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DEVELOPMENT TASK FOR CREATING SIGNS, LABELS, AND WAYFINDING STRATEGIES FOR SPACE 21 AT AALTO UNIVERSITY

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ABSTRACT

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The thesis documents the author's 24-month role as Space 21 coordinator, focusing on researching and creating signs, labels, and wayfinding strategies for the versatile, multidisciplinary sandbox within Aalto University. Space 21 serves as a collaborative space for staff, students, and researchers to undertake projects, experiment with exhibition setups, and host a diverse range of events. The thesis objective is to gain a nuanced understanding of the varied signage needs for coordinators, workshop masters, and office managers in different spaces, consolidating these insights within the confluence of workshops, studios, offices, and shared areas that define Space 21.

Inspired by visits within Aalto University and global maker spaces, the author navigates the intricacies of sign creation, organizing the narrative into thematic chapters in crafting specific signs. Additional insights are drawn from books, journal articles, and online design communities, enriching the exploration of the field of signage. The active fabrication of signs for Space 21 aims to aid users' navigation and guide the appropriate use of spaces, tools and equipment while also fostering a burgeoning community.

The thesis concludes with concise, personal guidelines for effective sign making, encapsulating considerations before, during, and after the design process. These guidelines contribute to practical insights to the discourse on signage in dynamic multidisciplinary environments.

Keywords: signs, signage, wayfinding, work safety, labelling, workshop culture, community development

CONTENTS

1 INTRODUCTION TO SIGNS

The following diary-type thesis follows my experience researching and making signs for Space 21. The goal is to better understand the need for various types of signs that space makers could use when evaluating or creating signs and other signage for their workshops, studios, creative spaces, offices, kitchens, and shared spaces. Space 21, where I've been working as coordinator for the last 24 months, is essentially a conglomeration of all those things.

Signs and other visual cues play a significant role in modern human culture and has existed in one way or another since the upper Palaeolithic period (the Ice age): M. Aubert et al. (2014): "two figurative animal depictions from seven cave sites in the Maros karsts of Sulawesi, we show that rock art traditions on this Indonesian island are at least compatible in age with the oldest European art. [...] Among the implications, it can now be demonstrated that humans were producing rock art by ~40 Kyr ago at opposite ends of the Pleistocene Eurasian world." Possibly the oldest cave art discovered is of a person's hand, the original "I was here" stamp that has survived for millennia. We've come a long way in terms of methods, tools, and our ability to create and interpret signs, but perhaps we changed that much, compared to our ancestors.
In terms of workshops and creative spaces, signs communicate information about a space, the people in it and their values and operating and safety requirements. Signs, as opposed to manuals or onboarding documents are useful for providing information briefly. Signage – the realm of all kinds of signs, can also be used to guide students and staff to find and use facilities or equipment, or provide information about processes and correct usage of tools. They can also help a space and its users to operate independently without 'permission' from some authoritative role - thus freeing up a workshop master or coordinator (such as myself) from answering simple questions repeatedly.

The goal of this thesis is to offer guidance and tips to anyone that is building a similar space. It's also for my own self-development and to make sure that I stay sharp about the role of signs in general. Why am I so fascinated by signs? Personally, I love creative spaces like workshops or studios because you can feel the creativity that has already happened within, and the potential for endless new creations. Tools and materials inspire me and can help build physical solutions to real-world problems - all one needs to do is unleash our inner creativity. It helps to have a few skills, or at the very least, be willing to learn and ask questions. Nevertheless, walking into new workshop

or new types of spaces in general can be intimidating – I often observed in myself and in other people feelings of being lost, ignorant, shy, or unsure of the spaces, tools or working culture, and felt all sorts of negative and inhibiting emotions. These feelings can even be traumatic, with a negative impact on quality perception Bonfanti (2011. 312). To overcome these kinds of obstacles there is help: physical and online guides, teachers, workshop masters or technicians other support staff can show you what is what, where to find it and how to use it, as can your peers. When no one is around, or if everyone is too busy, then what do you do? Also, the 'friendliness' of staff during these first contacts was often important for me to decide if I would work in the space and may vary depending on good or bad timing. In the past I worked at Aalto Fablab, a digital fabrication studio that was quite popular with design and engineering students. Often, we were short staffed. It was a struggle to help everyone in a timely manner and sometimes they would have to leave before getting help. Whenever I had more time, I would go around with a label maker and try to print onto the border of a computer screen or table - the essential procedures to using a 3d printer, laser cutter, or other machine. This wasn't to avoid providing proper instructions, but to assist those that were already somewhat familiar with the steps but hadn't committed them to memory and could use some helpful reminders. I also made them for myself, so that I would work more effectively. Printed and online user guides were made and shared, so that while waiting, one could study or even follow the steps independently. I never had time to execute all my ideas and so I wanted to dive deeper into the topic with this thesis.

My goal is to suggest the best possible signs for Space 21, based on inspiration from literature reviews and though investigations into what other departments and workshops in Aalto University and other places - especially maker- and hackerspaces, have done, and are currently doing. Ideally, to copy the best ideas while balancing the approaches to Space 21's own branding and communication strategy. In short, the goal is to copy the good practices, make signs, test, and develop them, and to integrate the process as part of my regular duties as coordinator of space 21.

2 DESCRIPTION OF THE CURRENT STATE

In this section the current state of Space 21 is described. Firstly, about the inspiration and concept of Space 21. The second part details various stakeholders and their interests. The third and fourth parts describe my own interests and work experience followed by my role as coordinator.

2.1 Inspiration for Space 21

The concept for Space 21 was based on Building 20 at the Massachusetts Institute of Technology The building was considered less important to the university and thus was used as a 'temporary' space for research groups where modifications to the building were allowed without requiring normal permissions. It was used by students and staff as an incubator until 1998 and had many notable success stories including being the home of the linguistics department where Noam Chomsky worked, and MIT radiation laboratory. It also housed the Research Laboratory of Electronics (RLE) but also had the piano repairs workshop, a model train club – the largest in the country at the time, prosthesis research for the blind, and much more (*MIT's Building 20: "the Magical Incubator,"* n.d.).

A similar concept was pioneered in Stanford university called d.school. A collaborative workspace for projects, workshops, and classes. The goal of d.school was to teach design thinking and other toolkits to students. As there was no budget for their own formal space for the first years, they had to move from one derelict building to another. This brought about many insights into using and making spaces for creative projects, workshops, and classes in affordable and modular ways. In many ways, Space 21 shares more with d.school based on size and the timeframe of the facility (limited funding period) and the goal of having a horizontal power structure within the space. Both facilities had the concept of modifying spaces depending on the needs of the occupants, or more importantly, allowing and encouraging them to modify the spaces as needed. The book Make Space: How to Set the Stage for Creative Collaboration (Doorley & Witthoft, 2012), details things they have learned in d.school over the years was the main source of inspiration for this thesis, as was the booklet Rainbows, Unicorns and Hoverboards – Making of OASIS – Story of a dream at the University of Tampere (Annakaisa Kultima, 2014), which details the creations of a coworking space through design-driven research. OASIS resonates with what I'd like to do at Space 21 as

one of the stated outcomes is: “The space has been enriched with innovative fixtures and furniture together with technological solutions. The space is intended to have a different feel and to promote a positive working culture.” (Annakaisa Kultima, 2014) I’ve also been inspired by workshops and maker spaces that I’ve visited in the past, even before the starting of this thesis and often I’m looking at how they solve basic practical problems, what are their best practices and how they communicate with their users – especially new ones.

2.2 Interest of Aalto University as a stakeholder

After the summer of 2021 the decision to create Space 21 was made on an administrative level as a part of the universities cross-cutting theme of Radical Creativity. Most of the concrete planning started in November – December with meetings with stakeholders and team members. The branding and the concept were developed before I began my work in January of 2022. In partnership with Aalto Campus Real Estate Management or ACRE, an unoccupied part of an underused and empty building wing was set aside for students, staff, and faculty to have a freely available creative space to further the goals of Radical Creativity and supporting novel and cross-cutting ideas.

2.3 Positionality statement

I was born in Finland but have studied abroad and in international schools in Finland. I studied humanities in college and have a bachelor’s degree in environmental engineering. On top of all that I tend to lean towards the arts as far as current studies go and have had interest in technology and design for my entire adulthood. I try to be aware of my biases and see things from multiple perspectives but politically I’m leftist. I try to be able to change my mind when presented with new information and thus stay open minded about things.

I have professional experience as an entrepreneur for six years and have previously worked as a research assistant in environmental sciences for the Finnish Environment Institute and as an assistant for a research group in the department of psychology in Helsinki University. I’ve also worked in construction, gardening, restaurant and tourism and traditional and especially digital fabrication spaces, mostly in Aalto Fablab. I’ve also freelanced as an engineer, designer, photographer, web designer and like doing odd jobs. I have given speeches, presentations, held

classes and had my works exhibited in design and science museums and other international exhibitions. I identify myself as a maker and designer. I have experience setting up multiple workshops and collaborating with artists and engineers in the past. Personally, I'm intrigued by the idea that right kind of environment can inspire creativity. As part of that, good signs can facilitate movement and usage in a space and make it feel accessible, welcoming and break down barriers that might hinder expression. Sustainability is also at the core of all my actions.

2.4 My role running Space 21

I am the coordinator of Space 21. There are many team members that are involved with the project, but generally those actors have minor roles in terms of the operations at Space 21. I oversee pretty much everything on site. My main approach as a coordinator, or previously as a 'workshop master', is to make sure everyone is safe, and that the environment is clean and organized. A key part of the role as coordinator is also to introduce the space to potential new users and guests, make purchases for tools, equipment, and supplies, manage maintenance requests, manage access and bookings via various IT-systems, as well as helping foster Radical Creativity within the university. After all this I try to help students and staff, within reason, any way that I can, so that they succeed with their projects, workshops, events, or experiments. Helping can also be the most rewarding part of the process because it's a great time to learn something new and challenge my existing skills, as well as helping meet the general objectives of Space 21. Because I found myself overworked, very often I found that setting up, building, and modifying Space 21 to suit the needs of users was the most creative time for me where I get to express myself. I also hoped that my interventions would reduce future work, for instance, by organizing and labelling drawers in the workshop.

2.5 My job description

The job application had this to say about the position of Space 21 coordinator:

"The coordinator coordinates the operational activities and user services of the Space 21 project in its workspaces. The person to be hired creates rules for the space usage in collaboration with the project group. S/he manages smooth and safe usage of the spaces, the different spaces for different needs. S/he organizes space reservations, storage, equipment, and furniture needs and timeframe and tracking of the space usage. The task of the person to be hired is to support the

goals of Space 21 and Radical Creativity with her/his own skills. The person is responsible for high-quality user service work for Aalto's students, faculty and staff also called the Aalto Community. The person to be hired will work to achieve the goals of this space concept across Aalto.

Some people referred to my position as 'mood manager' and I find that description to be quite apt. I try to set the mood by making sure that all the basic requirements and systems are in place and working so that students and staff can go about their work with positive feelings. I try to have the users of Space 21 participate in basic upkeep so that the spaces are always nice for everyone – but this is easier said than done. Often it relies on the more long-term tenants (student collectives and research groups). One of my key responsibilities is to keep everything safe, organized, and tidy first; after which I do what I can to make the spaces more aesthetically pleasing, efficient and automated, again inviting Space 21 users to pitch in and have a sense of ownership to the space. If I still have time after working on whatever future projects are coming up, I do my best to assist projects. For instance, by networking with workshops and departments so that I can get more material for upcycling during the first months, but later the focus was on helping modify spaces for the needs of projects, shuffling projects around so that everyone can have space to work in, and supporting student driven activities like workshops or events that promote networking, sustainability, creativity, arts, and social events. The latter also worked well as a marketing channel to introducing future users to Space 21. From a professional perspective I like the idea of creating and fostering communities that centre around design, art and physical prototypes or knowledge sharing through workshops, classes, and other forms of education.

2.6 Defining and setting up Space 21

Space 21 is a is a special project for Radical Creativity in Aalto. The space initially has funding from August 2021 – 2024. The yearly budget is around 10 000€ for tools, material, and events. Facility management, rent and salaries are separate costs. Radical creativity is best defined by my boss the Head of Radical Creativity, and the Head of IT Solutions for Research:

"We are all creative, and we use our innate creativity in new situations. By Radical Creativity, we at Aalto University mean a new creative activity that boldly pushes for fundamental change. Radical Creativity also emphasizes the flexibility to act in a variety of ways and to adapt our actions accordingly to achieve goals. The culture of radical creativity allows and supports creative

questioning and "not-knowing", and celebrates learning from exploration, experimentation, and failure. Creative approaches at Aalto provide diverse perspectives and skills to tackle topical challenges in a radically new way" (Mäkikoskela and Juvonen 2022).

The core ideal of Space 21 is meant to facilitate Radical Creativity within the university, across all departments to serve students, faculty, and staff. The idea was to utilize buildings that had lain dormant for several years and were targeted for demolition and new constructions. Municipal planning takes its time, so in the meantime the idea was to give students a low threshold place to work on their artistic, scientific, or business projects. There was also a lack of available space for projects and works that were longer than a standard academic period, or not necessarily a part of formal studies and unpacking or disassembling projects isn't always possible. A hope for Space 21 was also that it would help to create a multidisciplinary environment that could help to connect students and researchers across the campus. Because the building is destined for destruction, we are allowed much more freedom compared to the newer buildings on campus such as Väre - the main building for the School of Arts, which doesn't allow excessive modification - a massive obstacle in the eyes of many students. Radical Creativity and Space 21 has funding until August 2024 which coincides with the initial demolition time of the current location. Ideally, with new funding the concept, furniture and equipment would move to a new location. Space 21 is more the concept than a place.

2.7 Describing the chosen topic and relevant theoretical background

The topic of the thesis is to investigate and synthesize signage, labelling and wayfinding for Space 21. According to Bonfanti (2011. 313): "signage may be informative, directional, identifying and/or for security", it can therefore ensure that people can navigate to and within the space as much as possible on their own, and within the rules and regulations of the public spaces, such as the university, see Figure 1 below for a list of advantages of signs to both users and service organizations. While Bonfanti's research is based on commercial service providers such as grocery stores, I found that the same research applies can be applicable Space 21, especially considering that the first encounters may be crucial for the perception and reception of the 'facility' to users.

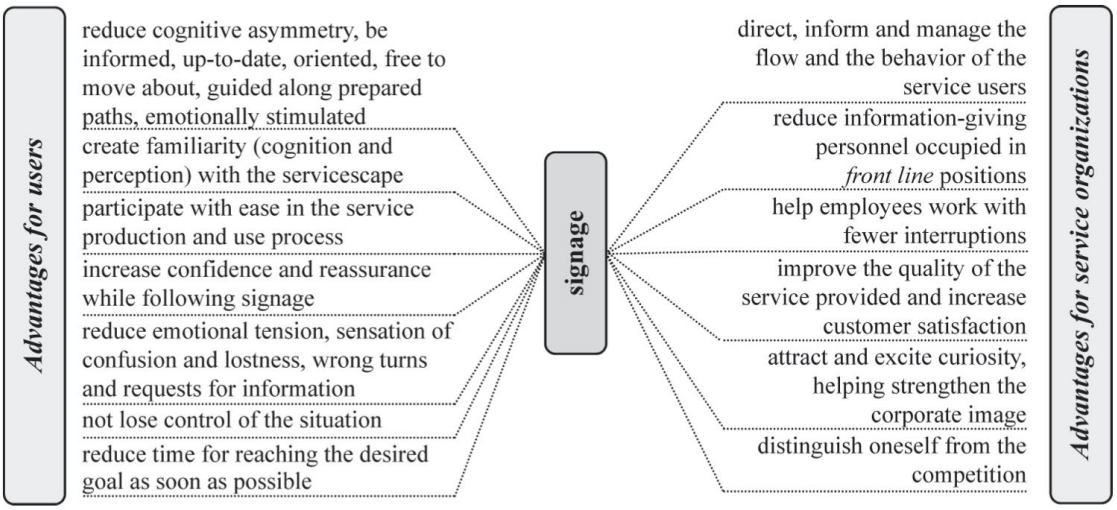


FIGURE 1: Advantages of Signs (Bonfanti, 2013)

Signs can also help to fulfil unexpected needs whereby "signs aim at stimulating or reawakening latent needs that originate deep inside every person and that, once satisfied, generate a basic satisfaction and a greater possibility of loyalty towards a business" (Bonfanti, 2011. 316). Signs that make users feel welcome, reveal value of a place, or induce exploration to pass time (while waiting) also help to establish a specific kind of atmosphere.

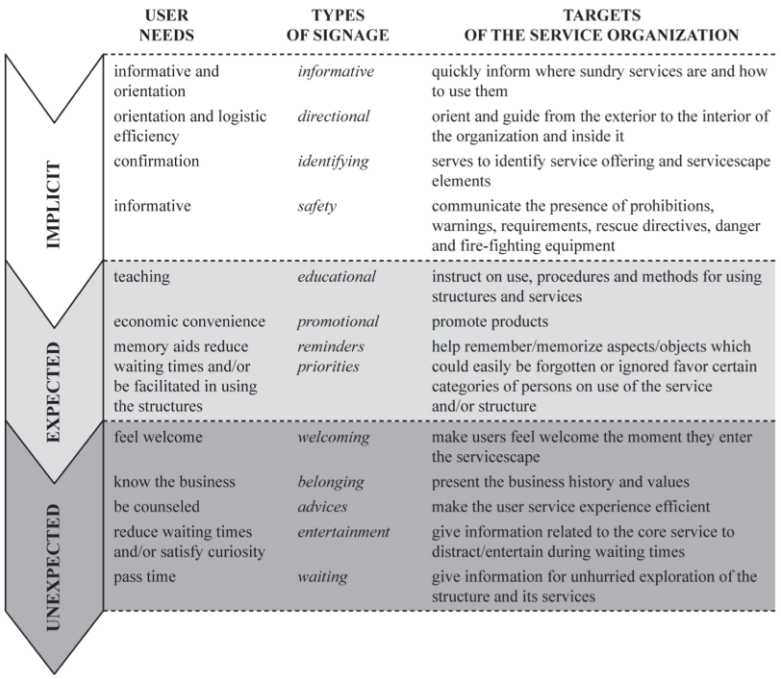
The theoretical framework incorporates iterative design principals, signage management quality or SMQ (Bonfanti 2013) and well as Human-Centred Design (HCD) approach (Giacomin, 2015). Sign management quality is a conceptual framework that proposes ways to implement signage from the service quality perspective or how signs, as opposed to signage in terms of design alone. HCD is an iterative approach that aims to make systems usable and useful by focusing on need and requirements of users in a way that considers human factors such as ergonomics to enhance effectiveness, efficient, well-being, satisfaction, accessibility, and sustainability (ISO, 2019). HCD is primarily focused on interactive digital systems, but I found that the same principals and methodology is useful for ideating and iterating on signs. Additional information is gathered based on literature on workshop and coworking space development, and through informal discussions with staff members from various workshops and makerspaces, observations on user behaviour at Space 21. A diary format is used to describe the work that has been undertaken but instead of listing work on a week-by-week description, the broad subject matter is described in a topic-based format.

