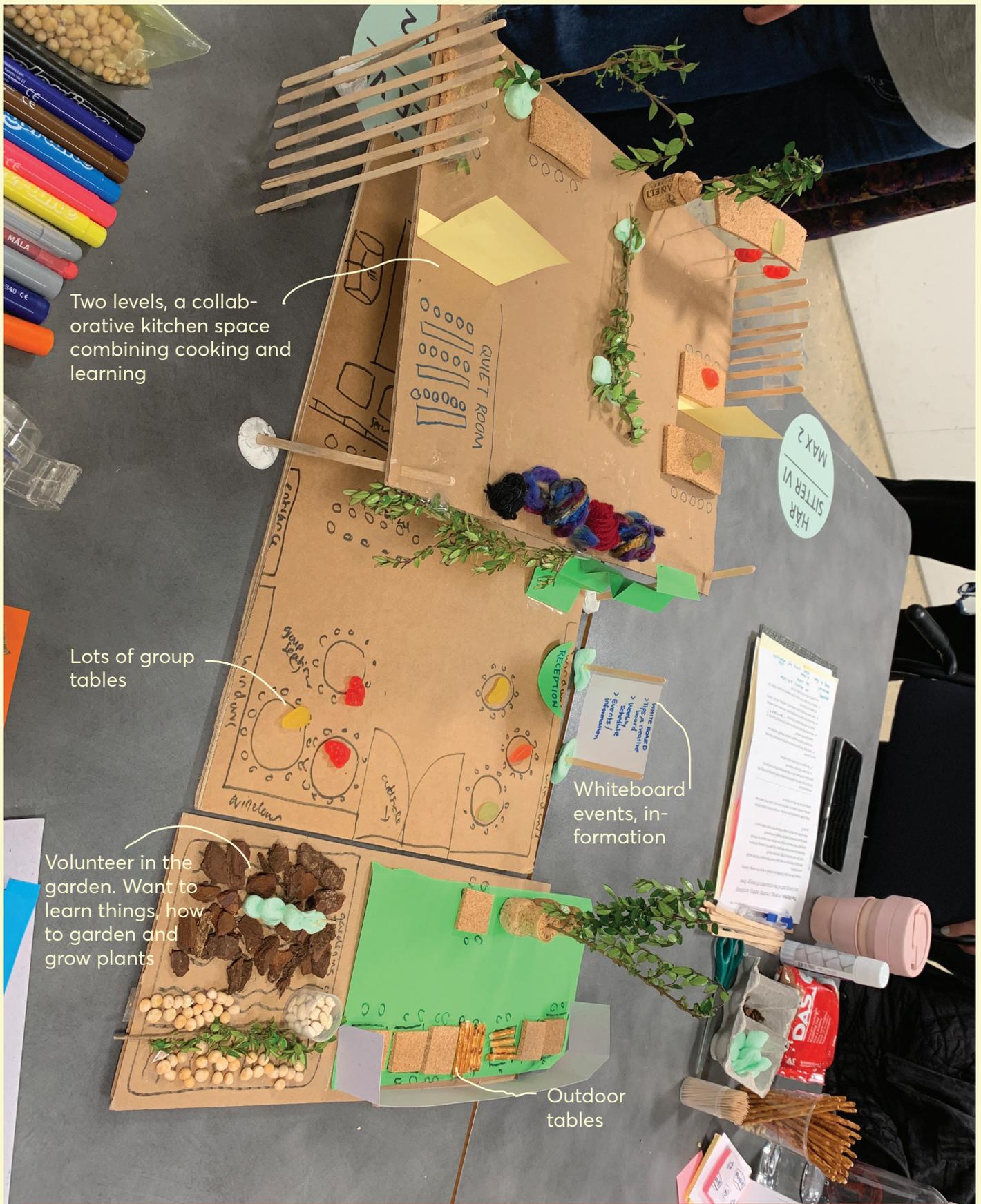
Two levels, a collaborative kitchen space combining cooking and learning

Lots of group tables

Volunteer in the garden. Want to learn things, how to garden and grow plants

Whiteboard events, information

Outdoor tables

- Cantine with cheap and sustainable food
- Students participating in cooking, earn food coupons

- Also open in the evening
- Cooking classes in evenings

Workshop at LU

From SBGs to Spatial Concepts

Sustainable Leisure

Encourage engaging in activities that foster personal well-being and environmental awareness, reducing reliance on electronic devices and promoting physical, social, and mental health.

Key Actions:

- Reduce screen time (social media)
- Engage in more physical activity
- Spend more time on creative activities
- Spend more time outdoors in nature
- Sleep more/earlier
- Socialize more
- Practice mindfulness
- Read more books

Sustainable Eating

Promote the adoption of plant-based diets, local and organic food consumption, home cooking, and growing food to enhance health and reduce environmental impact.

Key Actions:

- Eat more plant-based food
- Buy more seasonal, local, and organic food
- Cook more from scratch
- Bring lunch from home, avoid takeaway food
- Have a better (equipped) kitchen
- Eat healthier/better quality
- Grow own vegetables and fruits
- Take more time to eat and enjoy the food

Sustainable Work Practices

Support efficient and balanced work habits, create eco-friendly workspaces, and enhance overall work environment sustainability.

Key Actions:

- Work more efficiently, be more productive
- Better work-life balance
- Green study spaces
- Better work environment

The Kitchen

The Retr

Sustainable Hygiene Practices

Promote water conservation, reduce plastic use, and encourage the use of environmentally friendly hygiene products to minimize ecological footprints.

Key Actions:

- Take shorter showers/use less water
- Take cold showers
- Reduce the amount of plastic from hygiene products
- Use more environment-friendly products

Sustainable Mobility

Encourage active transportation methods such as biking and walking, and support the use of eco-friendly car-sharing options to reduce carbon emissions.

Key Actions:

- Biking more
- Exploring walking paths from/to home
- Affordable and eco-friendly car-sharing

Sustainable Waste Management

Foster a culture of waste reduction, encourage reusing and recycling materials, and promote upcycling to minimize waste and conserve resources.

