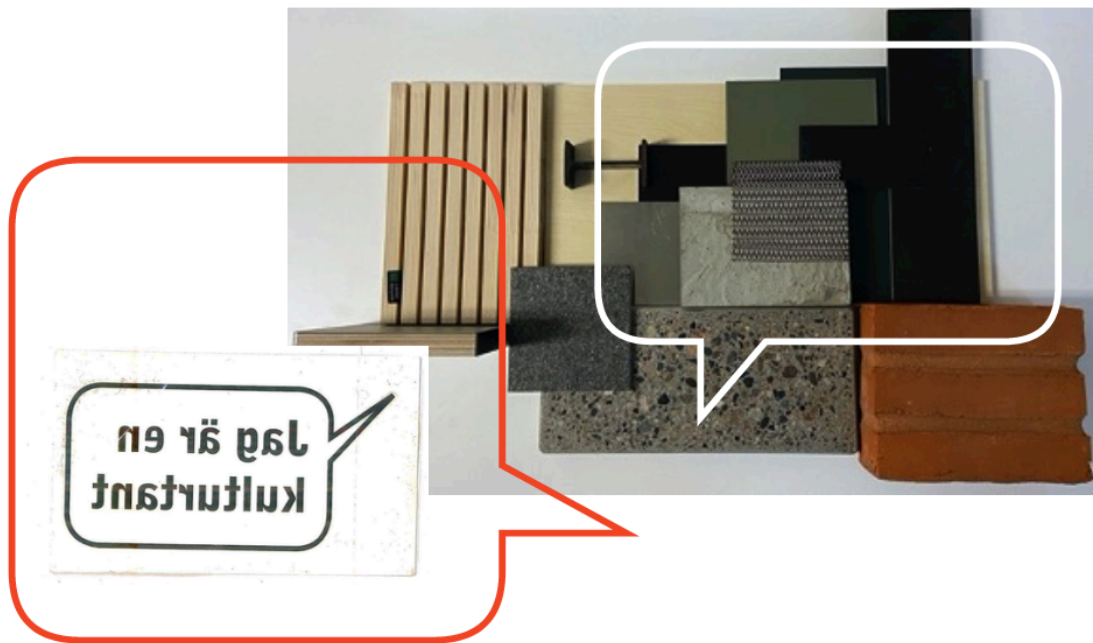# DIALOGUE WITH A BUILDING

Exploring Sustainability in a Dialogue Between

People and Materials in Public Spaces

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II

Dialogue with a Building

Exploring Sustainability in a Dialogue Between

People and Materials in Public Spaces

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IV

Dialogue with a Building

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Abstract

Within the area of sustainability and materials, this thesis explores the dialogue between people and materials in public spaces, with the Life Science Building as the applied case. The explored research question is *"How can we understand the dialogue between people and materials in public buildings?"* with the two sub-questions *"How are materials experienced in public buildings?"* and *"How are materials manifested in public buildings?"*.

In order to explore materials within public buildings, different methods are conducted which involves different groups of stakeholders. Systems Thinking is applied as theory, and Systems Oriented Design is the applied methodology. Within the methodology, the method for GIGA-mapping is combined with interview, observation and collaborative booklets. The interview and the GIGA-mapping workshop involved architects and other key informants related to the Life Science Building. The booklets involved participants representing the role of visitors of a public space or building, and the observations let me explore public spaces through the role of a visitor. These methods are analyzed using thematic analysis, content analysis and ZIP-analysis. A meta-analysis is conducted to connect the data from the different methods, where the spheres of sustainability is applied as a framework. Conducting these methods and involving different stakeholders have helped me to gain an understanding of how materials are experienced and manifested in public buildings.

The composition of the spheres helped to map out the building as a system, consisting of social, economic, environmental and political elements, through the viewpoints of experiencing and manifesting materials. Including several methods and stakeholders led to a dialogue with a building and an understanding of a building as a system. In order to understand the dialogue between people and materials in a building, the role and context of the dialogists should be addressed.

Keywords: Systems Thinking, Systems Oriented Design, Sustainability, Materials, Public Spaces, Dialogue

Acknowledgements

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1   Introduction

Materials are part of our everyday life, either we are aware of it or not. We interact and are affected by materials in our environment on different levels. These interactions and relations to materials have inspired me to engage in a dialogue with materials in a building.

1.1 Motivation

Buildings contribute with approximately 50 % of the CO2 emissions produced by humans (Kraftl, 2010), where manufacturing of building materials represents 5-10 % of the global CO2 emissions (Agustí-Juan & Habert, 2017). This points to how the choices of materials help to determine the environmental impact of a building. Since the choice of materials determine the use of natural resources and the amount of energy used for production and maintenance, the selection of materials is crucial (Ljungberg, 2007). The choices of materials can determine areas like technical lifetime, maintenance, service and repair (Ljungberg, 2007). The fact that choices and consumption patterns of materials contribute significantly to the CO2 emissions humans produce, has inspired me to explore materials further.

As economic growth is valued amongst manufacturers and governments, environmental sustainability is often addressed through products and sale (Anusas & Ingold, 2013), where packaging might mislead consumers (Chrysochou & Festila, 2019). "Eco-labels" is one method where everyday products are accepted as environmentally friendly in a quantitative estimate. Additional to everyday products, eco-labels also aim at buildings. Both the criteria for green building materials and green building rating systems do not correspond to environmental aims (Awadh, 2017; Khoshnava et al., 2018). A motivation to focus on materials is this explained paradox of sustainability, which presents itself through the building and construction industry. There is a paradox of building new, while maintenance, recycling, and reuse are simulations taking more place in current discussions. The area of building and construction is complex, where actions taken for sustainability are nuanced. Materials appeal to the everyday life of both people and spaces, which motivated a curiosity to explore its nuances.