3 PURPOSE AND OBJECTIVES

This chapter deals with the purpose of the thesis and my learning objectives and expected outcomes throughout the process of making signs for Space 21. The timespan is from January 2022 to January 2024. It also describes the reporting plan and development ideas that were made during the onset of the writing process.

3.1 Purpose of the thesis

The goal of this thesis is to better understand the needs of the various types of signs that space coordinators could utilize when evaluating or creating signs and other signage for their workshops, studios, creative spaces, offices, kitchens, and shared spaces. Qualities of signs can be implicit, expected, or unexpected, see Figure 2.



	USER NEEDS	TYPES OF SIGNAGE	TARGETS OF THE SERVICE ORGANIZATION
IMPLICIT	informative and orientation	*informative*	quickly inform where sundry services are and how to use them
	orientation and logistic efficiency	*directional*	orient and guide from the exterior to the interior of the organization and inside it
	confirmation	*identifying*	serves to identify service offering and servicescape elements
	informative	*safety*	communicate the presence of prohibitions, warnings, requirements, rescue directives, danger and fire-fighting equipment
EXPECTED	teaching	*educational*	instruct on use, procedures and methods for using structures and services
	economic convenience	*promotional*	promote products
	memory aids reduce waiting times and/or be facilitated in using the structures	*reminders priorities*	help remember/memorize aspects/objects which could easily be forgotten or ignored favor certain categories of persons on use of the service and/or structure
UNEXPECTED	feel welcome	*welcoming*	make users feel welcome the moment they enter the servicescape
	know the business	*belonging*	present the business history and values
	be counseled	*advices*	make the user service experience efficient
	reduce waiting times and/or satisfy curiosity	*entertainment*	give information related to the core service to distract/entertain during waiting times
	pass time	*waiting*	give information for unhurried exploration of the structure and its services

FIGURE 2: User needs, types of signage, targets of the service organization (Bonfanti, 2013)

These categories will be explored in the following chapters. Implicit signs are informative and convey rule and safety requirements (chapter 4.2), wayfinding (chapter 4.7) and important information (Chapter 4.9. Expected signs are more educational in nature and include things like

labelling for kitchen organization (Chapter 4.6.5) and visuals in the info pylon (Chapter 4.7.10). Unexpected signs can be things such as project posters and murals made by students (see Chapter 4.4.2).

3.2 Objectives

The objective is to make signs that are useful for new and existing users to navigate and interact throughout Space 21, so that they can have a seamless and welcoming onboarding experience. Through signs, they can learn to work in ways that I appreciate and that reduce repetitive or uninteresting tasks for me as coordinator – a simple example of this is to emphasise the requirement for a clean kitchen and workshop, so that I don't have to clean up other peoples' messes or spend too much time asking them to do so. Discussions and site visits and happened throughout the writing process, see more detail in Chapter 4.1. In March 2022, several months after I started working, I gathered a list of ideas for possible, see figure 3. These are items (signs to be made) that I expected, based on past experiences or from examples in other workshops that I'd worked in that were useful. Some signs were based on having to answer the same questions repeatedly or observing confusion from visitors or people with active projects in Space 21. The figure is a snapshot of my thoughts and actions at the time and not the product of a thorough investigation.

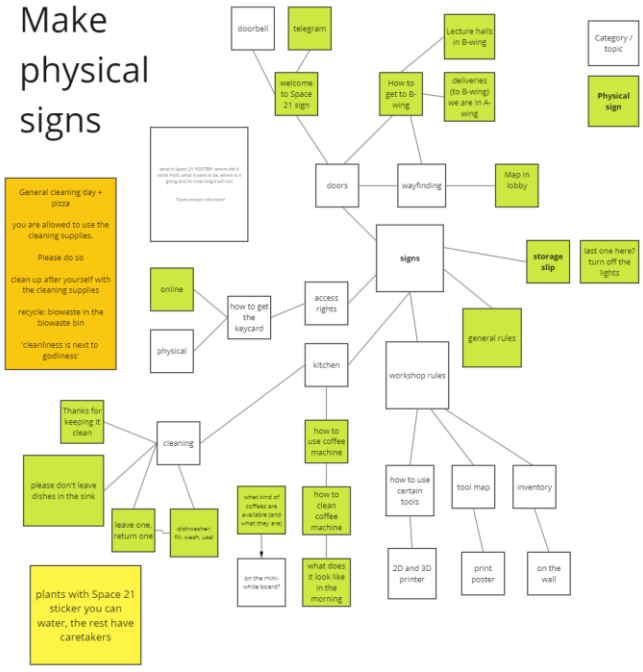


FIGURE 3: Development ideas for physical signs, posters, infographics for Space 21 areas. Made in March 2022.

3.3 Development task

The development task is case study that focuses on implementing signage for Space 21. Through unstructured discussions and site visits, signage is benchmarked with various workshops and makerspaces inside and outside Aalto University. I also made my own observations based on how tenants and visitors interacted with Space 21 during sign making processes and iterated on the signs based on HCD**.** A literary review was also used too grain insight and understanding of existing theory and for understanding standards in safety as well as finding more examples of good or bad signs. Interviews were site visits and simultaneous open discussions about signage in the interviewee's workshops or spaces, together, we explored the following questions:

- What makes a good sign?
- What signs are needed to make a workshop (and therefore Space 21) run smoothly?
- What are the different categories of signs and how are they used?
- Is there a framework or set of rules or considerations that can be used when designing signage?
- How do the signs make a space feel (welcoming, serious, strict, open, or no feeling at all)?
- Are students able to or interested in participating in the process of developing signage for spaces?
- Other relevant topics that arise.

3.4 Structure of the diary and reporting plan

The structure of the diary is topic based, as the whole process of sign making took multiple iterations, or I left time for testing and vetting the signs while I worked on other tasks. In the chapters I mention site visits, qualitative interviews, literary research, and interventions to existing signs and the making new signs. Some time is taken to describe key findings which describe tools and my rules that I established for making signage as I synthesize new knowledge.

Figure 4 below shows the timeline of what kinds of activities I undertook in relation to signage in Space 21. In-between I worked on my other roles as coordinator, and often small tasks may stretch out over multiple months, though this also allowed for time to observe user interactions with any interventions that I was observing at the time. During the site visits I took lots of photographs and observation notes, which can be seen in Chapter 4.1 The topics are presented in a topics-based

format, as development was very non-linear. Interviews were conducted monthly at various workshops. The green sections signify digital phases of sign making and related processes, while yellow sections signify specific tasks that involved physical activities like setting up spaces, for instance preparing the second floor of Space 21 when it expanded in 2023. These sections also involved printing signs for the physical spaces in conjunction with online content such as the reservation system and online wayfinding.

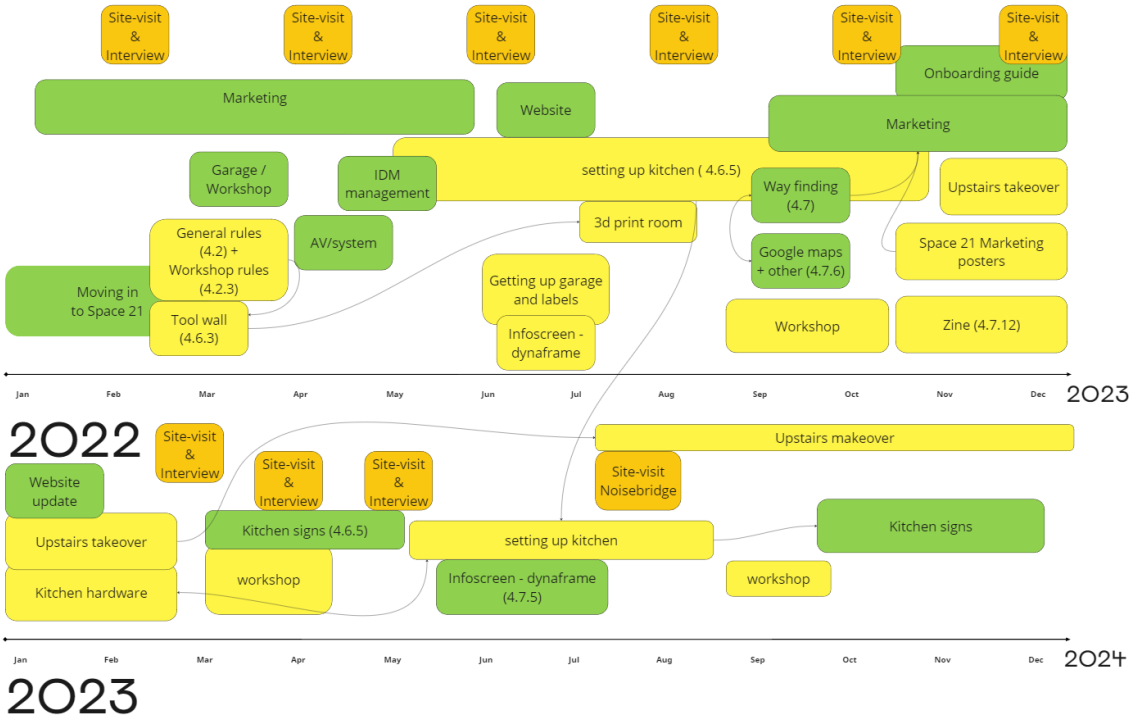


FIGURE 4. Framework for the development task that I've gone through in terms of signage, design, wayfinding, marketing, and onboarding.

4 BENCHMARKING AND MAKING SIGNS FOR SPACE 21

The individual points of interest are presented in the chapters below, but in general my research process was loosely based on Human Centred Design for interactive systems ISO 9241-210: (1) I'd assess the need for a sign through user experience or feedback or become (slightly) bothered by constant repetition of the same task or message, (2) create a temporary sign prototype, (3) see if the sign helped reduce repetition or perhaps undesirable outcomes, then (4) iterate on the sign if necessary, and then ultimately formalise the sign with a laminated printout, for instance. In the following chapters I detail my experiences researching various aspects of the space and determining where signage was needed. These include the following subjects:

- Developing general rules
- Developing workshop rules
- Understanding safety regulations
- Personal Protective Equipment (PPE)
- Safety signs and Accessibility in signage
- Using colour for branding
- Cues
- Wayfinding – Putting Space 21 on the map
- Space 21 'internal' map and reservation system
- Internal/External wayfinding
- Digital signage with Dynaframe
- Organization and labelling
    - Project posters
    - Storage
- Kitchen signs
    - Kitchen rules
    - Coffee machine guide
- Community board
- Signs made by students

4.1 Benchmarking various workshops, makerspaces, and hackerspaces

The benchmarking was conducted by combining in house visits to several workshops and maker and hacker spaces in other countries. The benchmarking theory is simply built upon performance comparison, gap identification and changes in the management process (Kozak, 2004). Benchmarking can help organizations in various ways, in terms of my research goals I identified this key points to keep in mind during the process:

- Motivates employees to reach new standards
- Allows organizations to realize what level(s) of performance is possible by looking at others
- Documents reasons as to why these differences exist ●
- Is a cost-effective and time-efficient way of establishing a pool of innovative ideas from

Site visits and discussions were had with Workshop or Studio masters. The topics included operational elements of the workshop as well as customs, traditions, and their best practices in relation to visual communication and signs. I didn't record or transcribe the visits but took lots of photos and notes after each meeting. Below are some of my summarized notes from the places I visited. Workshops were essentially benchmarked against each other, but the main purpose was to establish what my own level of performance should be at a minimum as coordinator and then exceed them by following the best examples from each location. main takeaways are then mentioned in the chapters dealing with the various topics I found to be relevant for Space 21. In order of interview:

Water jet cutter, Metal workshop & Paint workshop

The workshop used Adobe InDesign to develop safety signs for each machine and offered a template that other workshops can use to make the labelling consistent, these also included the safety standards, though I pointed out that the labels were still from the previous ISO.

Glass blowing workshop

Used existing signs from the previous workshop master, was happy with the glossaries in both English and Finnish (see Figure 11). Because parts of the glass sanding process required water, it damaged the safety warning printed on regular paper. I noted that the sheets should be laminated or otherwise protected.

Costume design workshop

Great examples in every regard. The workshop contained examples of original works as references, label maker sticker signs, and handwritten signs which were laminated and mostly all fitting together stylistically. Every clear box was labelled and there were entire folders of material libraries, dyeing libraries, and recipes and more. This workshop set the bar for what I expected to do at Space 21.

Biochemistry lab Biofilia

More of a chemistry lab. Icons used with text on cupboards seems to be handy when names of chemistry apparatus are new to users. Also, visual cues are easier to follow. The workshop master also had a name tag on her lab coat uniform. The lab manager also had a nice library of books that could be borrowed, and loans would be marked in a 'big black book' or logbook, I like this idea.

ADDLAB 3D printing research lab

This lab was perfect in many ways. Manuals, guides, and references were clearly labelled and in good locations. The vinyl cut works were phenomenal and clearly took lots of planning and time to implement.

Construction/Architecture wood, metal, and painting workshops

The atmosphere in architecture/construction workshop was maybe the nicest of all. The spaces were clean and well taken care of, but still felt like there was lots of freedom to do things inside. I think for me it was a mix of nostalgia and my love of carpentry (smells and tools, etc) and then the age of the workshop, some of the signs and even tools were almost recognisable from my uncles' workshop, the history embedded within was something that resonated with me.

The workshop master I spoke also did a lot to communicate with students with handwritten signs and the double-langue labels on machines and tools was also a nice touch. They had potted plants which also the students cared for from time to time, but the emphasis on making the space a bit homier was nice.

Aalto Fablab

I could write a book on the Fablab and organization, as I also had some hand in it from previous work. Labelled instructions on tables and computer screens helped students find essential software applications or sequences of actions to activate the digital fabrication machines. The 'garden' was

also set up by me, and generally the plants survive based on community concern for the often-thirsty plants. Current organization wasn't too good, shadows were missing from tool walls and the size of the space would almost warrant a map somewhere as there are rooms in strange corners. The space was also quite cluttered as there was a lack of empty desk space for people to work in. It was also difficult to tell the difference with a completed project and something that was still in the works. Signage for machines was great, they were labelled and even had QR codes to links that would provide additional information or links to videos on the usage of the machine in question.

Omnia Makerspace

The Makerspace was located near Aalto Fable but run by Omnia vocational school of Espoo. It was a refreshing makerspace as it's very minimalistic and neat compared to the clutter and 'hackerspace Ness' of Aalto Fablab. Previous projects were mounted to the walls or had specific surfaces instead of being scattered all over the place. Instructions were all found online and connected to the reservation system. Some information posted near or next to the machines, physical manuals were also in visible places. Other signage was minimal.

I've visited throughout the years from 2016 to present day, lots of maker and hacker spaces to give some context to my interest in the field, though often the scope of my investigations is much greater than signs as I'm also interested in the way the community/business works, tools and other aspects. : Fablab's (EACC and Valdaura in Barcelona, RUK in Roskilde, POC21 in Millemont, Oulu University Fablab, Le 104 in Paris, Fable Lisbon also had a biolab. POC21 (temporary Innovation camp in Millemont, France), Arabia Media Factory (school of Arts), libraries in Uusimaa Region, Aalto Studios, Oulu University Fablab and Public Fablab in Oulu. I also visited Pyöräpaja in Helsinki and in 2023 toured several labs in Hamburg, Germany including Fab City Hamburg, Hall of CRCLRTY open (fashion) lab and in Berlin: Rollerwerk, Chaos Computer Club (CCC Berlin), Haus of Materials (Berlin), C-base Hackerspace (Berlin), Noise Bridge Hackerspace (San Francisco).

As for the Aalto workshops, the general perception was that each workshop essentially had their own signage systems and styles. There are workshops that have a minimalist approach to signs with random styles and materials used, and others are almost meticulous in terms of signage and organization with custom signs for each tool or section of the workshop. As for the workshops in Aalto, there was no consistent time during the year where signs were looked at on their own and this seemed to account for a large variation in material and design language used for signage.

Generally, before the start of the academic year in Aalto University there is some time for 'resetting' a workshop and doing summer/autumn cleaning, though in general signs were not a particular focus of the clean-up. Removing old event posters was perhaps the main activity.

4.2 Developing General rules

One of the first things to do was to create a set of rules for Space 21. General rules are to establish the basic expectations and responsibilities of users in the space. Much of the university was in lock down during the Covid epidemic, which was just starting to die down around the time Space 21 was being opened. During the pandemic the university created a standardized Info, Rules, and Contact poster withing the ARTS department, see figure 5. The poster informs people about the basics of the space, who's in charge and reservations, where to get more information and what are the most important features and rules to follow. Note: these are no longer in use as of the Autumn Semester 2022, but some workshop masters have left them up because it contained all relevant information in one place. This didn't really exist before the epidemic as students were introduced to the workshop 'in person' during the start of their course work, which also made accessing the labs tricky. I used the poster as a template for my own poster on rules. This poster was finally updated at the end of 2023 for all workshops within the school of Arts, revealing that the time to make new signage was between two and three years.

FIGURE 3: Standardized workshop information poster for the Glass Workshop.

4.2.1 Version 1 of Space 21 Rules Poster

Space 21 isn't a workshop. My boss reiterated the fact many times during the first months of my work, as I tend to think of the space as a Fablab/Makerspace clone. The university has many excellent facilities that we couldn't compete with, considering our small annual budget and lack of staff. The idea is for everyone working on physical prototypes, artworks, or props to make them in the official workshops, and maybe do some assembly or light modifications within Space 21. To this effect I made two sets of rules- one for the space itself, see figure 6, and another for working in the 'garage' style workshop, see figure 7. Another consideration is that it's an all-purpose environment, and not focused on any one faculty and invites Aalto staff and researchers to use the facility as well. As such, the emphasis on the first set of rules was on establishing the 'vibe/mood' of the space.

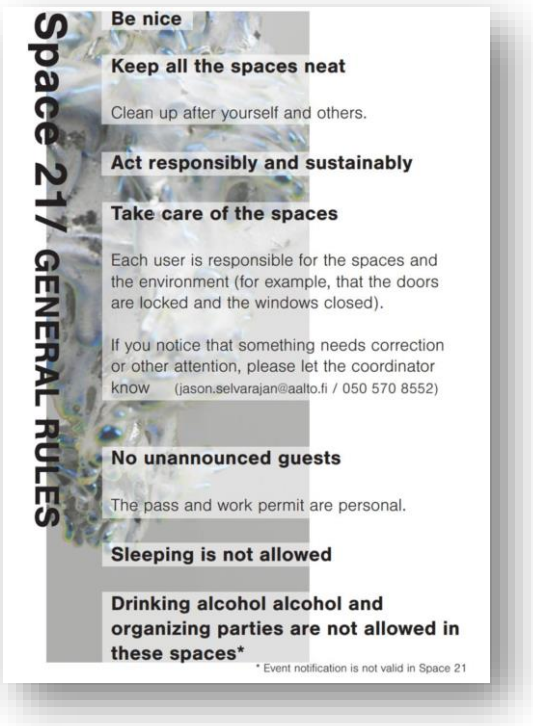


FIGURE 4: General rules as of April 2022.