**Key Actions:**

- Reduce
- Reuse
- Recycle
- Upcycling

reat

The Gym

3. Concluding three spatial concepts
Learnings from Co-Design
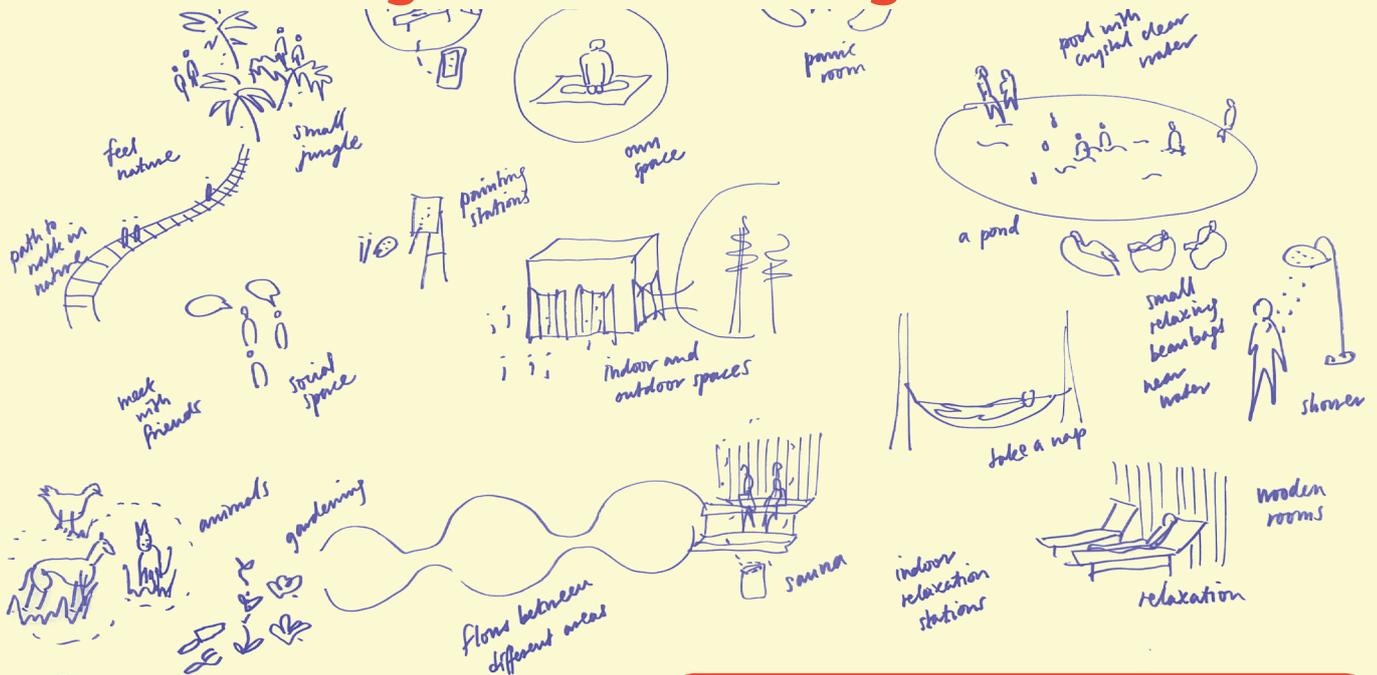
The Gym

The students chose to design for well-being and mental balance rather than physical fitness. If physical, they preferred movement in natural, relaxing and inspiring surroundings or body movement, rather than indoor spaces and traditional gym equipment. Dance was part of two descriptions, boosting the physical exercise with joy and social interactions.

Much attention was given to environments designed to wind down, relax and find focus. Groups explored solitude – community, recovery - pulse and tranquillity – motion, perhaps not preferring one before the other but communicating the need for both.

The Retreat

The students chose to design for relaxation, primarily using nature itself or natural materials, or using technology to simulate natural elements. Exposing the body and the senses– to wind, cold, water or heat – was a theme in all groups.

Relief from rage and stress was suggested through "panic rooms" or "scream rooms", a wish for secluded spaces where you can go to "express your

Solitude / Recovery / Tranquility

- taking care of your body
- color blue, meaning I want to be alone
- concentration on one sense
- clear mind
- focus
- meditate
- sleeping units

Community / Pulse / Motion

- a disco ball for friday nights
- dancing area
- more of a playground
- help to find fellows
- spontaneous
- generate energy
- a club night with avatars

THE GYM

forest to hike and go-around

a natural ramp to walk, hike, see all the new

platforms

change your perspective

climbing wall

dancing men

one space leads to another

play-fulness

playground

disco ball for friday night!

sleeping units natural materials

meditate
clear mind
focus
creativity
learning
get to know your body

"I can't plan my mood"

a dark room soundscapes

concentration on one sense helps filtration

swimming pool

feelings", "scream or do whatever you want".

Creativity, social interaction and exchange were also topics discussed, as well as food, in or in close connection to the Retreat. Students imagined the Retreat as a common space to counter many students' senses of isolation, a "third space" to complement the typical lecture room or student apartment.

not so tasteful. Bringing one's own lunch is a more affordable option but might mean eating alone, and since many students eat alone at home, they prefer social lunches – and dinners as well, if possible.

Communal cooking and new cooperative business models where students are not only consumers, but part of the local food production on campus – from growing vegetables to cooking meals – were discussed to achieve affordability, sustainability, learning and collaboration.

The Kitchen

Above all, the kitchen is a collaborative and social space, where you connect with others through cooking and dining. Some students really enjoy cooking but don't have the facilities to cook in their own apartments. Others don't like to cook but want to join in for other activities such as food preparation or even do the dishes, to be part of the cooking community.

The kitchen is also a place for research, development and learning. Apart from gaining academic skills at campus, students want to expand their life skills, advance their practical cooking skills as well as promote sustainability and health through daily routines. They want to be inspired by others, to expand their own menus.