In February, an update was made to the Rules Poster:

Be nice – this kind of goes without saying but tries to convey a mood or attitude.

Keep all the spaces neat and take care of the spaces are similar in nature but meant to emphasize a user's responsibility to take care of the spaces as a collective.

Act Responsibly and Sustainably – this also goes without saying and is part of Aalto's Sustainable Development Goals which are connected to each course. It's a reminder to use the recycling bins.

No unannounced guests – access is 24/7 but restricted to authorized people for the most part. The wording or explanation for this could be improved.

Sleeping is not allowed. The wording is a bit harsh and technically. I do verbally say that naps are ok, especially on some of our comfortable couches. The idea is that crashing at the space isn't appropriate.

Drinking alcohol and organizing parties is not allowed, this is because of the universities regulations and guidelines and so isn't subject to discussion. Because the space can otherwise be seen as a cosy and easy-going space it's good to emphasize that it's still first and foremost a working environment and should be treated as such.

4.2.2 Revision II – July update

Another revision was made several months later to fine tune the rules. This revision changed the emphasis or phrasing of the rules based on user feedback and questions that tenants had after starting at Space 21, usually questions were made during the first days of onboarding. Some changes are also based on new equipment, such as the fume hood in the kitchen, and I wanted to emphasise the significance of it, see the changes below:

Space 21 is a radical environment withing Aalto. Help us keep the 24-7 status and exceptional freedom by following the spirit of the guidelines.

- When in doubt ask Jason or staff
- Please clean up after yourself – help is always appreciated.
- Your project and space are part of the tour, so remember to represent yourself
- Place a project poster on the door with project description, a visual and contact information
- Label all your stuff and clear out the fridge regularly
- Use the ventilation fan when cooking!
- Napping is OK, but you can't sleep here
- Consider the spaces like classrooms - no alcohol or parties
- Experiments, events, workshops, rehearsals, and research are always welcome

4.2.3 Workshop Rules

Workshop rules were made separately for the ‘house rules’ because of varying safety and organization requirements. Rules were synthesized based on other workshops in Aalto but geared towards our own machines. Figure 5 above contains rules for a glass workshop which has little in common with our garage-level workshop consisting of tools that you can pick up with one hand. Besides the previously mentioned covid poster, other workshops had their own rules. Below is an example of the first version of the Workshop Rules, see figure 7. The background image was part of an animation used throughout the campus to advertise Space 21, so it’s use forms consistent branding. The Space/satellite theme was chosen to depict technology and engineering to connect to workshop environments but also caused some confusion with engineering students that interpret the name Space 21 to imply and incubator of sorts for space technology as opposed to a space meaning a place for working.

FIGURE 5. Space 21 Working rules poster.

4.2.4 Revision II – March update

Like the House Rules, the Working Rules were also modified to make the rules clearer, and specific while also offering some explanations. It also adds more rules about storing and using materials. There was initially no idea what kinds of work or processes would go on at Space 21, after the first half dozen projects had started, it became more clear what sorts of activities took place, and as I purchased more tools more options became possible, including perceived risks to myself.

- Always wear appropriate Personal Protective Equipment (PPE)
- Always have someone to back you up when climbing, lifting, or cutting things – no working alone!
- Jason should know before you use power tools for the first times. Respect the machines and check their condition before use. Insert batteries only when you are ready to work!
- Make sure your workspace is clear of obstacles when working, and clean-up after yourself
- All material should be labelled - otherwise it's free use. Let Jason know if you want to use, donate, or leave things.
- Let Jason know when something is running low, runs out or is broken!
- Recycling is your responsibility. There is a recycling area here: [insert map with locations]
- No spray painting or excessive dust indoors
- No smoke or fire work indoors – very sensitive particle alarms!
- No dangerous chemicals – Safety Data Sheet required on-site even when not hazardous

4.3 Understanding Safety regulations and accessibility needs

A part of my job is to make sure that the working environment is safe and so I would periodically research or get to know more about safety and accessibility in relation to workshops. When I started my work, I had many discussions with the heads of safety and security in Aalto to make sure that our spaces had appropriate security, walkways for fire exits, fire extinguishers, sensors and so forth. In terms of safety signs and personal protective equipment, they have their own EU standards, so just understanding and following them is sufficient. Accessibility is the extent to which products, systems, services, environments, and facilities can be used by people from a population

with the widest range of users (ISO, 2019). The section deals with how people with disabilities or learning disorders may perceive the signs, and how they can be addressed.

4.3.1 Personal Protective Equipment

Personal Protective Equipment or safety gear is also referred to as PPE. It's important to use PPE anytime it can be effective at protecting you from bodily harm. I worked in construction in the past and I had multiple safety training days that brought forth the importance of keeping working environments safe and they helped drill in the idea of always staying vigilant about it. This training also connects with first aid training which I perform every 3-4 years. The two encourage me to prevent work safety violations and accidents in general. As coordinator I'm the person that's responsible for people's safety while working in Space 21, and as the person who is purchasing and maintaining the tools, I also feel an additional level of responsibility to keep everyone safe. Ultimately, I try to remind everyone to use PPE before they start working and try to remind them that taking shortcuts and not using it can result in bodily harm that will only delay a project even more. The use of safety goggles and hearing protection is surprisingly uncommon with many students. Most likely because they don't have much experience with working power tools or the materials in question (use masks when creating lots of particles), or because they received poor instructions from their parents or previous supervisors. The same goes for cleaning up after themselves. When I give instructions, students do comply, but because I'm not always around I try to make all the PPE clearly visible and have signs to remind about their usage. In the following chapter I explored some workshops for examples. The architecture/construction workshop had the most consistent use of safety signs (signs and name labels on all the machines) and so I decided to just reference the best examples.

Some signs can be decorative and informative and don't necessarily follow the standard, for instance, the sign in figure 8 is not necessarily a reminder to wear gloves, since many spinning machines do not allow their use, but simply to be mindful when working.

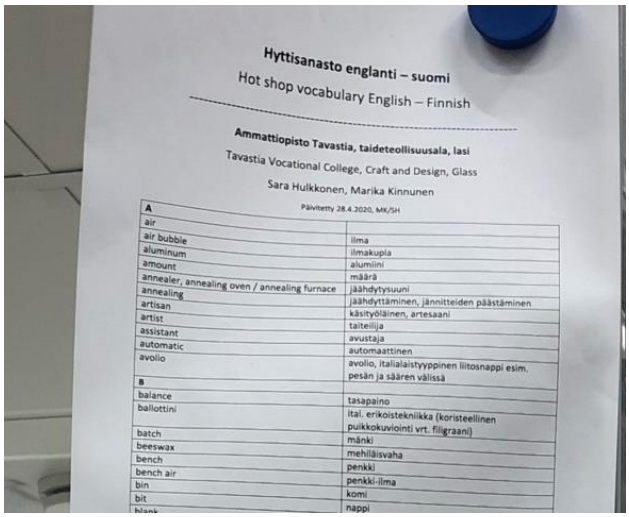
FIGURE 6: Safety sign in Architecture Metal Workshop. The sign says 'Kätesi on arvokkain työkalusi. Suojele sitä' translated from Finnish to English the sign says 'Your hand is your most valuable tool. Protect it'.

It looks like it's from the early 90's which adds a certain old-timey charm to the workshop and fits with the age of some of the machines. Based on the age of signs and the broad range and quantity of signs one can see that the construction workshop is clearly one of the longest running workshops that I have visited. All machines have a yellow Dymo-style sticker – see figures 9 and 10, which have the machine name and other information in both Finnish and English. This makes lots of sense considering the number of non-native users in the workshop.

FIGURE 7: Sign reminding to Wear a face shield on the lathe in Construction Workshop. The yellow tape also has the name of the machine in English and Finnish.

FIGURE 8: Construction Metal Workshop PPE sign. saying always use a face shield when using the Spot Welder in English and Finnish.

The teaching languages in Aalto University are Finnish, Swedish, and English but usually just one language is used at a time. A few workshops would try to label tools in both English and Finnish. I especially appreciated the glass blowing workshop which had a paper printout of key terms in English and Finnish. Note that the vocabulary list also contains meta data like the names of authors and the date that the list was made, see figure 11. As a bi-lingual myself, I'd often get confused with the names of tools, machines or processes and they would often be clear in one language or another, but not always in both languages.


Hyttisanasto englanti – suomi

Hot shop vocabulary English – Finnish

Ammattiopisto Tavastia, taideteollisuusala, lasi

Tavastia Vocational College, Craft and Design, Glass

Sara Hulkkonen, Marika Kinnunen

Päivitetty 28.4.2020, MK/SH

A	
air	ilma
air bubble	ilmakupla
aluminum	alumiini
amount	määrä
annealer, annealing oven / annealing furnace	jäähdytysuuni
annealing	jäähdyttäminen, jännitteiden päästäminen
artisan	käsityöläinen, artesaani
artist	taiteilija
assistant	avustaja
automatic	automaattinen
avolio	avolio, italialaistyyppinen liitosnappi esim. pesän ja säären välissä
B	
balance	tasapaino
ballottini	ital. erikoistekniikka (koristeellinen puikkokuviointi vrt. filigraani)
batch	mänki
beeswax	mehiläisvaha
bench	penkki
bench air	penkki-ilma
bin	komi
bit	nappi

FIGURE 9: Hot shop vocabulary in the glass blowing workshop. Branding and Colour

We call our own tool room a ‘Garage’ instead of a workshop. This is because I’m not officially a workshop master and I’m not securing the tool room from opening to closing (since Space 21 is 24/7, and generally everything is open access). The garage isn’t particularly well equipped for this reason. Also, the number of dangerous machines is limited. Riskier tools like an angle grinder and circle saw are kept in my locked office so that they can only be accessed with my supervision. This way I can make sure that they know what they are doing, wear appropriate PPE and know to clean up afterwards. PPE was placed in visible locations, namely on the tool wall. Safety signs were also placed on the door of the workshop/garage, and specific rules on a chalk board, see figure 12 below and figure 37.

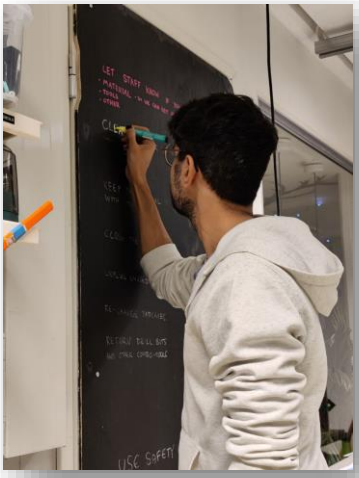


FIGURE 10: Making the garage safety and organization poster.

A black sheet of plywood was cut and drilled into a door to the storage room and acts as a black board when using Chalk markers. Neon chalk is used to highlight the most important information and make the message pop. Similar chalk is also used in other locations and so the choice of medium also creates a continuity in the design language and branding. Unfortunately, many of the rules on this door seem to go unnoticed. Perhaps if the door is left open it’s easy to miss the sign, or then it just doesn’t ‘pop’ as much, or there is some other problem. Sometimes the garage is in such shambles that it’s hard to tell what the clean state should be. Or then people’s definition of cleanliness just varies so much. In either case this sign is not complete, because it’s not being followed more than 50% of the time. I base this on observations of the workshop after I’ve thoroughly cleaned it, and then notice a new mess from someone’s project. I’m such a racoon, that

I often would check garbage bins for their content as a way of analysing what people have been up to – like a detective of sorts, but also to make sure that recycling is taking place.

4.3.2 Safety signs and the significance of colour

Here I researched a little bit about the current state of safety signs and standards. ISO EN7010 is the latest EU-standard for safety signs, see figure 13
below. ISO standards often require purchasing to access the regulations which are maintained by the International Organization for Standardization. When setting up a new workshop it is recommended to use the newest sign standards, but there's no need to replace existing signs in existing workshop, and it's more important to have consistency and clarity with the signs – they should be the same or like safety related signs in other workshops. Most of the workshops I visited still had safety signs from the previous ISO, but as mentioned that was still ok, and personally I like the old signs more.

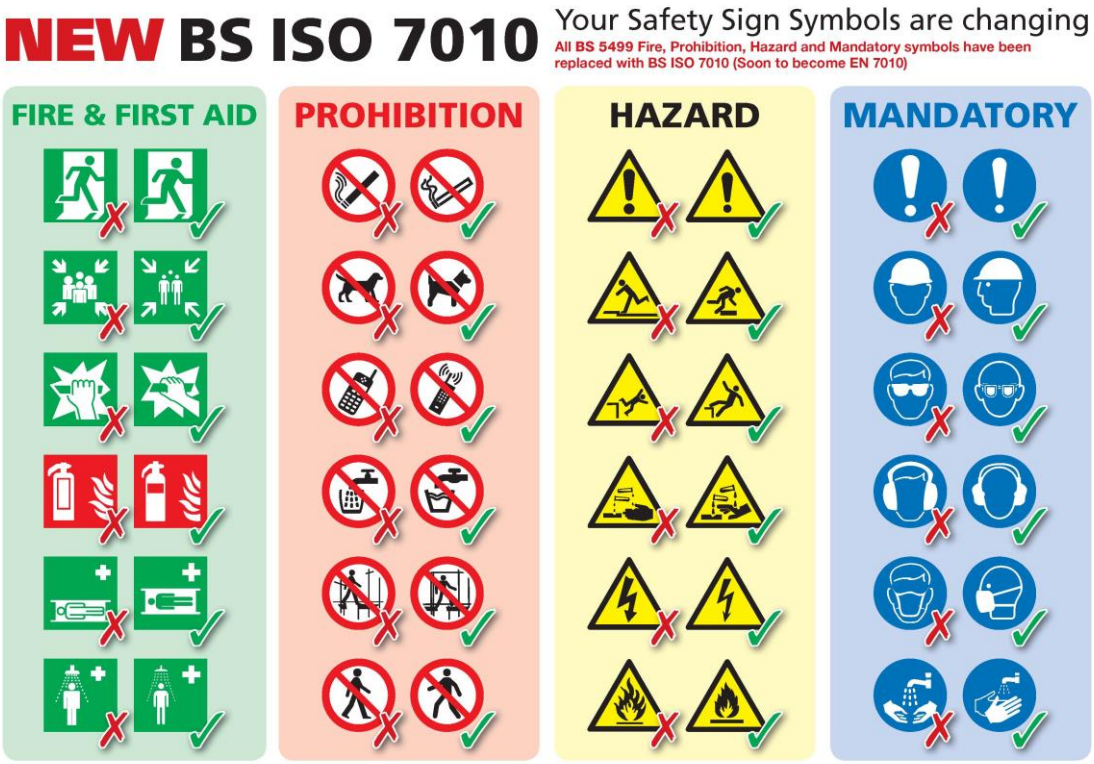


FIGURE 11: Comparison of old and new BS ISO 7010 standard safety symbols (Rizos 2013).

The safety data symbols can be purchased from ISO.org for around 16€ linked here: https://www.iso.org/standard/83841.html, but a similar package was also available from Adobe stock images, or just download them from Wikipedia: hi-res SVG files here: https://en.wikipedia.org/wiki/ISO_7010.

Colours and shapes also play a significant role in the standardization of warning labels. “Colour and geometric coding are extremely important for signage and safety. Specific colours warn about immediate danger to trigger a reflex to avoid it. Combining a colour and a shape conveys a message, for example, the red circle is used for prohibition, the yellow triangle for hazards and a green square is an emergency route or a first aid instrument. The red square indicates a fire-fighting tool, and a blue circular sign is used to communicate an obligation.” (ISO 7010 Safety Signs Guidebook, n.d.). Figures 14 and 15 show the common colours and symbols used for safety signage. I added it here because they are good references for making custom signs, especially to make sure that the safety colours aren’t used by mistake.

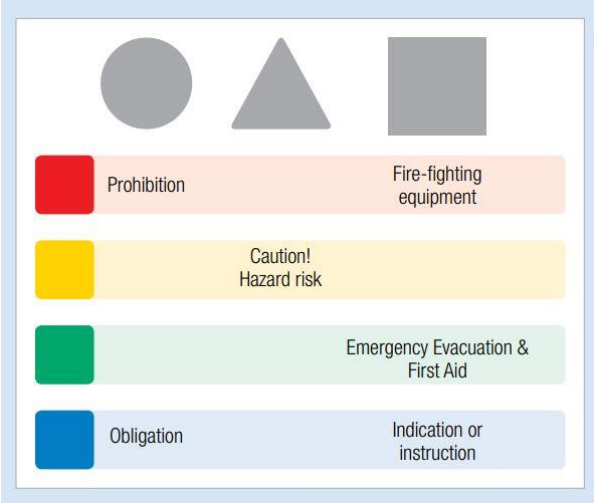


FIGURE 12: Shapes and colours in safety related signage (SignsInc, n.d.).

Meaning	RAL Name	RAL Number	RGB Hex[6]	Example of Colour
Warning	Signal Yellow	1003	#F9A900	
Prohibition/Fire Equipment	Signal Red	3001	#9B2423	
Mandatory	Signal Blue	5005	#005387	
Safe Condition	Signal Green	6032	#237F52	
Backgrounds and Symbol	Signal White	9003	#ECECE7	
Symbol	Signal Black	9004	#2B2B2C	

FIGURE 13: Common colors in safety related signage with RAL and RGB Hex codes, ISO 3864. (ISO, 2021)

When researching more about safety signs I found the paper published by Xie, H. et al 2012. which pointed out that not everyone notices signs: “only 38% of people ‘see’ conventional emergency signage in presumed emergency situations in an unfamiliar environment, even if the sign is located directly in front of them and their vision is unobstructed [3]. However, 100% of the people who see the sign follow the sign.” This made me think about fire and first aid training that I’d received in the past and it’s often pointed out that being aware of the signs and practicing scenarios is so that when the situation occurs your brain on autopilot can still do the right thing. Because of this I added a mini tour of all the fire extinguishers and procedures as part of the onboarding process at Space 21, see chapter 4.8.2 for more information. I also featured them in the internal map of the Space 21, this is explored in chapter 4.8.3.

As mentioned there shouldn’t be ‘much’ deviation from already accepted signage conventions as it would only obfuscate the perception of authority in the sign or make it difficult to see in the first place- especially in an emergency. Take the examples of the two fire extinguisher examples below in figures 16 and 17. Both give agency to the fire extinguisher as it lays idle for most of its lifetime, however, the design on figure 16 blends in with the mural so well that it can easily be forgotten or overlooked if a fire occurs near the room. This sign is most likely against fire legislation. Alternatively, the fire extinguisher in figure 17 blends well with the theme of the diving centre where it is located but the black background provides good contrast to the red tank and makes it visible. The additional (standard) fire extinguisher sign on the top-right of the image also re-emphasises that this is indeed where to find an extinguisher if you need it and part of the European standard. It might still be against the standard, but I haven’t investigated fire standards specifically.

FIGURE 14: Fire extinguisher with a mural of a fireman putting out a fire (mojar65, Reddit, 2018).

FIGURE 15: Fire extinguisher that looks like scuba divers oxygen tank (madmagic008, 2019).

4.3.3 Accessibility in signage

Universal Design - is an approach to the design of products, services, and environments to be usable by as many people as possible regardless of age, ability, or situation. To me, this also includes considerations for colour blindness, language barriers and learning disabilities. The following chapter dives into those topics briefly. Physical disabilities are covered in the European Accessibility Act (EU Directive 2019/882 “EUR-Lex - 32016L2102 - EN - EUR-Lex” 2016).

Colour-blindness is common in 2-10% of studied populations, there are broad variations of its prevalence. Africans and Aboriginal Australians have the least and Norwegians have up to 9.2% prevalence of red-green colour blindness among males. Colour-blindness is more statistically significant in men. The point is that the use of additional graphical communication techniques (iconography or patterns) could increase safety by making the workshop more ‘universally’ accessible.

Prime colours and red, blue, green, and yellow are the main colours used for signs. People with Protanopia, and Deuteranopia could have difficulty distinguishing red and green and so things like fire hazard and exit signs, see figure 18. Also, those with Deuteranomaly and Protanomaly might have trouble discerning the between risk levels mentioned in the previous chapter. Because of this, signs also use different shapes to indicate similar information, see figure 14 above. It would seem useful to incorporate colour with some other geometric shape or pattern to make the sign more visible to a larger population (Wikipedia, 2023).

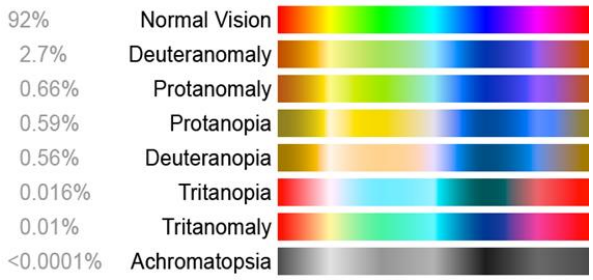


FIGURE 16: Pervasiveness of colorblindness and what they look like. (Nanobot, 2009)

Reading disabilities are also somewhat common and often overlooked. Pictograms are often paired with text to convey information quickly but also to communicate with people across languages and to children or people that can't read. I found information about a font called Dylexie (Dyslexie Font, 2017), which according to its makers enhances the ease of reading and comprehension.

Poor eyesight- or just not noticing a sign due to too many or bad signs can also happen, as mentioned above, people that see signs often follow them, so a simple solution may be to just make big, bold, and dramatic signs. This is also recommended in the book Make Space (Doorley and Witthoft, 2012).

In a study on How consumers with disabilities perceive "welcome" in retail servicescapes it was determined that:

> "Four primary situational factors explain to what perceptions of welcome/inclusion are attributed: service personnel; store environmental factors; other customers; and product/service assortments. a disability becomes salient only when there is an interaction between these situational factors and consumers' disabilities" (Baker et al 2007).

In general, these factors apply to everyone, and disabilities and preferences could be interchangeable, and while Space 21 isn't a retail store, the customer service principals are similar, our product is the rooms which may or may not be of interest to visitors or prospective users as is our usage capacity and other tenant. My takeaway from this is that by considering unique needs of others can increase how welcome a space can feel and by making it clear that inclusivity is an active goal we can increase that feeling for everyone, regardless of ability.

4.4 Branding

Branding plays an important role in establishing a new physical space, especially in the context of Space 21. Since it's not part of any existing department, student guild or otherwise already recognized entity in the university, some special attention needs to be given to it. Concept work and branding was performed by the team before I started my work. However, while I get help with digital marketing, I'm the one in charge of Space 21 branding on the ground. Most of the work is not sign related and so not included here. I generally use the guidelines set out for me, but I try to incorporate other aspects of branding in relation to signs, which are described in the following chapter.

4.4.1 Using colour for branding in Fablab Oulu

I visited Fablab Oulu in the winter of 2019. I noted that the bold colour theme made an impression on me, so I wanted to discuss that here. Colour is obviously a very important aspect of branding. Colour theory studies how colours work together to affect our emotions and perceptions. This topic alone could encompass the whole thesis, but fortunately the branding and colours for Space 21 were already decided upon before I started my work, so I don't have to think about it too much. This chapter is mostly to point out its significance so that it doesn't get overlooked.

Fablab Oulu uses orange throughout the spaces as part of its branding inside and outside. This seemed to be an active choice as the brand colour for the university is its complementary colour blue. The theme colour orange felt very cheerful and energetic and is sometimes used to describe engineering. It also connected multiple rooms together and made them feel like the same space, which also helped to make a perimeter between the Fablab and the rest of the university, as it was inside the main university building.

FIGURE 17: Fablab Oulu entrance with opening hours and information about Fablab on the wall. Orange is the brand colour of the maker space.

FIGURE 18: The orange brand colour extends to the interior where the walls, machines and even furniture are sometimes orange.

4.4.2 Using colour for branding in Space 21 and Radical Creativity

The official Aalto logo is black and white with a dash of colour used to differentiate with the various schools. For the most part I try to keep Space 21 colours as black and white to match the logo, see figure 21. The colour associated with Radical Creativity is the darker yellow as seen figure 22. After Space 21 started to have its own identity there was some concern about it not being clearly connected to the Radical Creativity umbrella, at that time there wasn't a clear logo for Radical Creativity so connecting the two was difficult.

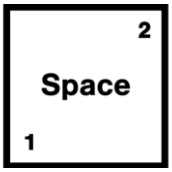


FIGURE 19: Space 21 logo

FIGURE 20: Radical creativity colour theme

I started to purchase some items that incorporated yellow. For instance, a yellow coffee machine, fitness balls and pillow covers. While not everything has to, or can be, black and white or yellow- if

technical specifications of tools, machines or materials are adequate, I'd often purchase products in those colours.

FIGURE 21: Mural designed with Space 21 and Radical Creativity colours in mind.

Near the end of 2023, four Computer Science students volunteered to make a mural in one of the new rooms upstairs. They didn't have experience doing it in the past, and so it was a fun activity for them, and in my mind Space 21 was supporting their creative experimentation outside of their field, and so encouraging multidisciplinary. The design was theirs, but colours were chosen together. Since the upstairs and bottom floor felt like distinctly different spaces; the yellow, black, and white colours were used to make a visual colour connection between the two floors, see figure 23. The yellow also subtly hints at the Radical Creativity cross-cutting theme that was funding Space 21. I try to use the yellow colour sparingly (just one or two walls) so that when you notice the colour it pops out yet isn't necessarily as obvious a colour theme as in Fablab Oulu.

4.4.3 Space 21 Merchandise

While it's not a typical sign, an example of a large branding effort we did at Space 21 was to make some swag for the first event that we hosted, the opening party held in March 2022. To commemorate the event white enamel mugs were purchased with the Space 21 logo engraved onto them. While the engraved mug isn't a sign per se it has been a significant part of the Space

21 branding because the mugs are commonly used for drinking coffee tea that is freely available in the kitchen. The mugs are somewhat traditional in Finland and often used in camping because of their durability- the mug thus represents both the tough nature of the Space 21 – rustic, and unrefined, but speaks of endurance and represents the hospitality of Space 21. Good coffee is only as good as the setting. The mugs were given as gifts to participants of the event, and I often would give the left-over unused mugs to VIP guests that visit, but most are available on the kitchen shelf for use. From sustainability perspective cardboard cups are very seldom used.

It's common in Aalto University for students to have overalls which are then covered in embroidered patches to signify, most often, attendance at various social events. A custom patch was ordered that bares the Space 21 logo as an affordable gift that can be given to students, even if they are just visiting. To be a little bit more creative and different the patch has a black background, but the white part of the logo is embroidered with glow-in-the-dark thread.

4.5 Notice Signs and Cues

Notice signs and visual cues are subcategories of signs. They signify less critical information but are used to hints or general information that helps a user interact with a space or tool. These sign types are explored in the following subchapters.

4.5.1 Notice signs

Effective signage relies on clear and intuitive cues to convey information efficiently:

"**Notice signs** provide general information that is important or relevant to a building, an area, a machine, or equipment... Notice signs are never used for personal injury hazards or warnings but can be used to indicate possible equipment or property damage" (Safety Services, 2023). These might seem inconsequential, but can make a space work much more efficiently, especially when introducing rules or workflows that are less common, or even opposite to how other, similar machines work.

Figure 24 below is an example of a notice sign. The handwritten text written in bold red marker points out the maximum allowable thickness when cutting metal sheets on a Sheet Metal Shear sign in Väre Metal workshop. This specification is critical for the machine to be kept in working order and shouldn't be ignored, hence the use of the red marker, -even though the machine itself

is also red, in this case the positioning and even handwriting both seem to make the message clear. Generally, notice signs should have a white background and black or blue text, therefore keeping the hazard colours reserved for high risk to personal injury. In the background there is also the general workshop machine sign with descriptions of the tool, links for more information and instructional videos and safety warning signs. There's also a 'traffic light' colour code which indicates that the machine requires extra supervision/training from staff.

FIGURE 22: Väre Metal workshop Sheet Metal Shear sign.

4.5.2 Use of Visual Cues

In the context of signage, a cue refers to a visual or design element that provides information or direction to the viewer, this can be either digital or physical: "They guide users through interfaces, and help make digital navigation effortless, intuitive and—ideally—enjoyable. They direct attention, subtly hinting at what users should do next" (Interaction Design Org, n.d.). Cues are essential for guiding individuals and conveying messages effectively, particularly in environments where quick comprehension is crucial. Cues can be almost anything and consist of symbols, writing, icons, coloured tape or even fabric. They don't necessarily say or depict anything, but can help the user find relevant information, or hints for following steps in a procedure. See figure 25 for an example with a label maker sticker attached to a screen, informing users not to lock, or shut down a particular computer terminal.

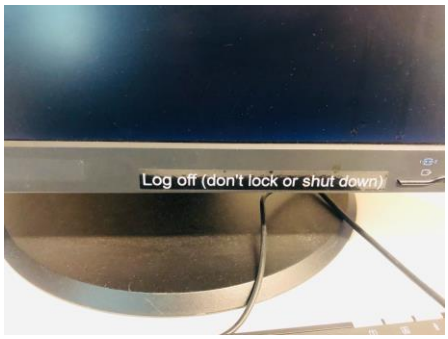


FIGURE 23. Sticker on screen as an instructional cue.

FIGURE 24: Drill press console with added text "Speed" and "ON".

Metal Workshop in Väre has also made modifications to a drill press as seen in figure 26. Handwritten text has been added to make the dashboard functions clearer. Similar markings can be found in many of the older machines throughout all workshops. Some industrial machines are a little bit unintuitive to use, so workshop masters have tried to make it easier for students to learn how they work.

4.6 Organization, labelling and resources for students.

In this chapter I describe what I learned about workshop and kitchen organization and labelling and looked at forms and things like infographics and information libraries as well as a reservation system. The site visits were undertaken before summer of 2022. As there were so many sites to choose from, I chose to take example from the workshops environments that I felt the best in, from

a perspective of a 'potential' new user. The workshops and labs visited are Biofilia (bio-chem) lab, Mixed Material Workshop and Metal Workshops in school of Arts, the costume design studio from Aalto Studios and ADDLAB which is a research lab that's part of the school of Engineering. Besides Aalto campus Facilities, I also visited a bike repair hackerspace in Helsinki, makerspaces in Berlin and a Fablab in Denmark.

4.6.1 Reservations and scheduling

Scheduling is an important part of my duties as coordinator. I had to debate between using Physical vs Online reservation systems (see chapter 4.8.4.) I first looked at Aalto Spaces application, which is used throughout the university to book classrooms and meeting rooms, but this only works on a day-to-day basis, and project reservations might be weeks or months long, so it didn't fit my requirements. Another system developed within Aalto is called Aalto Takeout. This is both the name of the physical location and the website where reservations occur. Initially all the rooms were setup in Aalto Takeout, but the space reservation system is a bit cumbersome and most importantly it's difficult to have people use the application on an ad-hoc basis. It also doesn't have a feature that could show usage of all the rooms (visually) over time which I needed to have a holistic view of ongoing projects. I solved this by maintaining a board on an online tool called Miro, see figure 27. However, because this isn't part of supported IT infrastructure, I don't share the document publicly. As the spaces are shared and sometimes overflowing, a natural way to adapt is for people to simply use the available empty rooms when needed. Online reservations work well if each room has a screen showing the days reservations, but that infrastructure wasn't implemented within Space 21 due to cost of implementation, and the usage is generally under one official booking per day. To solve this problem simple paper signs are made and taped on, or next to the door of the room in question. This way everyone can see upcoming reservations and when organizing and event or class I can have the hosts/teachers/tenants make the paper reservation on their own and thus make sure that the information provided is accurate. Having the users make their own 'signs' is also like the project poster process, whereby the users express themselves and the project a little more. Also, the handwritten touch is a bit more personal than a printout but most importantly it's visible to everyone using the room, even temporarily. A reservation allows the reserve to just-fully kick out anyone working in the room.

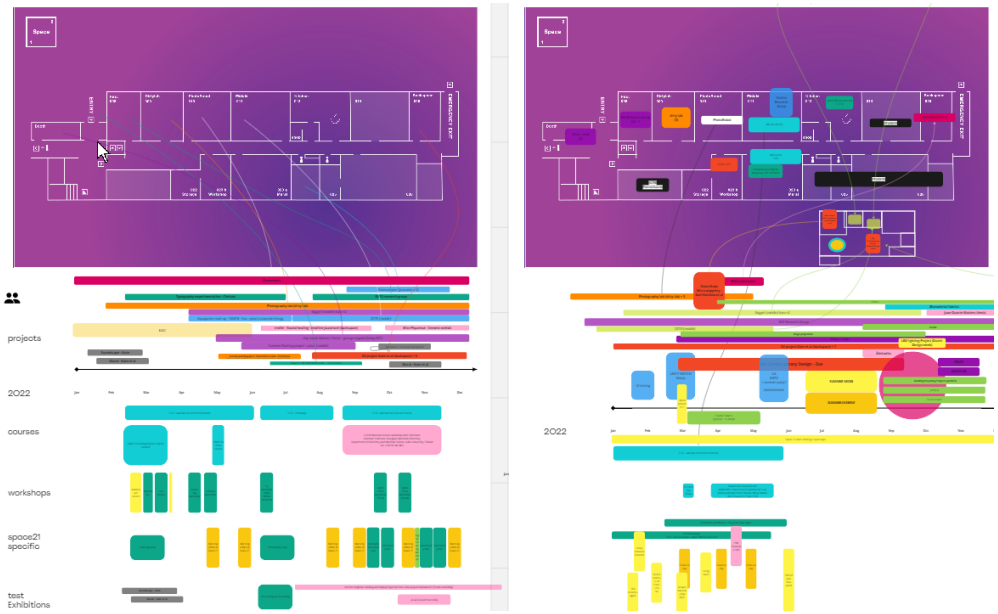


FIGURE 25: Miro board that I use to keep an overview of ongoing projects.

4.6.2 Workshop organization and labelling

I visited several workshops between January to June in 2022, to see how they organized and labelled their stock. Different kinds of labelling materials and styles were used. Some elements used depended on the user base – for instance the Aalto Juniors (and sometimes Biofilia) chemistry lab, seen in figure 28 were made for school children to use, and so pictograms were favoured instead of just words with laminated or taped paper – also standard chemical safety warning signs were used for storage containing chemicals. The mixed material workshop organized tool compartments with a black-on-yellow label maker (possibly the same style as in the Construction workshop), see figure 29.

FIGURE 26: Label maker text with some printed and laminated or taped pictograms. Text in Finnish and English.

FIGURE 27: Mixed material workshop tool shelf labels are made with a label maker.

Most of the workshops had consistent labelling but Costume design workshop and ADDLAB were my favourite examples, so I included them here. The costume design workshop was very homey and practical in its approach to signage, it fit the atmosphere very well and the process was quite simple. They used both laminated printouts as well as white-on-black label maker stickers, see figure 30. but also durable as many of the laminated papers felt like they were quite old and touched by dozens or hundreds of people but still in great shape. ADDLAB was a stunning setup as every shelf, cabinet, machine, and storage container had custom made vinyl stickers to describe the contents. The use of clear and transparent containers and shelves also let you see what was inside. Manuals were also placed in designated areas. ADDLAB was exceptionally consistent due to labelling being done all in one go after the workshop relocated several years ago. During this time storage containers and everything else was standardized and blended in with the furniture. ADDLAB gives off an atmosphere like a chemistry lab but was even nicer because it was more aesthetic, see figure 31 – though I may be biased because the lab focuses on the latest in 3d printing technology and had over a dozen different kinds of 3d printers, which I was very fond of.

FIGURE 28: Costume design studio containers labelled with a label maker or printed text on paper with tape or laminate on top.

FIGURE 29: Vinyl cut labels on a tool cabinet in ADDLAB.

4.6.3 Tool wall

The following chapter deals with tool walls- possibly my favourite subject related to workshops. No matter the mounting system, be it screws, pegs, strings or custom 3d printer tool mounts – placing most tools in clear view is helpful and creates a sort of affordance to users. Affordances determine what actions are possible, so in this case having the tool physically accessible conveys that they

you are allowed to use it and suggests to the user to return the tool, immediately when removing it from its designated place, as the shadow makes it clear what tool goes where – like a puzzle piece and placing a tool in the wrong place just looks wrong, even if it fits. Many first-year students may have never encountered many of the tools in a workshop and so learning dozens of tool names can be difficult, especially in a new language. Therefore, labelling tools is not sufficient, though useful for learning the current names of tools. I'm certain that nothing can beat a shadow wall. James J. Gibson coined the term affordance in 1966. In researching the term, the following quote resonated with me: By learning how to use an artifact, a child (or adult) "enters into the shared practices of society" as when they learn to use a toilet or brush their teeth" (Williams and Costall 2000), and in turn they become a member of that world. I always liked building things, but the more I learned about tools and how and when to use them, the more connected I felt like an engineer, designer and artists and felt a stronger link to the Maker community, as I could better relate to and discuss matters with my new 'peers'.

Pyöräpaja had a beautifully built wall - made from repurposed wooden doors and contains a mishmash of tools used for bicycle repair, see figure 32. Outlines and key information such as the tool sizes for wrenches are written with marker pens. Notice the screwdrivers in random order and without markings in figure 33. From experience this is a valid solution for common tools that are difficult to distinguish. The most important thing is that they can be in a certain area. Trying to impose order where almost every screwdriver is from a different supplier would be more confusing. Seeing tool walls in multiple co-working workshops I realized that missing tools is always a bit awkward, and having the wrong shadows from tools that have replaced older ones can be problematic for new users. There would need to be a good way to update the shadows, or systems in place to replace tools that go missing. This is something to keep in mind.