Food on campus today was a topic engaging many students, described as too expensive and

- **social**
- **collaborative**
- **engaging**
- **learning**
- **lab**
- **innovation**
- **local food production**
- **circular systems**
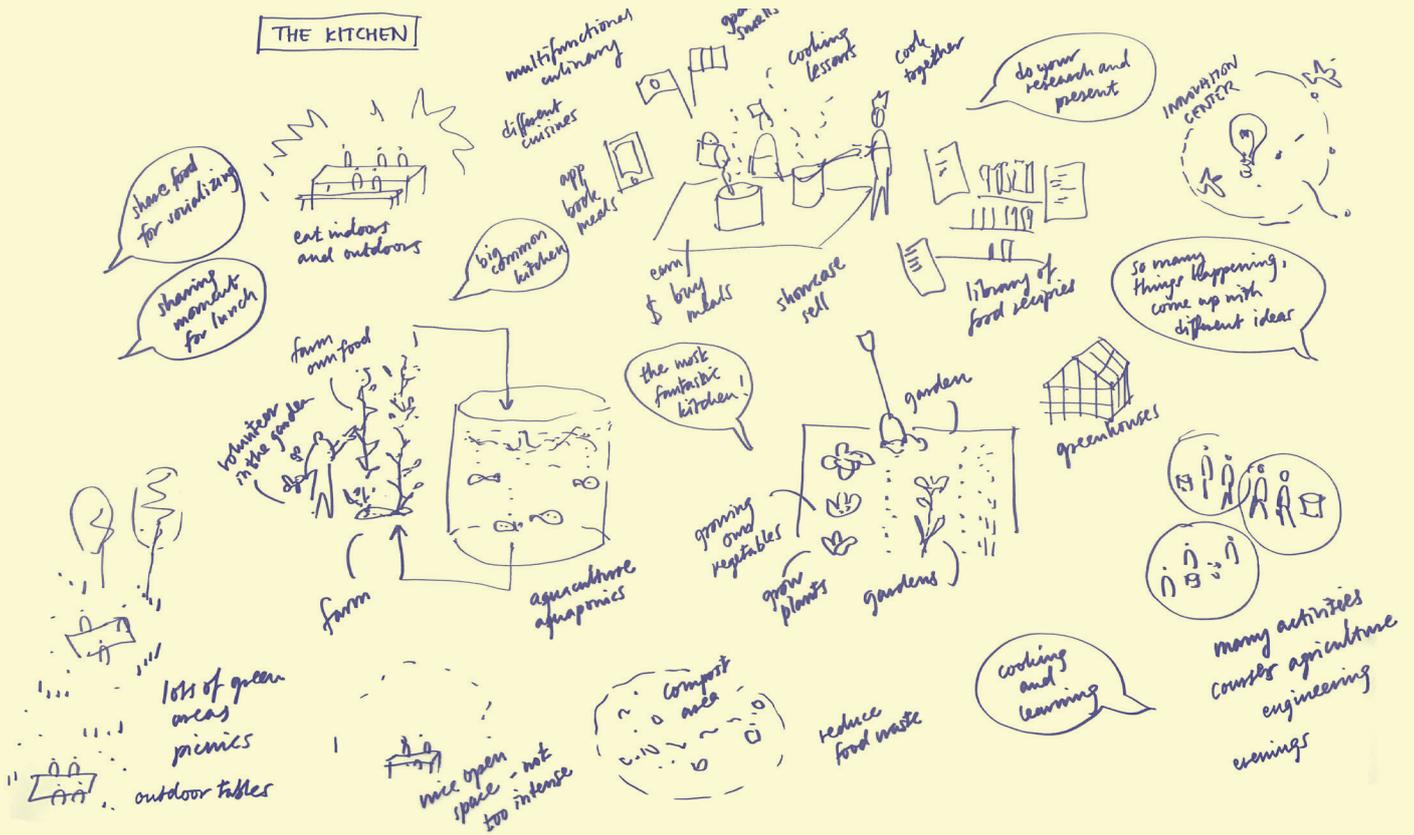
Participatory design

Arranging workshops with students early on, to play and start conversations through experimental design is a method to understand students' underlying wants and wishes, i.e qualitative research. While the participants create physical models, they also talk and discuss their personal experiences, what they lack today or how they want to live. This conversation starts in, but is not limited to, the spatial concept at hand.

Apart from discussing spaces, places and activities on campus, students brought in other aspects of their daily lives, stories that help us understand and design the future.

Design to combat:

- Loneliness. Students can experience loneliness and isolation. Small student apartments are not suited for guests. Digital learning makes it more difficult to make new friends.

- Stress. Loads of accessible knowledge, different media, wanting to succeed. Students find it difficult to focus, relax, and find peace.

- Putting a lid on. Students feel they have to act in an orderly manner – no screaming or crying. They cannot act out, to relieve stress or frustration.

Design for:

- Making a difference. Students wish to be part of a shift towards a more inclusive and sustainable society

- Wanting things to be real. Students want to complement academic theoretical studies with live experiments, to make campus more fun and engaging

- Engagement. To have access, to have responsibilities and to be able to shape campus is desired.

Dream campus has

more students accomodation

free organic food for students free bikes

sports facilities [free]

large common spaces for gathering and eating

multiple nationalities

freedom / express my self freely

welcoming info health support

Workshop at LU. Foto: Arkitekturinstitutet

What is it that shapes the campus community?

To better understand the rich ideas shared by students, we use a systems thinking approach. This method helps us see the bigger picture, understand how different parts of the campus interact, and explore the many ways we can address challenges together. Systems thinking encourages qualities like curiosity, compassion, and courage, and it calls for a shift in how we think about using and designing campus spaces. The students' vision imagines a dynamic, multi-functional campus where living and learning are deeply interconnected.

We have been prototyping on a campus that reflects these ideas—one that's more than just a place to study, but a place where you can live, connect, and thrive. A campus with a wide range of resources, activities, and spaces that would support learning, social connections, creativity, and overall well-being.

To make sense of the students' ideas, we've organized them into different levels or layers:

1.   **Operational level & Values and Believes:** This includes the practical aspects of how the campus functions day-to-day. And the underlying principles and values that shape our campus community.

2.   The **"Hard ware" level** - The physical environment, the buildings, spaces, and resources that make up the campus.

3.   The **"Soft ware" level** - The immaterial system, digital tools, services, activities and experiences that could enhance the campus environment.