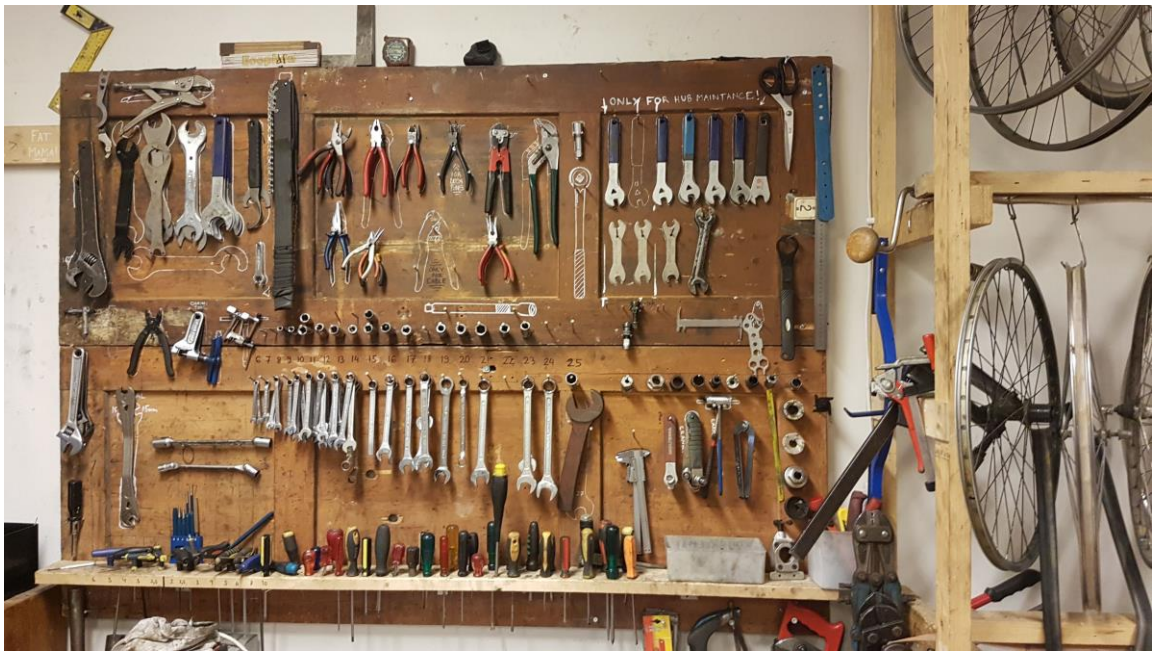


FIGURE 3230: Tool wall at Pyöräpaja bicycle collective in Pasila, Helsinki

FIGURE 31: Tool wall in Metal workshop in Väre. Outlines clearly indicate which tools are in use or missing. Also notice that some tools are placed in the wrong area.

I went to visit a maker-friend in Berlin, and we toured several workshops in April 2023. I had the best time in Rollerwerk community workshop which housed multiple start-ups and organizations under one roof. My friend Timm had designed and built a modular tool wall system based on modules that attach to the wall with a French cleat mount, see figures 34 and figure 35. The modules can easily be moved around, and even picked up and taken to a workstation for easier access. The modules are machined wood plywood with, and aluminium T-slot profiles embedded in them and mounted with architectural foam board which are then outlined for shadows or silhouettes or traces. The tools are held up with metal pegs that can be tightened and loosened to

the T-slot profile, thus enabling unlimited combinations of mounting options. I got very familiar with the system as we spent an evening installing the system of the wall.

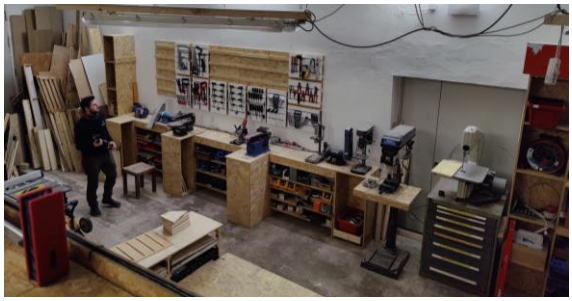


FIGURE 32: Rollerwerk circular city collaborative workshop. Tools are from Open-Source Ecology Berlin.

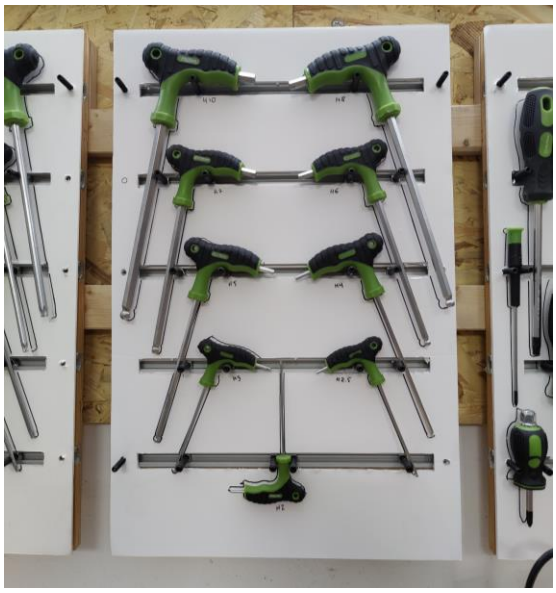


FIGURE 33: A CNC machined wood and aluminium T-slot profiles and mounting with architectural foam board shadows and labelling.

CNC cut marine plywood seen in Figure 36 creates these beautiful silhouettes/shadows. This design is fitting since the PPE must be used when operating the machine that made the sign.

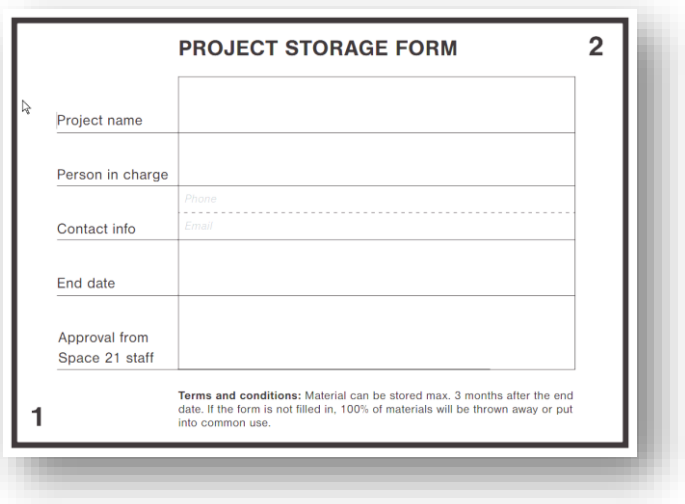
FIGURE 34: CNC cut shadow wall for PPE.

Figure 37 below shows the tool main tool wall in Space 21. Commonly used hand tools and materials like glues and tapes are mounted on a plywood board. Traces of tools were made with a white chalk marker so they can easily be erased if tools are changed, and additional labels were added to categorize tools that used magnetic mounts and to specify the locations of spanner sizes for ease of use. Though the design might seem innocuous, my design for the tool wall is in its fourth iteration, and while not perfect, the system has worked well considering that the photo wasn't staged in anyway, and only a digital calliper (that I was using) was out of place. Returning tools was working effectively.

FIGURE 35: Tool wall at Space 21 with shadows.

4.6.4 Forms

Most workshop incorporated some method of storing students' incomplete projects. Design Factory and Väre workshops had very similar structures and I copied their format, including terms and conditions. One modification was made: instead of disposing of material after the 'expiry date' I added that they may be put into common use as part of our sustainability goals, see figure 38.


PROJECT STORAGE FORM 2

Project name

Person in charge

Contact info Phone Email

End date

Approval from Space 21 staff

1

Terms and conditions: Material can be stored max. 3 months after the end date. If the form is not filled in, 100% of materials will be thrown away or put into common use.

FIGURE 36: Project storage form for Space 21

The main way I manage rooms is by having students make their own signs. The main one being a project poster that is placed by the entrance of the room they are working in. The project posters should contain the information on the Project description form, see figure 39. Most often I encourage students to make their own poster so that they more freely express themselves. I also plan to use the project posters to keep a record of past projects for record keeping. Old project posters are also displayed in the hallways and on the digital screen, to give examples of what kinds of projects can take place in Space 21. The pamphlet The Making of Oasis (Annakaisa Kultima, p.103) points out that this process is part of creating an identity for Space 21, which evolves as people use it. It also suggests making a timeline that would help set the space in time which is something I hope to implement in the future.

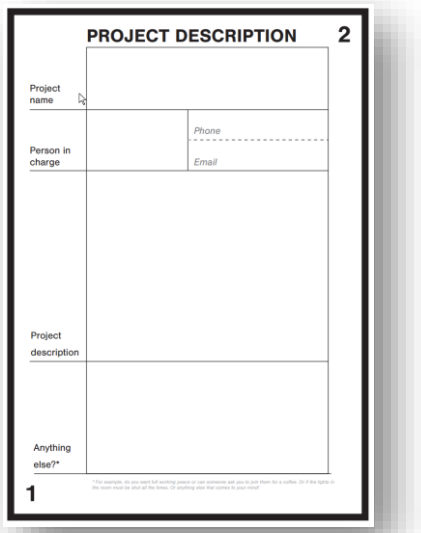


FIGURE 37: Project Description form for Space 21.

4.6.5 Kitchen organization and labelling

The Kitchen was perhaps the longest running signage project in Space 21, as it's still ongoing. The usage and layout of the kitchen changed several times. I couldn't get much inspiration from other kitchens on campus because ours was the only one with cooking appliances besides a microwave. Community kitchens in makerspaces and hackerspaces were all a bit worse than I'd hope for in terms of the potential for cooking and instructions on their use. I later realized during the thesis I overlooked this aspect as I was more focused on the workshop facilities. Cooking is one of my hobbies and I like to take care of my kitchen the same way that I learned when working in restaurants in the past. I learned to host from my mother and grandmother and their friends as a child, so I understood the connection between hosting and having a well-maintained kitchen. In Space 21 there were multiple issues with fire alarms caused by popcorn in the microwave. Other fire prone equipment was removed, and new devices were brought in, like an air fryer or pressure cooker. I started to see the kitchen much the same way I would a workshop, while a coffee machine or air fryer might be familiar to some, there was a constant influx of new users that may not have used them before, and so proper introductions had to be made. My most common focus on the onboarding tour was mentioning multiple times how the common spaces were to be kept clean and that people to volunteer to clean the coffee machine and empty the dishwasher from time to time, and to be weary of the smoke detectors. All those elements also added to the development of a community and community rules and the working culture. I often found myself noticing the kitchen

being untidy much more often than other spaces. I was often very strict on others to it particularly neat, while I had a more relaxed attitude about other areas. Because of all that I made lots of small signs all over the kitchen and over many iterations made the following rules, seen in figure 40 below.

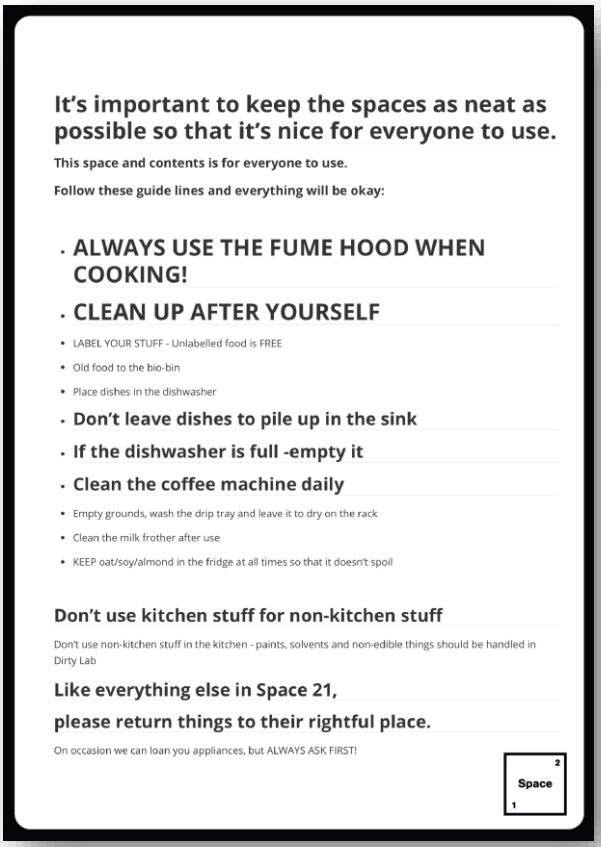


FIGURE 38: Kitchen rules poster

As a reference, some of the first kitchen posters can be seen in figure 41 and was made by a student. I would normally explain the same message verbally, but the sign makes it apparent that not everyone was following that rule. While rough, the size of the 'label your food sign' makes the significance of doing so clear. The paper on the Kitchen Rules note on the top right of the fridge has clearly been damaged by moisture – the point when wrinkles start occurring could be a good time to decide if the rule will be made permanent, modified, or removed altogether.

FIGURE 41: Label your food poster made by Andrzej, and Kitchen rules poster made by the author.

Another student made the temporary sign in figure 42 on painter's tape asking people to return milk to the fridge. This was made after I complained to her that it would often be left out. At first, the sign was placed on the wall near the coffee machine, but it didn't work, so I removed the tape and moved it to the spot where the milk was often left to sit. The change in location worked immediately and since placing it I haven't see the milk being left out – success! The text is also fading so it's clear that I need to make the final sign ASAP.

FIGURE 42: Sticky tape reminding people to put milk back in the fridge. Made by Katie.

While the signs in figure 43 below aren't instructions they work as cues and affordances by making the contents of the drawer's public knowledge, thereby inviting people to open them and find what they need. The style used closely resembles those seen in ADDLAB, but instead of vinyl prints that are difficult to move and modify, I opted to use our printer and laminating machine and affixed them with double sided tape. This way the arrangement of drawers could be modified more easily.

FIGURE 43: Labels made for kitchen drawers.

It has been difficult to ascertain the full impact of the signs as there are often new users in the space, and I'm not always around when they are using the kitchen. Another factor that changed was that 2023, one person started working kitchen/living room. They often made lunch daily and so they kept the kitchen in good condition and helped to cleanup up after others and keep the kitchen organized.

4.6.6 Infographics and references

Infographics and reference 'libraries' are good ways of conveying loss of information in one go. The follow examples are from the Construction workshop and Costume design workshops. I found them inspiring, and I'm always interested in showing rather than telling because the message is much faster to pick up and more information can be shown immediately. Also there seems to be an

element of exploration in infographics as there can be layers of information displayed on top of each other. The examples below show a material library in figures 44 and 45. The varnishes and patinas in figure 44 clearly took a long time to produce and was the work of a student. The visual chart helps students see what kinds of results they can expect with different combinations of materials. The real-life example that can be touched is also much more informative than a photo from a website or book. The same goes for figure 42, depicting various welding methods and materials that are commonly welded with them. The plywood sheet with the welded parts is mounted on the side of a storage shelf and is one of the first thigns you notice in the welding workshop because of the contrast of the wood and the yellow tags, compared to the generally gray and blue surfaces in the workshop.

FIGURE 44: A reference chart made from dozens of pieces of wood of varying species oiled or stained with different materials.

FIGURE 39: a reference guide showing metal plates attached to a plywood sheet made of different material and what welding method is required.

Figures 46 and 47 are examples of infographics on sizing clothes and a visual reference on how to thread a needle in a sewing machine. The placement of the ‘cards and choice of materials was consistent, and it felt very intuitive to find relevant information. The sign indicated what kinds of clothing should be available nearby and made sure that the chart would stay in place by tying it with a string. The whole storage room was neatly organized and had multiple refences for students to quickly size costumes for actors.

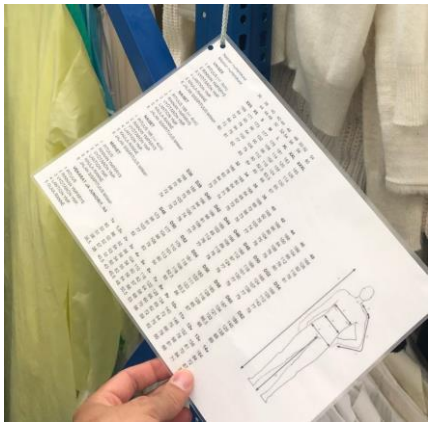


FIGURE 46: A laminated sizing chart for men women and children. The chart is used to understand the dimensions related to standard sizes in clothing.

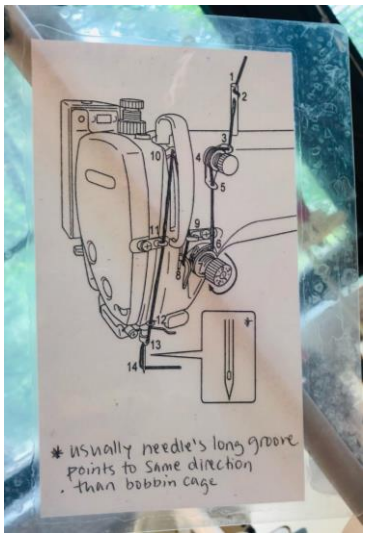


FIGURE 40: Set Design Workshop laminated diagram showing how to setup the thread on the sewing machine.

Other versions of this 'placard' also highlight the thread to help the user identify the key elements required to thread a sewing machine and important information about the needle. The diagram has been laminated to make it long lasting.

4.6.7 Cleaning

Establishing expectations of cleanliness is difficult, especially with so many people and limited supervision. People tend to have their own measurement of messiness and different ways of going about cleaning, organizing, and leaving their working spaces. I'm generally very messy in my own space and as I work, but I find it important to leave public spaces in a clean default state, leaving room for the next person to work, and to see what the default and clean state looks like. Here, I explore some cleaning signs in other workshops and look for inspiration. Figure 48 is an excellent example of what I mean by default state, much like shadows or traces on a tool wall, the printed photos in figure 61 reveal the contents of the box which is a good way for new users to locate things without having to pull out each box from the shelf. It also helps to organize and return things after using them. The doors and insides of the shelf also had photos for loose items, such as the lights or cables, so they also had a designated place.

FIGURE 48: Photography Studio organization is done with photographs of box content on them.

Figure 49 below is comical and attention grabbing. The 'no fishing' sign is very noticeable and made me wonder 'what is that doing here', then I read the text below and realized it was a joke/trick to make me read the sign. While it's sort of a misappropriation of the safety standard, prohibition signs aren't as serious, and because I only noticed one such sign in the workshop, it wasn't distracting from other signs, or making me question the validity of the other signs.

FIGURE 49: No Fishing sign used as a cleaning reminder at the Construction Workshop.

The size of the cleaning sign at the ceramics workshop in Väre saying 'Clean up after yourself or work somewhere else' in Figure 50, is quite small, but placed at eye level on the door, so it is always visible when entering. While the sign could be more permanent (see Tools for Sign Making), it shows that effort has been taken to make the sign and to make the message very clear. This sign is stern, but the tone is softened somewhat with the use of orange as opposed to red and the additional smiley face. Note that orange in safety labelling indicates a medium level or risk which helps to establish the tone as few things are as upsetting to the workshop masters, as the need to clean up students' messes.