"The Operational level"
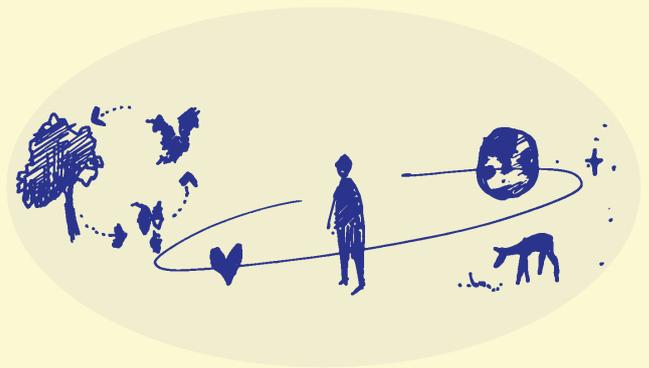
"The Soft ware level"

"The Hard ware level"
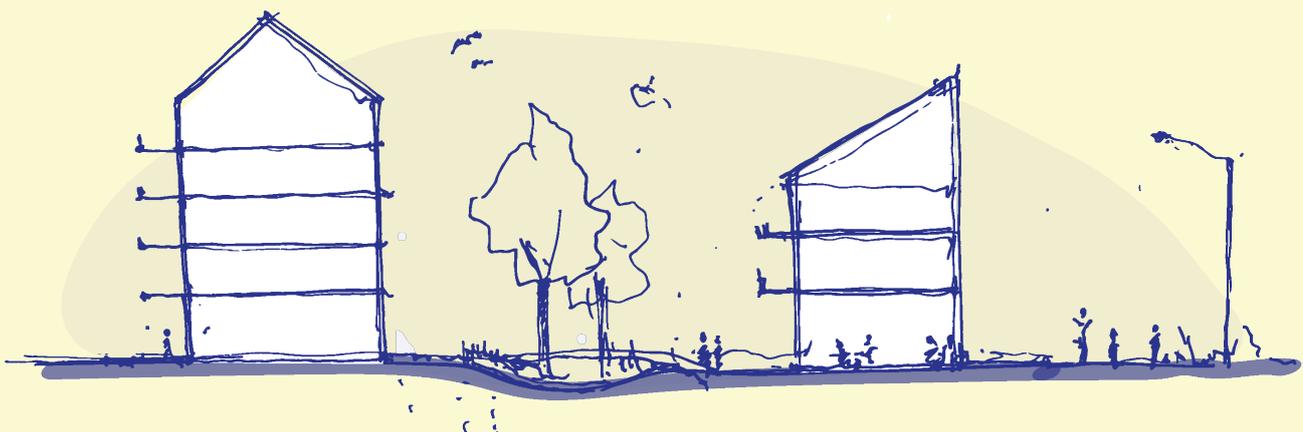
The "Operational level" and "values and believes"

Examples shows how a campus's daily life is run by values, making sustainability, social connections, and creativity key parts of the campus culture.

The "operating level" of the campus, focusing on the practical processes, behaviors, and systems that also help the campus run in a sustainable way.

Category	Values and Believes	Operational Practices
Promoting Sustainable Behavior	Promote a mindset where sustainability is part of everyday life. It's about respecting the environment, conserving resources, and ensuring that our actions today don't compromise the well-being of future generations.	Clear goals to promote sustainability among students and staff, including recycling programs, energy-saving initiatives, and green activities like gardening. Supported by campus-wide campaigns, making sustainability a shared responsibility.
Building a Socially Connected Community	Social connections are essential for a thriving community. This belief drives efforts to create an environment where everyone feels welcome, supported, and encouraged to interact with others.	Providing spaces and opportunities for social interaction, from common areas to hosting regular community events. These spaces are accessible and inclusive, ensuring that everyone feels they belong.
Encouraging Creativity and Innovation	Creativity is seen as crucial for personal and community growth. The campus believes that creativity should be nurtured and freely expressed, as it leads to innovation and enriches the campus experience.	The campus provides opportunities for creative expression through art workshops, performance spaces, and student-led projects.
Integrating Sustainability with Social and Creative Initiatives	Sustainability, social interaction, and creativity are interconnected, guiding campus life and ensuring these values are integrated into everyday experiences.	Campus initiatives like community gardens and sustainability-themed events reflect the integration of sustainability, social interaction, and creativity. These activities are designed to be effective and engaging, combining multiple values.

The "Software level"

Examples – What to do and engage with, in the campus community.

Engagement Area	Examples
Diverse Activities	Explore various campus activities and courses in areas like agriculture and engineering. Participate in or propose new ideas and projects.
Research and Presentation	Utilize tools for research and presentation in class or at events.
Local Economy and Marketplace	Sell goods or services on campus, supporting a local economy that promotes student initiatives.
Booking and Meals	Use an app to book kitchens, study rooms, or relaxation spaces. Check and order meals easily.
Culinary Experiences	Book a kitchen for personal or group cooking. Join cooking lessons, themed weeks, and develop the campus kitchen.
Social Cooking and Learning	Cook with fellow students, earn food coupons, and enjoy shared meals. Participate in evening cooking classes and enjoy affordable, sustainable food options.
Gardening and Sustainability	Grow your own vegetables, volunteer in the campus garden, and learn about sustainable practices.
Social and Private Spaces	Find a balance between social interaction and personal space with flexible spaces for both.
Rehabilitation and Well-being	Access spaces designed for relaxation, recovery, and well-being, helping to connect with nature.
Technology and Personalization	Experience spaces that simulate your preferred environment for study, relaxation, or focus.
Social Connections	Engage in activities that prevent isolation, such as shared meals, living with like-minded peers, and socializing in flexible spaces.
Special Dining Experiences	Enjoy unique dining options, like a subscription-based restaurant offering a special meal each day.
Walk, Think, and Reflect	Utilize campus spaces for walking and reflection, allowing for alone time or interaction in an adaptable environment.
Creative and Focused Learning	Engage in activities designed to help focus and filter information through sensory experiences or dedicated learning spaces.
Flexible Social Spaces	Find spaces offering both openness and intimacy, connecting with others or enjoying solitude.
Health and Recreation	Take care of your body with fitness activities, nutrition guidance, and 'gym Tinder' to meet workout partners.

The "Hardware level"

Examples – of wanted spaces in the campus environment.