FIGURE 50: Cleaning sign at the ceramics workshop in Väre saying 'Clean up after yourself or work somewhere else ☺'.

Figure 51 has a handmade sign that was made by the workshop master when noticing improper use of the sinks. Placed near the sink it's clear that the paper will eventually get. For temporary measures a piece of paper is great, but this rule will be required long term, so at the very least placing it in a sleeve or laminating it would be good, or making a printed and more legible sign would be a good idea. The style of the sign is also important because the handwriting feels more gentle and personable -note the cute little heart and thank you as an extra plea to students to be responsible. I used the same method in the Space 21 when I noticed that someone was cleaning painting supplies in the kitchen sink, see figure 52. I'm happy to report that the intervention seemed to work, and I haven't noticed any non-kitchen messes since making the sign after Summer 2022. This is also a sign that could be laminated, however, the condition of the sign is still good over a year later, and so sufficient for the time being. A rule about the topic was also added to the kitchen rules poster.

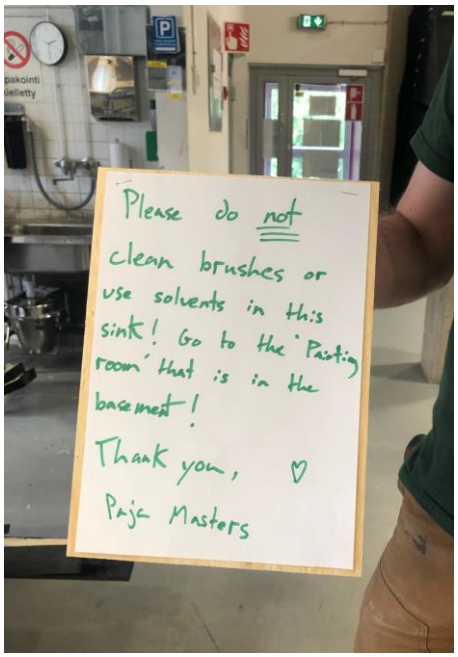


FIGURE 51 Handmade sign telling where to clean paint brushes.

Figure 52: No paint in kitchen sink sign.

4.7 Wayfinding

Around the time I was making the general and workshop rules I was also trying to make getting to Space 21 as easy as possible. It felt like almost every workshop in Aalto was a bit of a secret, where the exterior of a building gives little clue as to what fun places lie inside. In this chapter I compile some pondering and working process on developing various wayfinding signs. The book

Walk This Way (Cossu, 2010) was helpful in getting a deeper understanding of what makes good wayfinding signs and had lots of beautiful designs that I used for inspiration. This quote frames wayfinding well:

“Sign design can be seen as the frame that "makes places, which delimits the spaces and gives a comprehensible dimension to objects. The mediation between the user and the space happens through design; it's how users interact with the environment. Arrows, instruction booths, maps, and entrance labels set up conditions in which the wayfinding experience is carried out. This complex process, which is at the base of how users perceive the entire visiting experience, is more visual than verbal…” (Cossu 2010).

Because I was constantly opening the door for (non-Space 21) people ringing the doorbell and wondering why they couldn’t enter the building. I had to explain repeatedly that they were looking for B-wing and the 2K door. I made the arrow in figure 53 so big that it would be noticeable from a distance, and it seemed to make an impact. One day, soon after I had attached the tape, I followed someone walking towards our door. I saw them looking at the sign and then divert away from our door and continued forwards towards the inner courtyard – success! While the red painters-tape was meant as a placeholder, it seems to have survived multiple months of weather conditions, so I will leave it up for as long as it looks good.

FIGURE 53: Navigating to Space 21 at A-wing and how to find main building in B-wing.

4.7.1 Putting Space 21 on the map

Space 21 is located on the bottom floor of Vuorimiehentie 2 A in Otaniemi, Espoo, Finland. The usable floor space is currently around 350m^2. In November 2022 we also received some 130m^2 extra space upstairs, and prior to that, the lobby and lobby info desk were incorporated as part of Space 21. Bringing an old building back "on-line" proved somewhat challenging since student and staff weren't used to activities in the A-wing part of the building. Also, the school of Chemical Engineering was only familiar to chemistry students, so many hadn't ventured into this corner of the campus. To help guide people to our location I made the following map, see figure 54. The graphic tries to highlight the proximity to the Metro Station and key recognizable buildings in the area *The campus is quite large with key facilities* up to 10 *minutes' walk from the* centre point, Space 21 is around two and a half minutes' walk from the metro and so it's positioned the heart of Aalto. The map is used in the 'zine'-flyer, on the official website, and the map was also used as a graphic in my email footer during the first months of Space 21. Aalto buildings are all coloured in purple and thus it helped to convey that Space 21 was part of Aalto University, which may not have been clear from the logo or name alone.

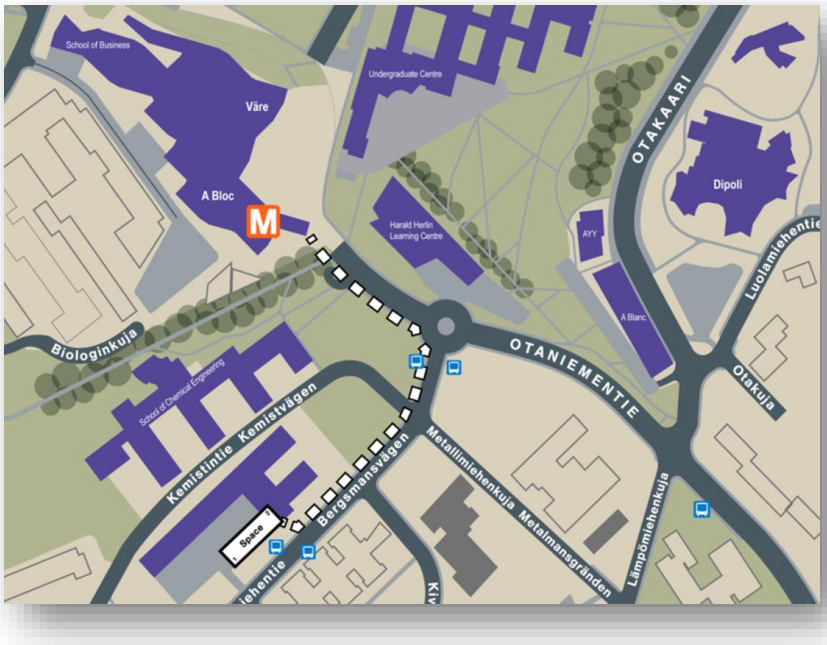


FIGURE 41: A map showing how to get to Space 21 from the Metro station.

4.7.2 The Entrance

Even after 2 years of running Space 21, we still don't have a very visible entrance. There's a vinyl print on the door, but it's not always visible because the vinyl print is white on clear glass, also the size and location make the entrance visible within a short range. To make it a bit more visible and fun, we designed a LED strip with an intern that has crawling lights around the windowsill to draw attention to the window with the sign though as can be seen from the figure 55, it's not that visible during daylight hours.

FIGURE 42: Space 21 door sign with animated LED strip

On one hand not making the entrance clearer is a huge gap in our wayfinding and even branding, on the other hand, Space 21 is somewhat exclusive. While many events are hosted and the number of visitors is many times greater than the number of tenants, only those with active projects or some roles have the 24/7 access to Space 21. By making the place a little bit hard to find and secretive it makes it a little bit more special for those that have access and adds a sense of discoverability to newcomers. Some students also hoped that Space 21

4.7.3 Internal Wayfinding

Internal wayfinding is about navigating inside a building. Like a map of an airport or mall. Space 21 started off as just one corridor, but within a year I manage to acquire more rooms, including spaces in a 2nd floor. To make it clear to visitors I wanted to use internal wayfinding to expand our presence.

The first rule of wayfinding is that nothing is as helpful as a knowledgeable human being who has been assigned to assist strangers... In circumstances where it is not possible to station a receptionist, a “you-are-here" map should be displayed [...] correctly oriented for the viewer and relate to some obvious landmark in the immediate vicinity” (Deasy and Lasswell 1985).

The image of the Isometric map of Fablab RUC, Denmark was taken some time around 2018 when I visited the lab, see Figure 56. It served as inspiration for the Isometric view of Space 21 in the zine (see chapter on zine). While the RUC design is clearly more stylized and detailed the isometric view helps to reveal the use cases of each room to a degree.

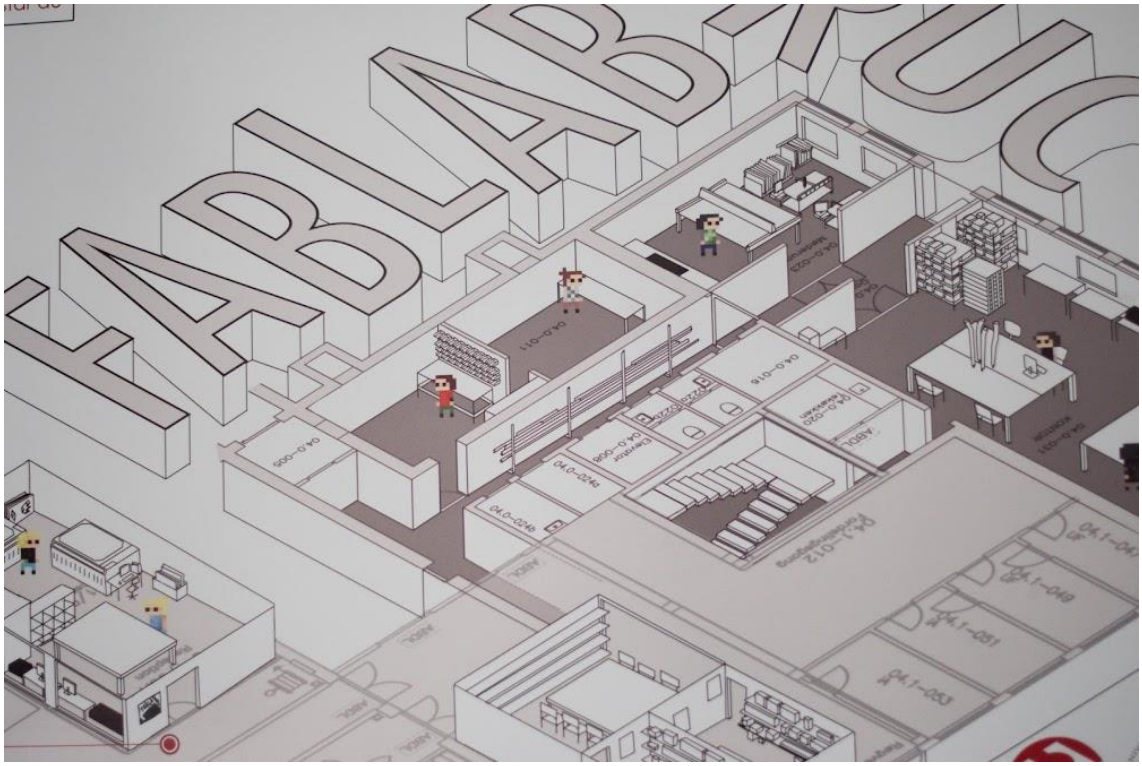


FIGURE 43: Isometric map of Fablab RUC in Roskilde, Denmark.

The first internal map was a blueprint style map made for the housewarming party, see figure 57. It highlights some of the main events and things that visitors should see. The style and template were great and used to highlight the prototypical nature of Space 21 and worked quite nicely. After the upstairs location was acquired, I wanted to make a new map that would also help me remember the room numbers for facility management reasons and modified the early blueprint model, but added some features and renamed the rooms to what I was calling them. Figure 58 is a floor map

of the ground floor and upstairs locations of Space 21, as of Jan 2023. The ‘you are here’ is a blue dot which is more visible in a high-quality print.

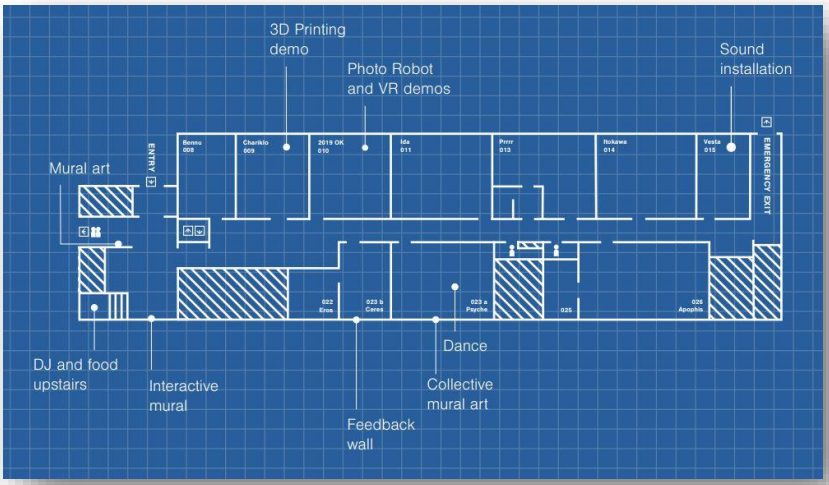


FIGURE 44: An event map for our Housewarming party, March 2022. Made by Maria Uusitalo.

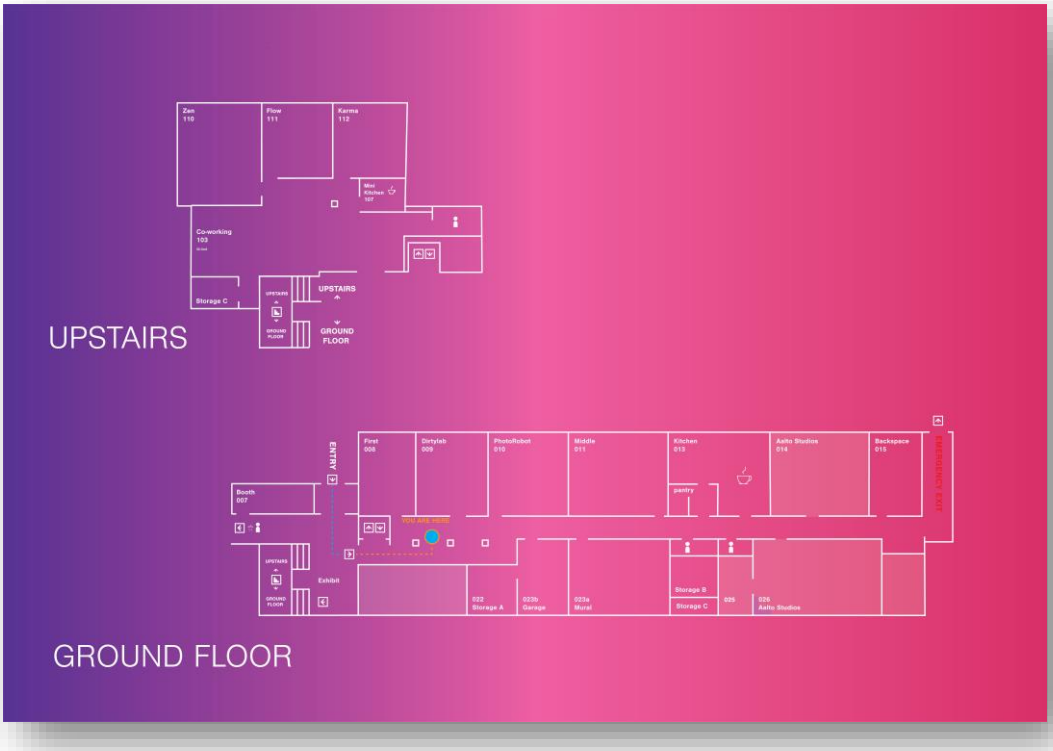


FIGURE 45: Space 21 wayfinding map

For naming rooms, a chemistry theme was initially considered since the Space 21 logo borrowed from the periodic table (with atomic number and mass being the 2 and 1 in the logo). This wasn't the best idea since names of metals and atoms were already being used in the chemistry building in the wing over, so the design and comms team we voted for 'space' themed names for the rooms. We ended up with various asteroids, but after trying it for several months it felt too confusing because the asteroids weren't that well known to most people – even to myself as a self-identified space-nerd. Ultimately, I landed on descriptive names for the rooms. 'Booth' is the unused guard/info booth, 'First' room is the first room inside Space 21 after the locked doors, followed by 'Dirty Lab', which is the room where dirty or wet work is supposed to happen – in fact, while I called the room Dirty Lab for almost 2 years a student has just renamed it in December 2023 to 'Wet Lab' with a new sign on the door. My office was called 'PhotoRobot' because that's where a special photogrammetry rig was setup. 'Garage' is a garage-style workshop, not to be confused with the well-equipped and staffed workshops across campus, and 'Mural room' was given its name because it features a large student-made mural. The upstairs room names are more like placeholders, until their identity merges, often from the type of activity that occurs there. For example, the room labelled 'Karma' now houses two painters, so it might just be called the 'Painting room', and 'Flow' has 3 textile-based projects in it, so it might as well just be called the 'Textile room'. 'Zen' is also turning into a 'master's thesis writing room' / 'Yoga studio', so likely it will bare one of those labels. The map has been helpful for me since I must refer to the official room numbers when making maintenance requests. Instead of finding the digital copy on my disorganized computer, I printed the internal map and rolled it around a tube which makes the map a bit more fun to explore, is visible and easy to find, but also movable if needed, see figure 59.

FIGURE 46: Internal map of Space 21

4.7.4 Directional signs

Visiting Space 21 for the first time seemed to be confusing to newcomers. When I would let them inside for the first time, most people would be clearly confused as to what direction to go into and there was a lobby with the staircase going upstairs (which you see first) corridors to the right (which you see second), then once walking into the middle of the lobby, you'd notice a door to the left (which you see third), but that was still not Space 21, as you take another step forward you'd finally see the entrance to Space 21 (fourth on the list). Initially it was planned to place a large poster or sign in the lobby pointing towards Space 21, but it never got made. I got frustrated that it was causing so much confusion, so I taped a sticker to the floor with painter's tape pointing to the left. I also made a laser cut sign with an arrow on that point left and taped it to the wind closet door. According to Montello DR. "Directional signs can be particularly easy to understand because they require less abstraction than you-are-here maps, because they can accommodate changes to the environment" (Montello, 2010). Neither sign stands out prominently, but they seemed to do the trick. Alternatively, I got used to, or even liked that people would get confused a little. Discovering Space 21 and being a little bit confused (both outside and in the building) and surprised and finally delighted seemed to be an interesting way to introduce the space, and make it feel a little different than already established and officially labelled spaces.

An example of nice directional signs was from Fablab RUK, a very extensive lab that spanned 2 floors and over a dozen rooms, see figure 60. Laser cut wayfinding signs were placed all around to help users navigate internally. The use of material and tools found in the lab (laser cutter and plywood) also added a nice 'DIY maker' touch. I haven't made such signs for Space 21 because of time constraints and the fear of adding unnecessary signs – especially because most of the rooms are along a single hallway, though it's always a little bit on my mind. To determine the need, I should interview visitors about it - generally the only thing people ask directions for is the WC.