Space Type	Examples
Food and Farming Spaces	- Gardens, greenhouses, and farming areas for students to grow their own food. - Aquaculture and aquaponics systems for raising fish and growing plants together. - Compost space to recycle food waste and nourish the garden. - Innovation hub for experimenting with new ideas and technologies. - A library filled with food recipes. - Indoor and outdoor eating spaces for picnics and gatherings in nature.
Cooking and Social Spaces	- A large, welcoming kitchen for group cooking, sharing meals, and learning new skills. - Common kitchen as a hub for social activities. - Green spaces for picnics, relaxing, and enjoying nature. - Ice skating areas available during winter for fun and community bonding
Sustainable and Energy-Efficient Spaces	- Buildings with integrated energy-smart systems. - Open spaces designed for comfort, with pleasant sensory experiences and background music. - Multi-level areas with group tables, outdoor seating, and information boards for events and activities.
Relaxation and Creative Retreats	- Indoor relaxation space with a retreat-like atmosphere. - Pond, performance stage, and painting stations for creativity. - Walking paths through nature, wooden rooms, and bean bags for unwinding. - Sauna and other spaces for balanced relaxation experiences.
Emotional and Mental Wellness Spaces	- Pool with crystal-clear water and a small "jungle" area. - "Panic room" for expressing intense emotions safely. - Spaces designed for relaxation with various areas tailored to different moods and needs.

4. Applying The Concepts
What If Campus Kräftriket Adapt The Vision?

A Campus 24/7

The 24300 sqm at Kräftriket is now open 24 hours a day, and turned into a living and learning environment. Small spaces, large halls, outdoor courtyards and culturally rich environments are used to its fullest potential.

The built environment opens up for new ways of living in the already exicisting structures. Fueling innovation and experimentation through curiosity and exploration.

Care

With an increased intensity of use, the structures for maintenance and operations will be adjusted to better suit the new needs .

A gardner/matchmaker connect ongoing intiatives with curious students. Building the community and on-site presence whilst caring for the campus grounds
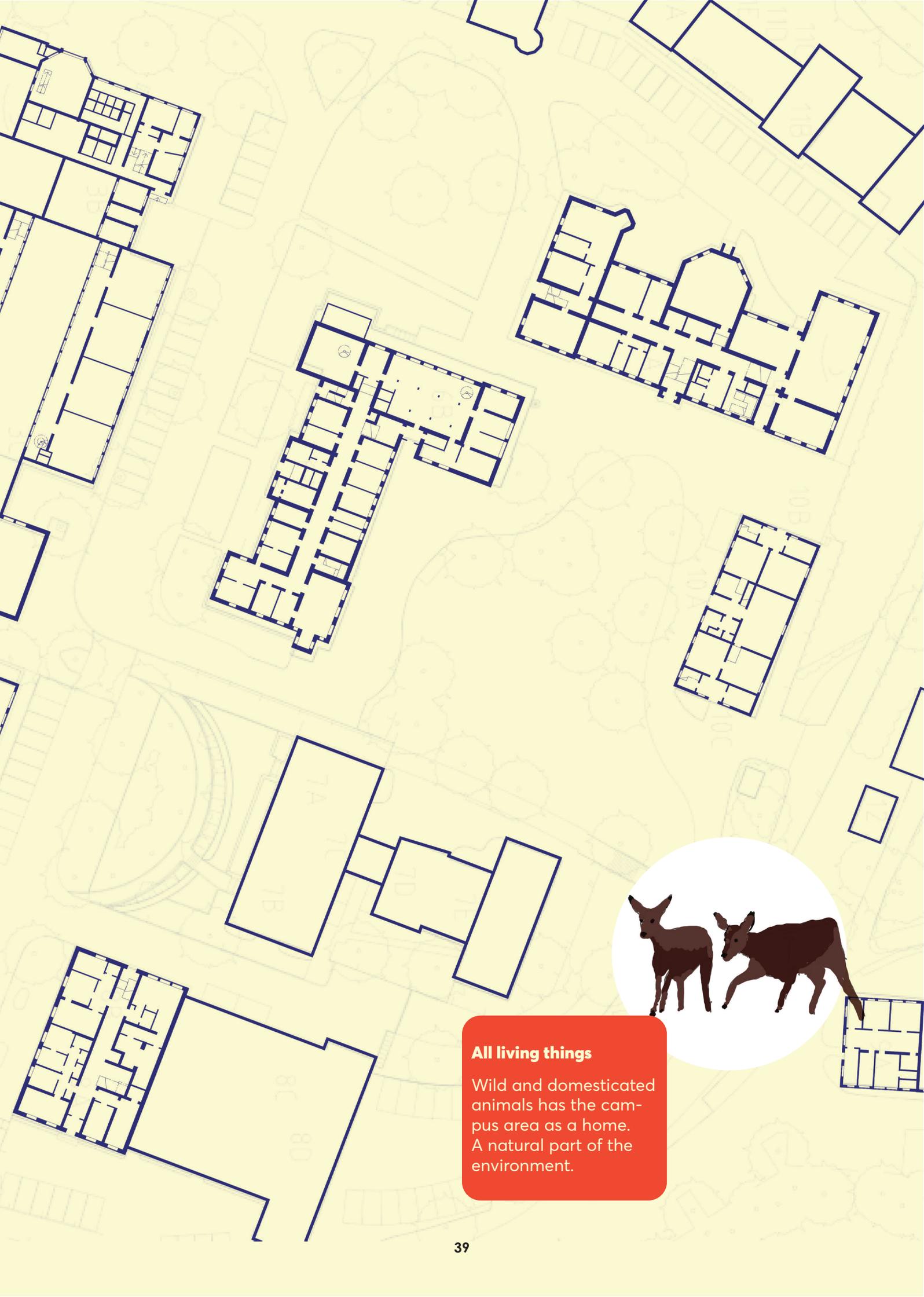
All living things

Wild and domesticated animals has the campus area as a home. A natural part of the environment.

Imagine one day at campus - the Kitchen

it is morning

people start coming down from the sleeping pods upstairs, on their
way into the Kitchen or towards Brunn
someone snuggles around a little by himself, like in a cocoon
it's sunny so some people are already outside, sitting along the warm
house wall with their toes in the soil
slowly but still visibly the leaves unfold
the chickens have come out and are pecking around
some researchers and students talk about an experiment
the plants are checked, has the dew dried up, is more water needed
from the rain barrel?
a hen seems to have escaped
the aquaponics system bubbles behind a glass wall
day-fresh vegetables will soon be picked

it is lunchtime

more activity, more people in motion and more talk
all doors are open, a flow between inside and outside
it smells good
it will be Indian for lunch, aloo palak – lots of spinach right now
in the large kitchen, cooking and learning happen at the same time
in the background, you hear voices from a lunch seminar in the
innovation centre
on the big screen a presentation from an ongoing international
collaboration is about to start
extra portions are placed in food boxes and can be purchased in the
app
food scraps are left in the compost and some end up with the hens
fun to see how the legumes are really growing now

a light rain is falling outside and the wind seems to have turned
many people are booked in for dinner
there is a small celebration, so long tables have been set up inside the
innovation center, voices spreading between the rooms
three cooking teams are at full speed around the pots in the kitchen
Hasse is on site as usual, he knows everything about the premises so
there are usually some questions and he keeps track of everything and
everyone
the fire is lit and there are quite a few people around the tables now,
the atmosphere is a bit like a restaurant but people stay longer
one group brings out board games
a woman with headphones is sitting inside a wrap-around armchair,
perhaps listening to a podcast
alone but still together

Hand-drawn architectural floor plan sketch with annotations:

- do your research and preserve
- aquaponics nutrition
- showcase / sell
- library of recipes
- the most fantastic kitchen!
- big common kitchen
- nice open space – not too intense
- sharing moment for lunch
- outdoor lunch
- fireplace
- compost area
- volunteer in the garden
- farm our own local food
- reduce food waste
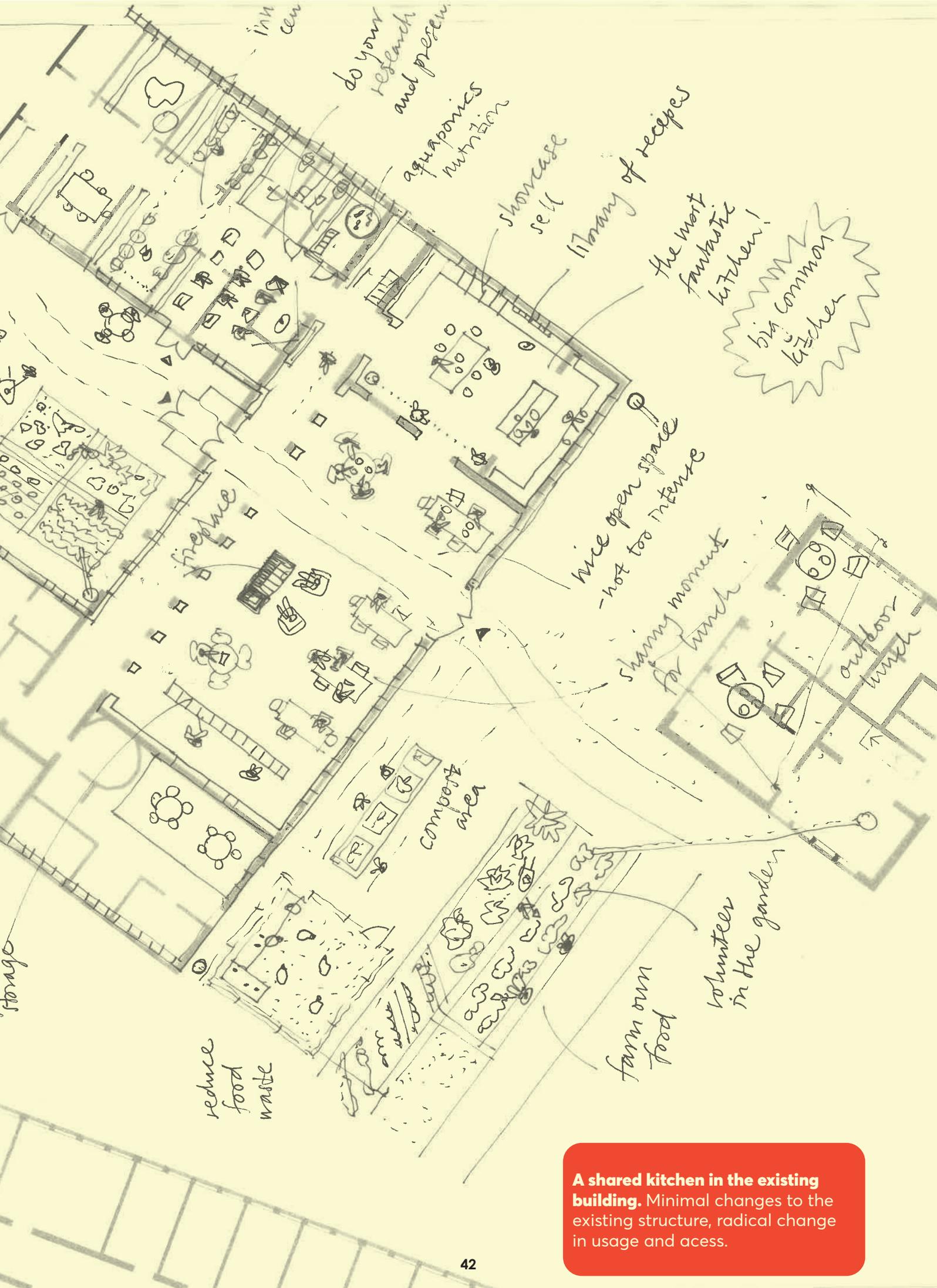
A shared kitchen in the existing building. Minimal changes to the existing structure, radical change in usage and acess.