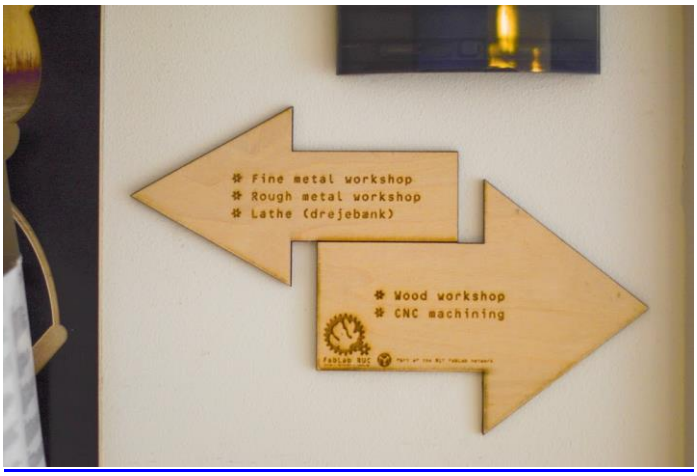


FIGURE 60: Wayfinding signs in Fablab RUK

4.7.5 Digital wayfinding on Takeout

In the first months in 2022 the location was also set in Aalto Spaces, an internal application showing all the bookable spaces in Aalto. Reservations in that system were only available for hours or a single day at a time, which wasn't adequate for our multi day/week/month rooms, so a different booking system was setup with Aalto Takeout, see figure 61.

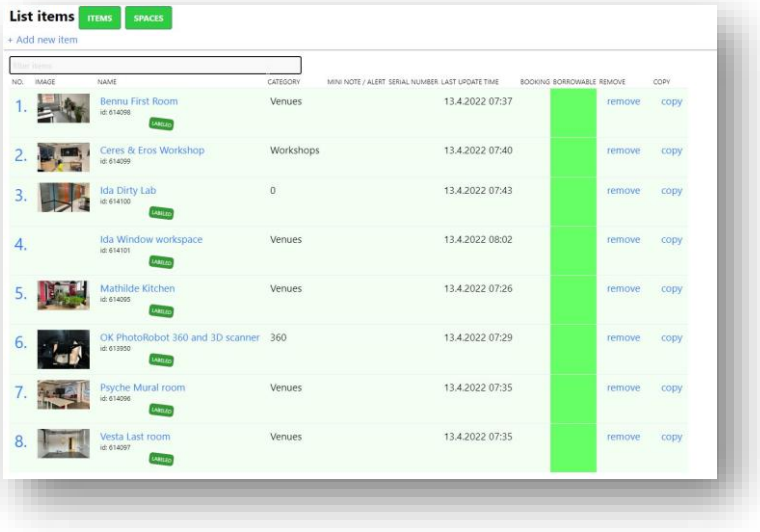


FIGURE 61: Screenshot from takeout.aalto.fi showing the availability of rooms in Space 21.

Aalto takeout was originally made for sharing equipment such as AV equipment, but also allowed for placing special spaces such as editing rooms, or a VR studio. I felt like Space 21 was a good fit since rooms could be reserved for days or even months at a time, much like a digital camera. The

system couldn't handle multiple users per item, and this was problematic when Space 21 started to get popular. I often had multiple projects in one room, and so a reservation system didn't help me, or others understand all the projects happening in a space. In the end I opted to leave the rooms in takeout so that people could find us, but actual bookings would still go through me, via e-mail or a direct message and the usual onboarding process. Room reservations when needed were done with physical paper on the room door are explained in chapter 4.6.1. Reservations and Scheduling.

4.7.6 Digital wayfinding for online maps

Space 21 was set as a location on Google Maps, Apple Maps, and Open Street Maps. This made it easier for people to find the location, and I could also just say that you can find us on all the navigation software's, instead of saying the address, which might be confusing to some. Photos were also added to Google Maps, and it seems to be very popular, see figure 62.

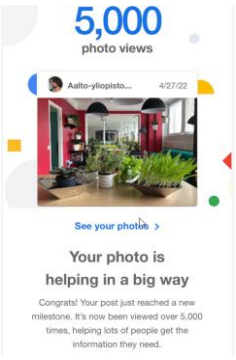


FIGURE 62: Viewcount of a photo of Space 21

4.7.7 Location in e-mail client

Aalto IT department was also informed of the 'new' active location and so it was added as an address in Microsoft Outlook. This way if I send an invitation or calendar invite, it will say: Space 21 and then the physical address. It has helped save me some time when making appointments and reduce the chance that I'd accidentally type in the wrong address. These actions also help to establish Space 21 as an official entity, instead of it being an obscure experiment in an old building.

4.7.8 Coffee Machine and kitchen

Finland has the highest per capita consumption of coffee in the world (CBI, 2019). The coffee machine is like the 'caffeinated' blood of Space 21, during the conception phase there was an idea to market Space 21 as having **the best coffee on campus**. I took up the challenge and did my best to source a quality machine, beans, and other coffee ingredients. The coffee is 'bait' to want to work at Space 21 but also a reward 'for having accesses. Part of having good coffee is having a clean and well-maintained machine. As there are multiple users, I would always introduce the coffee machine usage and maintenance as part of the initial onboarding to Space 21. The coffee machine is like a self-contained system that reflects my values and expectations and permeates to all the areas of Space 21. It helps teach that everyone is responsible for general upkeep of equipment and spaces. This helps me focus on core tasks instead of cleaning. To help other help me, I drafted a coffee usage poster, and the amazing student assistant Maria helped me make this infographic, see figure 63. Where the main functions are overlayed on an illustration of the coffee machine. I was so happy with it, and wanted to advertise that we had the coffee machine by adding it to the Space 21 zine (see chapter 4.9.3.).

FIGURE 63: Coffee machine use infographic. Made by Maria Uusitalo and Jason Selvarajan.

There were some stumbling blocks and lots of questions about the coffee machine when I first got it to Space 21 around April in 2022. The most confusing thing for users was that the screen wasn't a touch screen, and they wouldn't notice the manual buttons on the edge of the display. Other than that, there were minor issues about how the milk frothier worked. After the infographic poster was made, I didn't hear too many questions but usually people helped each other make coffee. I taped the coffee machine with gaffer tape that matched the colour of the labels in the coffee machine infographic, see figure 64. The idea was to give cues to where the functions of the machine are in 3d space. Also, the colours were somewhat coded to the action since blue is easily associated with water, and green with power or 'go'. The orange and pink were used because those were the only neon colours, I had left but resemble each other but are distinct.

FIGURE 47: Coffee machine with neon-coloured gaffer tape as signifier.

4.7.9 Community Building

A significant part of many of the maker spaces I visited had an immediate sense of community revealed by a community board, often visible near the front entrance. Workshops in the university didn't normally have such a thing, but possibly posted information about student helpers that were available. Community boards or community contact walls often had profile photos that had all the relevant information to recognize and contact people in the large and multidisciplinary environment. All the main bosses are posted on top with the 'First Contact' sign, making it very clear how to get a start in Design Factory, see figures 65 and 66. I appreciate that phone numbers and e-mails were also shown, as sometimes this information was kept obscure in other parts of the university.

FIGURE 65: Community contact wall in Design Factory in 2022.

FIGURE 48: Community wall in new Design Factory building in 2023.

Fablab RUC seemed the most innovative when it came to communicating about staff availability and skills. At the entrance was a Helper community board which was clearly made in the Fablab, see figure 67. The board was hung on the wall and made with a laser cutter, it has a photo of staff or student helpers and a 3-way rocker switch, LED, and a simple circuit on the back. The board shows if they are away, unavailable, or available to help. They also had several displays that would advertise events and the teachers or workshop master's and their specialized skills which could help students get consultation, see figure 68. I'd like to use this method to have students share more of a bio or skills that they have and display it on the Info Pylon (See chapter 8 Digital Signage chapter 4.9.1).

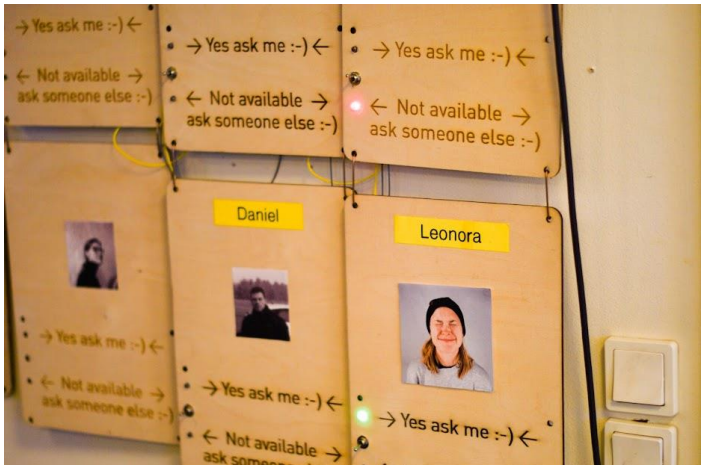


FIGURE 49: Helper community board, Fablab RUC, Denmark.

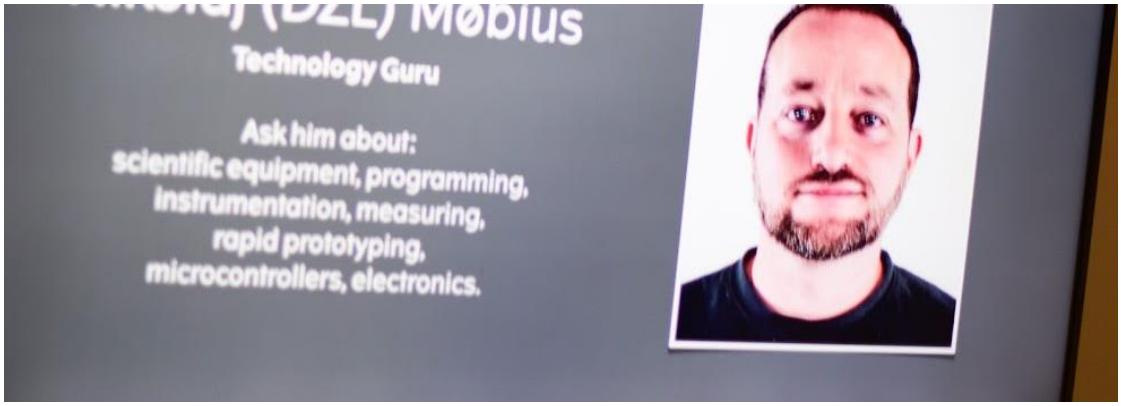


FIGURE 50: Slide show shown on a TV with profiles of staff members and listed relevant skills.

I tried to combine sign making with community building by having students help make signs for Space 21 and thereby taking ownership of the space. For instance, painting murals on the walls or renaming rooms for their current purpose or making custom 3D printed signs for bathrooms. I also encouraged members to make instructional signs if they learned something new that could be useful for others. I never established a formal process for this, but I mentioned during the onboarding that if they wanted to paint the walls or roof, they had the possibility to do so, and I would support them with materials.

4.7.10 Digital Signage / info pylon

Even though I love analog stuff, I'm also fond of digital content because of how dynamic it can be. Old TVs and other AV equipment is regularly donated to Space 21 by the Aalto Audio Visual team. To take advantage of a surplus of screens I placed several small monitors around the common spaces, so that I can info-blast current events and relevant information. This work was undertaken during summer of 2022 with the help of an intern. It has been used to set the mood for specific key events such as community driven movie screenings. The digital screen is used to show posters about the day's movie or an upcoming symposium which can be seen figure 69. Generally, these events are low-key so there isn't a great need for internal marketing, however, feedback from organizers has been positive as it adds an extra element of attention and helps make events slightly higher profile. To not be too distracting I opt to use animations that are high frame rate but slowed down so that transitions take longer than 10 seconds or more so that they change subtly and seem static when just walking past.

Dynaframe is a slide show software that runs off a Raspberry pi micro-computer. The inexpensive device was installed behind the display screen and connects to the TV with an HDMI cable and can be updated via a local server. This allows me to make updates to the screens without having to physically move files via USB, and control which slide show playlists are being displayed at any given time. One use case is to have a 'marketing mode' whereby guests from outside the university can see what Space 21 is all about in a more general sense. The software is still in development and often has bugs, however, current releases as of the end of 2023 allow for good enough control of what I want to do. As part of the onboarding process videos will be made and displayed on the screen in the future so new users can watch the auto-playing video to get a good and thorough introduction to specific house rules. Dynaframe also allows for switching between slides with an IR-sensor – the small pink box on the left side of the screen in figure 69.

FIGURE 51: Digital information board running on Dynaframe and a Raspberry pi.

4.7.11 Onboarding Information Guide

During the first months of Space 21 I was establishing rules and workflows as I was learning them. One of the first things that students need to do is request access Space 21 via an internal identity management system called IDM. I have the role of 'key master' and oversee granting access. While I could do this manually for each person, it is faster to have the requestor to make the application themselves. I could require them to describe their project in the application and store the data for later use. To help explain IDM registration process, I took screenshots of the website and in a text-editor added some descriptions to them and highlighted key information so that students can quickly perform the required steps. I printed out the instructions and posted them next to my office wall where many onboarding sessions tended to end. I also made a QR code, see figure 70. that can take users to the website that contains the same information in case someone wants to perform all the application steps, before visiting Space 21.

FIGURE 70: QR code linking to the online guide (Space 21, 2022).

4.7.12 Zine

Since the beginning, as new visitors and students were coming to inquire about availability for rooms and project spaces and even being granted a workspace, I increasingly found myself repeating myself about the onboarding process, rules, customs I was going about establishing and so forth. I also noticed that I would give different explanations and introductions to different people, depending on their experience with Aalto – bachelor's or master's degree or above, and depending on my own schedule and as Space 21 kept changing and establishing its identity and working methods. To make the onboarding more formal I opted to make a zine – a small comic book style leaflet that is typically printed on paper sizes ranging from A5-A3. The zine can be seen in figure 71. The zine opens like a flip book but also can be flipped inside-out for additional mater – most of which is online or spread throughout the building (IDM onboarding, rules, and coffee machine guide). Multiple designers were involved with the zine, and it took almost six months to get it made (between Summer and Winter 2022). I'm not sure where the idea came from since other workshops had a flyer at best, I think I just always liked how they can fit lots of information and it also worked as a marketing leaflet that could be spread around the campus. The graphic also shows the fold lines as well as cut and bleed markers and colour calibration used in the printing process.

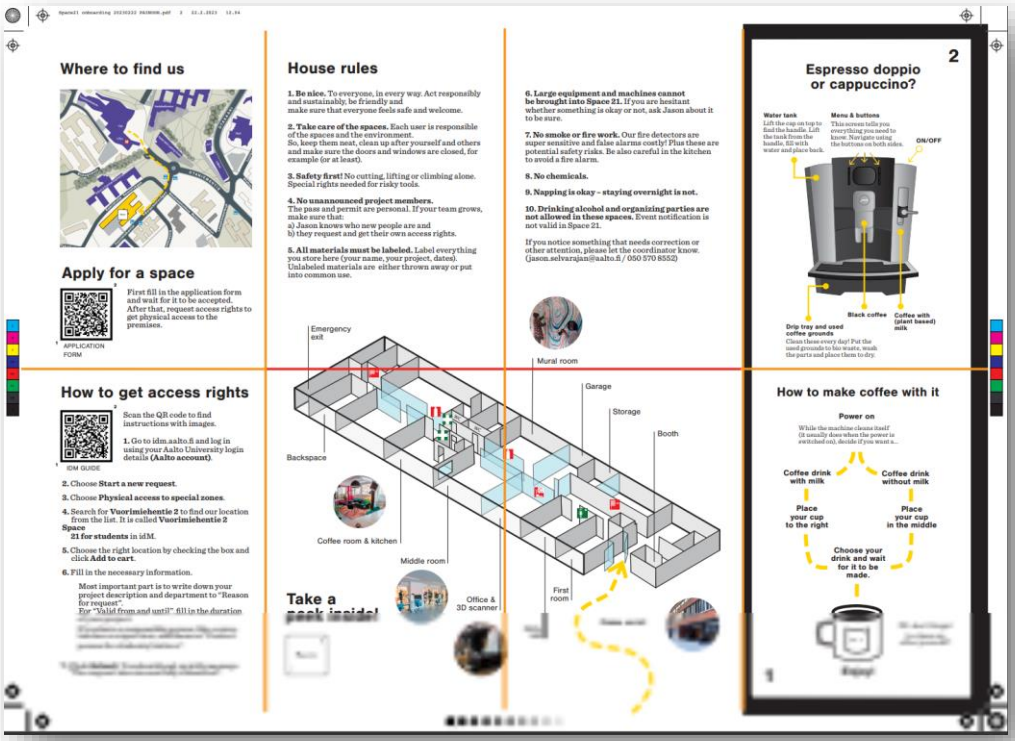


FIGURE 71: Space 21 onboarding guide and zine.

5 CONCLUSIONS

Throughout this long development process, I've observed and made lots of signs. I also perceived how people interact and ignore or don't notice them. I feel like I'm still not finished with my work, but as mentioned in the first chapters, I wanted to stay vigilant about signs and keep it on my mind as a constant part of my work. I'm especially interested in the perception of signs from new users. I wanted to focus on this topic so that I could try to build a fluid and creative space that would stay orderly on its own. So far, the reception to my interventions have been quite positive and I've received positive feedback from then on. I often notice that once I've made a sign, I feel like that section of Space 21 is closer to completion, and something I don't have to 'develop' anymore, but simply maintain. They also help me save time and mental energy with onboarding and general upkeep and maintenance, as everyone else can see how things are supposed to be used and put back.

Below are some of the comments I have received:
'Partrik would love these kitchen signs, I should bring him here to see them' - Heidi.
'I love that you use physical reservation signs, so you don't have to check some online thing' – Zoe.
'Everything here is so fancy; you even have a manual for the coffee machine' – Sol.
'Wow, you can see how important the coffee machine is, it's even in the guidebook' -

Based on my experience I have come up with ideas of what to take into consideration when making signs, and what kinds of tools can be used. These ideas are presented in the subsequent two subchapters.

5.1 Considerations in sign making

I've noticed during the thesis that making a simple sign for Space 21 can take many hours. There are many considerations to be made, namely the initial need, materials, branding, culture and tone, placements, feedback and revision and consistency and they are listed in the sections below. In the following section I describe my tips and rules for making signs that I've developed throughout the thesis writing process. While there is lots of material available on semiotics and user-oriented

design which is glossed over in the following chapter, the actual craft of designing, making and implementing physical signs is also of significance and mentioned in subsequent chapters.

5.1.1 Need for a new sign

The most important thing is to consider is the sign needed in the first place. As I've mentioned multiple times my primary consideration is to reduce my own workload by removing the need for me to repeat myself. If a sign can help me do that, and all other criteria are met, I make a temporary sign and then consider the other elements related to it. Figure 72 is often the first step I take when considering if I should make a sign. I think about how the sign can help me automate a task or message by giving allowance to others to do the job on their own. I also consider how I perceive the sign once it's made, how it fits in, and how others might observe the sign – this in turn helps me decide what kind of sign would best fit the situation, where it should be placed and what kind of verbal and non-verbal language I could use.