From parkinglots to living environments

Soil experiments, growing gardens and recreational planting takes over the outdoors. Turning hardsurfaces into productive, diverse living and learning environments.
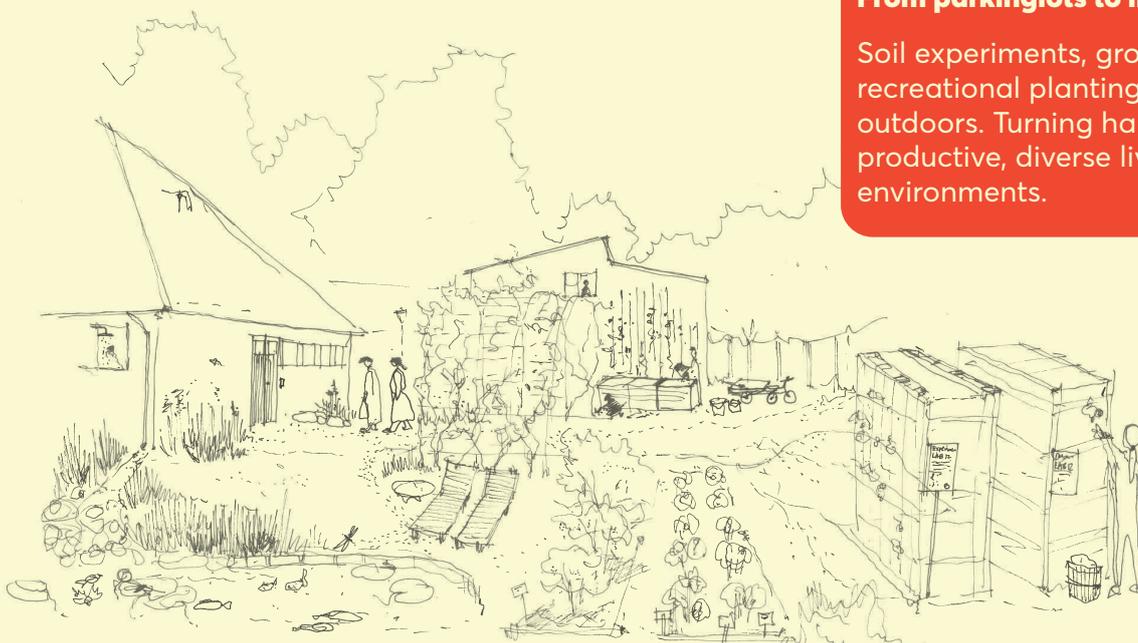
Imagine one day at campus - the Retreat

it is morning

early on, some have already been out swimming
there is something about the stillness, before the wind has woken up
to walk down the hill towards Brunnsviken when there is fog over the
water
inside Brunn, a rather quiet morning ritual is taking place
body wash is done while sitting next to taps with water, running slowly
after the thorough washing, many choose to take an energizing swim in
the pool
someone is resting at the edge of the pool
the light streams in through the beautifully arched windows
around 8 AM the tea shop next door starts to fill up with morning
guests
people finish an outdoor yoga session, they get up and walk towards
the washing area
a meditative start to the day and a first contact with the elements on
the way there
the calmness gives new energy

it is lunchtime

people are out walking along the water
the cat Batman has settled down in the open doors to Brunn and is
both inside and outside at the same time
Kevin comes out of the soundproof room where you can scream and
kick the soft walls, it has been a tough week with stress and frustration
everyone has their ways of finding balance
shout out or do whatever you want
some lie in lounge chairs and take naps
others have gathered in beanbags by the water

it is evening

it is still light but it is getting darker now
the sauna is on and friends meet in rooms clad in wood
on the other side of the bay, people have gathered by the kayaks
others have chosen to spend time alone
on a hike through the forest
on a platform reaching out into the water
disappeared into the reeds
surrounded by nature

the Gym at Kräftriket Solitude / Recovery / Tranquillity

Our proposal for Kräftriket is to use the natural surroundings and waterfront for landscape installations like viewing platforms, wooden walkways, footpaths and yoga pavilions. Natural wood, shingles and wood ships are examples of materials to use.

Community / Pulse / Motion

Spaces dedicated for occasional dancing and par- ties can easily be arranged within existing court- yards and larger indoor halls. Add easy plug-in access to loudspeakers and possibilities to control lighting, for instance hanging in bet tween build- ings.

the Retreat at Kräftriket

We propose to transform a few of the existing spaces into Retreats. One of them is a building by the waterfront that has recently been used as stor- age. It is now named Brunn, after Brunnsvik- en.

Besides being a place for well-being and relaxation, Brunn can replace the need for individual showers. Although taking a shower to wake up is convenient, visiting the Retreat is a whole different experience. While many public swimming pools focus on sport and hygiene, Brunn is a space where the morning routine becomes more of a cleansing ceremony. Brunn has more in common with tradi- tional Japanese or Turkish baths. You tend to your body and mind, not so much water is needed.

Just like the Gym, you can find the Retreat all over campus, indoors and outdoors: Small relaxing bean bags near the water. A small jungle offering relief.

the Kitchen at Kräftriket – exploring the future of campus life

Imagine one day at campus - the Gym

it is morning

> right from the start, your body is in motion
> your mood will determine how your day develops
> the gym is not one space, it is integrated into the entire campus
> choose between spaces for meditation, focus or creativity
> get to know your body

it is lunchtime

> visit a platform with an expansive view to gain a new perspective
> or find yourself in a dark room with a soundscape that changes
> according to your mood
> concentrate on one of your senses to clear your mind and focus
> climb a wall, a playful staircase, take a zipline or follow a wooden ramp
> amongst the trees
> get motivated, explore

it is evening

> the dance floors are open and illuminated disco balls lure you there
> the whole campus feels like a playful place
> Gym-Tinder will match you up with others also wanting to practice
> judo
> one place or space leads on to the next
> the entire campus is open to the world
> voices and music
> tonight, a crowd will come to join a session of learning in motion
> a club night with avatars
> the impressions, the people and the playfulness invigorate and give
> you new ideas

What if....

The campus turned in to a 24/7 living and learning environment. Instead of office hours, the campus teams with life year around, providing homes and unique learning environments. The new density of people provide for a multitude och activities and attractivity to explore and connect socially. Connection to nature based systems are strengthened and explored providing time for relaxation and rehabilitation for the campus inhabitants.

A morning yoga class takes place out on the lawn towards Brunnsviken

A new construction for a greenhouse is being built to increase the food production tests. Small alterations that incrementally build up spaces and provide for more activities

Outdoor spaces are filled with experiments. Here new food systems are tested, composting experiments that are both experimental and productive.

The storage space is turned into a communal bath and relaxing area, to nurture and take care of your body. It is a relaxing space that changes with seasons.

A group of friends planning thir work over a morning coffe

Solitude / Recovery / Tranquility

Our proposal for Kräftriket is to use the natural surroundings and waterfront for landscape installations like viewing platforms, wooden walkways, footpaths and yoga pavilions. Natural wood, shingles and wood ships are examples of materials to use.