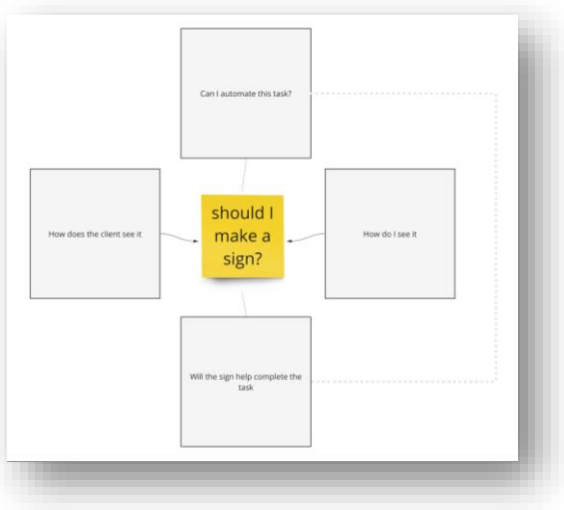


FIGURE 72: Should I make a sign consideration chart.

5.1.2 Materials

Be consistent with the material selection. Ready-made or custom, make sure you can make the same signs many years into the future. So, avoid using specialized machines or services that won't

be readily available when you want to make a new sign. Also consider how long the sign should last for so that it fits within some sort of material and time budget.

5.1.3 Branding

Indoor signs don't have to match the company or space branding, but it should stand out from regular posters or temporary notices. Essentially the signs should or can have their own branding style that is separate from the larger entity that it's a part of. In this case Space 21 uses different colours and typefaces to Aalto University.

5.1.4 Culture and tone

What kind of culture is being fostered- is it a friendly or funny, encouraging a do-ocracy type attitude, like something one would find in Noisebrige, San Fransico, or more hierarchical in nature where seriousness and strict adherence to the rules is of key importance, like in a chemistry lab where safety is the prime concern.

5.1.5 Placement

Placement should be visible and near the object/s in question. Larger signs may indicate greater significance or importance (Doorley and Witthoft, 92-93, 2012). Some signs can also be hidden in places that become visible only when the need arises, for instance, the inside of a cupboard.

5.1.6 Accessibility

Try to consider people with disabilities or things like language barriers to make signs that are more universally accessible. Colour, typeface, and placement instantly come to mind.

5.1.7 Feedback/Review/Revision

By placing a sign and observing interactions with it can be a good way to see if signs need changes, if they could be moved to more noticeable locations or otherwise help accomplish the goal of the sign. There should be a time marked in every annual or bi-annual calendar so that some time is designated to removing old and obsolete signs, and creating new signs, updating signs with irrelevant information, or replacing damaged signs. Adding semi-visible links or filenames in signs can help the maker find the correct file faster and thus make revising signs easier to perform.

5.1.8 Consistency

It's important to keep graphic design, materials, branding, and tone similar or even the same throughout the spaces, even if elements of them change. There should be unifying threads that make the signs identifiable and connected to each other and the space. It should be evident that a sign has been made for the space in question. The Space 21 logo is black and white with simple text in a box. To keep the format consistent signs in the kitchen, have pictograms with a similar outline as the logo, but with curved edges. The designs are different, but similar enough that in context it's clear that the sign was made for Space 21.

5.2 Tools for Sign Making

Throughout my investigations both before and during the thesis process, I've taken notes, photos and conducted interviews with staff or members of the workshops and other spaces mentioned. At best all signs are designed from the onset of making a space, but often-times, in creative spaces change is the only constant. It's important to use what materials and tools are available, but also consider what is the result in terms of branding and aesthetics. Summarized in this section are various ways of going about making signs from handwritten notes to vinyl cut-outs, 2D and 3D prints, label maker signs and stickers and even notes on painter's tape. Each one has it's time and place where they may be effective. In the subsequent text each of these are briefly described.

Handwritten notes and signs can serve the same purpose as any other type of sign but are generally short-term unless they are intentionally made by hand- like with a menu in a café wall. Long-term signs should give extra attention to caligraphy, design and the markers used. Short-term

signs can work to attract attention as they generally are a message to pass on immediately relevant information such as a recent change, a direction to an event, an out-of-order sign or something else. Hand written signs could also include things like outlines or shadows on tool walls, or arrows.

Paper printers need no special mention as the technology is ubiquitous. Special care can be taken to calibrate the printer/colour profile to reproduce colours accurately (especially for the safety signs). Heavier card stock can be used to provide durability and reduce transparency (when posted on glass) to increase legibility. Also see the chapter on laminating below.

A vinyl printer-plotter is a machine that has an integrated printer and cutter in the same machine, this lets you print multi-coloured designs onto various materials (often vinyl) such as stickers with transparent, translucent, or opaque backgrounds for walls, windows and floors or heat transfer materials for ironing onto textiles. These machines are affordable and there are more options when it comes to vinyl quality and adhesives. With the correct materials the stickers can last for many years if not decades depending on the material and what they are exposed to. In figure 73 cupboards and modular boxes in ADDLAB have their own vinyl stickers. This process is time consuming but leaves no doubt as to the purpose of the storage container. The clear cabinets and transparent boxes also help to show content that is locked away. The ‘Ask Staff!’ sign also points to who has the keys and more information. The labelling in ADDLAB was in my opinion the best on campus. This format might not be applicable everywhere as they seem to have had the opportunity to standardize their boxes and keep their material somewhat static. For places that have more turnover of materials and projects, fixed labels might not be ideal.

FIGURE 52: Custom vinyl signs on doors of cupboards and on boxes in ADDLAB.

I really like the vinyl cuts used in Fablab and ADDLAB and so I made and transferred signs for different waste fractions and placed them on our recycling bins, one example can be seen in figure 74. Vinyl text using a stencil typeface was often used in my own designs because it is faster to prepare as you don't have to peel out the vinyl from inside the individual letters (like the inside of the letter O). With rounded fonts the non-used vinyl layer also peels off much more easily.

FIGURE 53: Sign made with painters tape replaced with vinyl cut logo.

A laser cutter works in the same way as a vinyl cutter or plotter but uses a laser instead of a knife tip to manipulate the stock material, which is often Acrylic/Plexiglas or (special laser cuttable) plywood. The benefit of laser cutting is that you can also use the 2d structures to make 3d signs but stacking or using slots or glue. You can also engrave onto glass, or the materials mentioned above and thus have transparent or translucent signs. Adding LEDs can also make an impact and draw attention to the sign. See examples of laser cutting in Chapter 4.7 and 4.8.1.

Dymo label makers are quite common throughout Aalto and storage cupboards have extra rolls of the quick print material. These are great at conveying thought and care in the labels, but the colour and fonts should be consistent. If not, the age of the label comes into question. The Dymo stickers generally don't stick for very long which is why I would recommend Kroko. Kroko is a Finnish label making company that specialises in industrial labelling. The glue is far superior to Dymo and can last for decades if with handling and use when applied correctly (correct material and label). I use the label maker for tagging power plugs, so when I'm under a table trying to disconnect the toaster, I know which one to unplug, instead of accidentally unplugging the refrigerator. I also label locations for tools in the workshop by labelling the tool itself (with a pen if the sticker won't stick), and the area on the shelf where the tools sit. I can't stress how amazingly well this simple solution has worked. Much like shadows on the tool wall, I know what's missing and people often put things back in place, so I don't have to deal with it.

3D printing can be used to make signs visible from more angles and can make a sign 'pop'. Initially I planned to make all signs with a 3D printer. But the manufacturing process is a bit more time consuming, and material usage probably has a greater carbon footprint, even though PLA is compostable. An advantage of 3d printing is that if the final location is known the attachments can be designed into the print itself. For signs or labels or metal surfaces you can integrate a slot for a magnet (or just glue one on), or for wall mounting add screw holes. They can also be non-invasive by using hook-type features and then be hung on the object in question. It's difficult to get adequate scale for signs as most print beds are smaller than A4. Making large multi-part prints is even more time consuming, and so I tried to stay away from the process, so that a fast and consistent material could be used throughout the spaces. An example of a 3d printed sign can be seen below in figure 75. As there were only two bathrooms in Space 21, students argued that they shouldn't be gendered. I told them they could make the bathrooms gender-free if they took charge of making a

new bathroom sign. It was also the first of many signs that students were encouraged to make next to the project posters.

Figure 54: 3D printed unisex signs for WC. Made by students Joonatan and Iivo.

Polaroids are a great way of quickly updating a community wall or showing what material or tools are inside a box, or showing what a default layout should look like. So, when everything is in a chaotic state, people that aren't familiar with the space can return everything to their rightful place. If something like this doesn't exist, it's up to people to try to place things best they can, or perhaps do nothing, because they don't want to put things in the wrong place. A photo can be unequivocal if it stays up to date. Early on I purchased a small polaroid style printer machine that attaches to my smartphone. As an onboarding step new 'tenants' at Space 21 are asked to send a photo of themselves that I can print and place on the community wall, see figure 76. This is in line with what Doorley & Witthoft (2012) suggest as they say that 'Posting recent photographs front and centre forges a simples and immediate connection with everyone who enters your space'. Paper prints work in a similar fashion, but there's something a bit cute about using a polaroid as they are often used at parties to bring people together. Also, the instant and simple nature of it is what I like the most.

Figure 55: Community wall section on our information wall

A laminator is a cheap and effective way of formalising and protecting it from the elements and indoor moisture. It makes a printed, or hand-written note last longer, and can make it easier to hang, store or move around without damaging it. A laminated sign shows that time and effort has gone into making the sign, so it's not as easy to ignore as a wrinkled or creased piece of paper – which can seem like an old or forgotten sign. Laminating isn't exactly a sustainable practice, but neither is wasting time, energy or materials printing things that don't have a long lifespan. For reoccurring but custom events, laminated signs can leave fields blank and be filled in with a non-permanent marker. Laminating key pages from tool manuals is also a good way of presenting key information in a durable way. Photo or poster frames can also be used in the same way as laminated material and while they cost a little more, they are reusable and so a good idea for signs that change often.

5.2.1 Software for making signs

I heavily encourage the use of vector based or parametric software for design work as it can be scaled to any size, so software like Adobe Illustrator can provide much better reusability than Photoshop – a raster based graphic design tool. Here I list the main software that I use when making signs:

- Adobe Creative Suite, especially Adobe illustrator
- Microsoft Office or any text editor
- Using Office, Pages or some other text editor can work but it would be good to use a consistent style.
- Typora can be fast but cleaner than basic text editors and even supports .SVG and .PDF file formats which ease printing.
- For 3d signs I often use a combination of Illustrator, export files as .SVG or .DXF and then make them 3d in Fusion 360.
- Tinker CAD is an easy alternative to Fusion 360.
- Blender is an open-source CAD tool that I hope to transition to in the future.

Using pictographs also raises the bar and font, colour and contrast can be used to highlight information. I often use **thenounproject.com** as a resource for icons that can also be used as for stencils or stickers. Colour rules mentioned in a previous chapter should still be considered. Another useful website is printables.com, a repository of 3d models that can be downloaded and printer. Thingyverse is also quite good, but the website is constantly getting more difficult to use.

5.2.2 Hierarchy of sign making

I made a little chart to define properties of good signs from worst to best, starting from the top of each table, see figure 77. Of course, each situation should be considered on a case-by-case basis, but ideally long-term signs are made to look more permanent, show that time and effort have gone into making them, and are part of a cohesive whole in the space that the sign is in.

Text
Text and icon/picture
Styled text and icon/picture
Styled text and icon/picture
Styled text and icon/picture + date
Styled text and icon/picture + reference to document + date

Figure 77: Hierarchy of sign elements

Text refers to a basic font like Times New Roman or Verdana. Stylized text means that additional care has been made to be consistent or intentional with the aesthetic and visual aspects of the sign – alignment, spacing, kerning etc. Icons or pictures add some non-verbal communication and so are also more international and can be much more informative as the saying goes 'a picture is worth a thousand words. If English isn't your first language, it might take a moment to register the words cutlery, but you would instantly recognize a knife and fork.

Materials also play a role and can make a sign more durable and/or add weight to the perceived importance or officialness of a sign. A hierarchy of material for signs can be seen in Figure 78 below.

Post-it / Writing on tape*
Paper (also thin to heavier and cardstock)
Paper in plastic sleeve
Laminated Paper
Custom material (laser or metal cut, vinyl, et cetera)
Custom material + coating (or protected when possible)

Figure 78: Hierarchy of materials for signs

Custom materials include UV prints on hardboard, metal, glass. Vinyl on acrylic or pretty much anything that shows that additional effort and resources has gone into making it. Wood can also be oiled or coloured in various ways, and it also protects the wood from dirt and moisture. Signs can last for many years, and so it can be worthwhile to invest in making them last. Also, while a deteriorating sign may still work, it also conveys a message which may or may not be the goal.

5.2.3 My Rules for Sign Making as an Outcome

Here I describe some of my guiding principles for making and evaluating signs, I have iterated on this list throughout the thesis writing process, whereby I've added new rules and removed or revised earlier rules as I have issues or find methods that work. The rules are not listed in any order:

Taking time to make signs, saves time in the future!

Anything (message or instruction) that is repeated should be considered for a sign.

Any sign can be better than no sign.

A bad sign can be worse than no sign at all.

Too many signs are overwhelming and easy to ignore.

Good signs are clear and easy to read.

Pictograms/icons are great and can be paired with text.

photos of how things should be when in their default state encourage proper placement.

Silhouettes or shadows make returning tools (or things) satisfying and clear.

Test the placement for a sign – visibility and proximity are key.

Use colour selectively and consistently – Different colours for different levels/layers/categories of signage.

Safety related things should always have a sign + use the standard labelling colour and shape when appropriate.

People become blind to signs over time.

Review and refine your signs periodically.

Metadata like date of making, references, or links (to online storage or folder pathways) in your signs are helpful for updating signs.

6 REFLECTION

Writing this thesis has taken a long time and made me quite addicted to looking at signs everywhere I go. I became a sign nerd through the process and appreciate the work that people do to make signs that help me navigate through the world. I especially love thoughtful and custom-made signs that show personality and passion. Because of my other duties at Space 21, I took a similar approach to many workshop managers throughout Aalto and other spaces - I didn't have enough time or energy to dedicate entire workdays to signs. However, doing things in phases, especially when a room was being modified or renewed, helped to focus the task and often it gave me a feeling of completion when the last (for the time being) signs were put in place. It's like the period at the end of a sentence stating where a tool or appliance is supposed to be, or how it should be treated. All without me needing to verbally say it to all 170 people that currently (December 2023) have access to Space 21. I'm happy that I can add a new 'feature' to the kitchen or garage and have everyone find out about it on their own time when they need the information.

I really enjoyed exploring other workshops and that was also one of the reasons I chose this topic for my thesis. I wanted to get to know the campus facilities better and was hoping that I could offer them some tips and tricks on how to improve their own signage. As I mentioned, it's difficult to take time to focus on signs as they seem like a lesser priority. Because they can save so much time, I believe they are worth the investment, and would like to encourage other workshop master's and even their superiors about the importance of signage, enough so, that they would dedicate half a day (or more) time to it each year – to use the time to observe, evaluate and refresh or make new signs, competitive benchmarking could be used for this process:

> "The benefits of using competitive benchmarking include creating a culture that values continuous improvement to achieve excellence, increasing sensitivity to changes in the external environment and sharing the best practices between partners" (Vaziri, 1992)

I've found the same fascination with signs as I have for working with tools and making things. It lets me combine my skills in graphic design and various software, social engineering -in a way, also interior design, user centred design and knowledge of user experience. In a way it helps me channel

my view of the space to other users in an experiential way. As for my other work in Space 21, so far, I'm happy with what I've accomplished so far and I'm excited for the future.

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APPENDICES

APPENDICES

Definition of terms appendix 1

Plants and interior design appendix 2

DEFINITION OF TERMS

APPENDIX 1

Affordance - refers to all “action possibilities” latent in the environment, objectively measurable, and independent of the individual’s ability to recognize those possibilities. Further, those action possibilities are dependent on the capabilities of the actor.

Cue - is a signal of something or a reminder of something. It suggests something from past knowledge or previous experience that provides a framework of meaning that can be used to interpret the sign.

Chart junk - refers to useless, non-informative, or information-obscuring elements.

Dynaframe – software built for a microcomputer that allows can run slide shows, audio and video and widgets, accessible wirelessly.

Semiotics - is the study of signs and symbols.

Symbol - is a more complex in terms of its cueing processes. A symbol is something that represents something else by convention or by association.

Sign - any visual or physical object that conveys meaning or information to an observer. This includes symbols, images, text, or other visual elements that communicate a message.

Signage - typically refers to the design and implementation of signs for a specific purpose or in a specific context. This can include things like wayfinding signs in a public space, advertising signage for a business, or safety signs in a workplace.

Infographic - a visual representation of information or data that uses design elements like charts, diagrams, illustrations, icons, and text to convey complex ideas in a clear and concise manner. Infographics are often used to present statistical data, research findings, or other information that may be difficult to understand or remember when presented in a traditional text format. They are designed to be visually appealing, easy to read, and engaging, which makes them a popular tool

for marketing, education, and communication. Formats for infographics, including posters, pamphlets, and digital interactive graphics.

PPE – Personal Protective Equipment consists of things like helmets, gloves, and work shoes. Special clothes or gear designed to protect you when using a specific machine or when doing a particular kind of task.

Workshop Master – The name given to people that run workshops in Aalto University. This role essentially a lab or workshop manager, or technician, or perhaps both. Workshop masters oversee everything related to daily workings of a workshop, such as procuring material, maintaining machines, workshop organization, making inductions and supervising students as they work. While not officially teachers, workshop master's often help students find information, give design suggestions, and sometime work the equipment on the behalf of the students.

Zine – An A4 sized flyer or pamphlet that has a central cut that folds up and can be read like a little booklet by turning pages. When inverted reveals more pages that are printed on the backside of the zine page.

This section deals more with interior design than signage. These are included because they still have a bearing on culture forming and communicating information about the space. The couch and carpet in the kitchen/living room relays that it's ok to relax in the room and that it's not a strict working space, at the same time the room is often used for workshops and the raised table, and stools make people more engaged in conversations with each other (Doorley and Witthoft, 2012). The plants and small bookshelf also make a 'homey'-vibe. To support inclusivity a LGBT+ flag was hung outside the kitchen which, hopefully, also communicates that the kitchen and Space 21 is safe space. Small traditions such as grasses were grown for Easter, see Figure A below, and a plastic Christmas tree set-up for the winter season. These help us change the atmosphere in the room for the seasons and keeps the space from becoming static. Staff and students are also encouraged to move furniture around as needed and leave things in new configurations.

FIGURE A: Photo of Space 21 Living room with Easter grass growing.