Community / Pulse / Motion

Spaces dedicated for occasional dancing and parties can easily be arranged within existing courtyards and larger indoor halls. Add easy plug-in access to loudspeakers and possibilities to control lighting, for instance hanging in between buildings.

The greenery is appreciated by all residents and the ecosystem bounces back from the previous carcentered landscaping.

A walk down to the waterfront for a night swim in Brunnsviken.

A group of students measure the different crop production, and now carry out their live testing one evening.

In the evening the space continues to be a meeting spot. Here you always find someone to talk to. Sometimes presentations are held and the space can fill the outdoor area.

(5.) Takeaways

1. The future is already built – it is all about how we use it

Designing the future might not be about designing new buildings. In fact, we already have an abundance of spaces. Spaces at Swedish universities are used only a fraction of the day/week/year. A new way of using and sharing spaces, post-functionalist usage based on shared access and membership contracts, could increase space usage radically, thus reducing the need for new spaces, energy and resources.

2. Moving from spatial separation towards inclusion

Imagine Kräftriket as a place for living, playing, supplying and caring, as well as for learning and working. Imagine spaces being used day, night, weekends and holidays.

Imagine Kräftriket as a neighborhood or a village, connected to the world through relationships and people of all ages and backgrounds. Everyone is an occasional migrant, but no one is homeless. Meet students, researchers, workers, dwellers, visitors, strollers.

3. Living labs for sustainability

Students propose future campuses to be living labs for sustainability. Although students were not asked to design "housing", they were inspired to come up with new ideas for basic living functions like resting, staying clean, cooking, eating and socializing.

Based on the students' design a space for taking care of the body is not necessarily an individual shower room. A space for cooking is not necessarily a kitchenette in a student's apartment. Students designed shared spaces with the potential

to move aspects of everyday life from a private to a common sphere, adding to a sense of community.

A living lab for sustainability should start with shared use of the built structures at hand.

4. Adaptive and responsive

Space usage should be adaptive and responsive. This can be made possible by non-exclusive space usage, i.e. activity-based environments where different individuals and organizations can book and use shared spatial resources. All are facilitated by digital booking and scheduling.

Not only spaces, but people will become more adaptive and responsive. You might bump into someone you didn't expect to meet. You might get a quirky room when everything else was already booked, or the whole session had to be outdoors. In the end, that only added to the common experience.

5. A life-centred approach

Campus is designed to meet people's different moods and feelings. More attention is given to well-being, reflection and inner peace. Non-productive spaces, introverted spaces, get-away spaces and acting-out spaces are added to the program.

Nature is present, strengthening the bond between people and the planet, the weather and the seasons. We spend more time outdoors, and indoors we use materials and textures that remind us of nature through touch or smell.

Campus is designed to help us stay curious and playful. To help us be friendly, make friends and have fun. After all, learning through play is the best way to grow.

An important reference project for H+Forest is Living Lab

Living Lab is a testbed-concept that integrates research and experimentation in real-world environments. Living Lab emphasizes user-centred design and co-creation, involving end-users, researchers, and stakeholders in the iterative process of developing and testing solutions. This setting facilitates the observation of real-time interactions, behaviours, and impacts, thereby offering invaluable insights that drive further innovation and improvement. Living Labs bridge the gap between theoretical research and practical application, fostering a conducive environment for sustainable and user-oriented innovation.

During the H+Forest project, we collaborated with two campus-based Living Labs: HSB Living Lab and KTH Live-in-Lab. This collaboration was pivotal in gaining a comprehensive understanding of students' everyday lives through both qualitative and quantitative data. By immersing ourselves in the daily routines and experiences of students, we were able to collect detailed insights into their living patterns, energy and water usage, and waste management practices. This data was crucial for evaluating and refining the sustainable living solutions being developed

HSB Living Lab

HSB Living Lab in Göteborg is an innovative research and residential facility aimed at developing sustainable living solutions. Located at Chalmers University of Technology, this dynamic living lab serves as both a home to students and researchers and a testing ground for new technologies in housing, energy, and waste management. The building features modular apartments, flexible infrastructure, and real-time data collection to study and optimize resource efficiency. By fostering collaboration between academia, industry, and residents, HSB Living Lab seeks to advance sustainable urban development and improve quality of life. The insights gained here contribute to the broader goal of creating smarter, greener cities and influencing future housing designs and policies globally.

KTH Live-in-Lab

KTH Live-In Lab acts as a bridge between academia and industry. The centre is also a significant puzzle piece in the work towards creating the smart and sustainable buildings of the future. KTH Live-In Lab is a neutral arena for collaboration between small to medium-sized companies and large established companies, as well as research groups from different research areas. KTH Live-In Lab is also an important tool to enable the research required to answer the current multidisciplinary questions in relation to buildings and the climate.

6. Transforming vision into reality
Taking the next step

From a research perspective

Developing the future campus to encourage and enhance sustainable behavior is crucial in order to meet the challenges ahead. To do so successfully, insights from research must serve as a starting point. In this context, it is important to acknowledge that most students and faculty, as people in general, have the intention to act sustainably but face obstacles when turning ambition into action. Here, design informed by what people actually do, rather what we want them to do, can help provide truly sustainable solutions.

Sustainable design choices can also work as a backdrop for students to focus on learning, creating and retreating. If sustainable design is default, and not something to be achieved by an individuals' active choice, the future campus can provide students and faculty a space where focus is limited to the here and now, but can allow for future imaginaries and development since the sustainaable campus is both here and in the-making.

From a spatial facilitator perspective

A holistic mission - To create a sustainable and adaptable environment, we need to recognize that our piece of the puzzle is always a part of a larger, interconnected ecosystem where cultural, social, economic, and environmental factors all play a role. By embracing a holistic mission that consider the long-term impact of our decisions, we can steer towards a desired future we wish to experience.

With a human centred co-creative process - To create an environment that is also adaptable to both current and future needs, it's essential to involve the people who will live and work in these spaces. By setting up a process where you can co-create possible future scenarios together, we can design environments that not only address the needs of today, but hopefully, also will be resilient enough to adapt to the changes of tomorrow

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Swedish
Energy Agency