1.2 Context

This thesis is written as a collaboration between the Sustainability & Design Lab, the Library of Medicine and Science, and Statsbygg, with a focus on the new Life Science Building. Additional to presentations of the building at the start of the master program, I got the opportunity to visit the building using augmented reality, in February 2020. In Chapter 3, I will present more on the building and its project.

The project office presented sketches and project outlines. One area of the office presented the physical materials, which I found it was easier to formulate questions around as they were more tangible. Figure 1 shows photos of materials taken during the visit at the project office. *Where did the materials come from? What does each material represent? How do the materials represent sustainability? And in what way?* These are some of the questions that emerged when visiting their project office. These questions led me to further explore the materials in the Life Science Building.

Figure 1: Photos from visit at Life Science Project Office in February 2020

1.3 Research question

To explore the materials in the Life Science Building and proceed to map out their relation to the building and its visitors, I propose the following research question:

How can we understand the dialogue between people and materials in public buildings?

To explore dialogue between people and materials, I will focus on two sub-questions:

1. *How are materials experienced in public buildings?*

2. *How are materials manifested in public buildings?*

To engage in dialogue with a building, I will involve different stakeholders and explore through different methods. The research question will be explored with a dialogical approach, such as suggested by McCarthy and Ciolfi (2008) in exploring visitor experience in the museum context. The dialogical approach aims at experiences as complex and layered, where an experiencing can consist of opposites such as material and conceptual, physical and cultural, reflective and sensory. A dialogical approach aims both to the physical environment and the communities, where the physical environment participates in a dialogue between a person and the environment (McCarthy & Ciolfi, 2008).

Manifesting materials aim at investigating how choices and considerations are made in the design and building process, and on whose or what behalf these choices and considerations are made. In this context, to manifest is understood as something to become reality and is applied to the process in which materials transform from ideas into materiality.

Experiencing materials aim at investigating awareness of materials within the physical building. As materials can also be experienced within a building process, I emphasize how its applicability within this thesis points to the physical space or building. McCarthy and Ciolfi (2008) express how *«Experience involves acting and being acted upon, sensing and feeling both, and transforming them into something emotionally and intellectually meaningful. The sense people make of their experience—individual and collective—makes use of place and indeed makes or transforms place» (p. 250).*

While manifesting materials represent how abstractions within the process become reality, experiencing materials represent how the visible and tangible outcomes of these manifestations are experienced. These two focuses within each sub-question represent one group of stakeholders, where manifesting materials aims at the role of architects and experiencing materials aims at the role of visitors (explained further in Chapter 0).

1.4 Chapter guide

Chapter 2: Background

Chapter 2 explore the area of 'sustainability and consumption', where the research area 'materials' is explained within this context.

Chapter 3: The Life Science Building

Chapter 3 presents the case of The Life Science Building. Based on an interview with an architect from the project, materials within the building project are presented.

Chapter 4: Theoretical and methodological considerations

Chapter 4 presents Systems Thinking as the applied theory, where Critical Systems Thinking and Feminist Systems Thinking are explored, in addition to the relation to design and materials. Systems Oriented Design is further presented as the methodology. Additionally, the chapter provides a description of methods for data gathering and analysis.

Chapter 5: Results and Analysis

Chapter 5 presents the methods conducted: *Observations of Public Spaces*, *Collaborative booklets*, *GIGA-mapping*, and *Merged finings and analysis*. Within these presented methods, their result and analysis are explained.

Please take note of Appendix A, which presents a link to a Miro board with illustrations and visualizations of results and analyses throughout the project. Several of the figures are

provided in the Miro board in addition to the thesis, and it can be helpful to view them from the link as more detail can be accessed.

Chapter 6: Discussion

Chapter 6 provides a discussion of the findings from the conducted methods, and how they answer to the research question.

Chapter 7: Concluding remarks

Chapter 7 provides the concluding remarks of the thesis, in addition to presenting contributions and future work.

2   Background

In order to start exploring my research question, I will present some literature around two topics. The first topic, sustainability and consumption, will put my research question in the wider discussion on sustainability and unsustainable consumption. The second topic, materials, will address existing literature about understanding materials, including digital materials, materials in design, and experiencing materials.

2.1 Sustainability and Consumption

As construction and building projects are significantly responsible of CO_2 emissions produced by humans (Kraftl, 2010), gaining an understanding of sustainability as a basis is crucial for further explorations. Consumption will be explored as an area representing current patterns in society. An inclusion of consumption will help to understand the different spheres of sustainability, before the two topics will culminate in the exploration of materials.

2.1.1 Sustainability

Sustainability is often discussed in regard to maintaining the ecological balance of the Earth in the use of its natural resources. However, the concept of sustainability involves several pillars; the environmental, the economic and the social are three of them (Purvis et al., 2019). Environmental sustainability involves the natural resources, and that we are consuming them at a sustainable rate. Economic sustainability regards how businesses and countries uses resources in a responsible matter, where profit is operated sustainably. Social sustainability regards the wellbeing of society and other social systems, and maintaining the wellbeing in the long term. These three pillars summarize as planet, people and profit, and show how natural, human and economic capital must be handled responsibly (Hansmann et al., 2012; Purvis et al., 2019).

It is generally accepted that there is an imbalance in the use of the Earth's resources, which has serious effects, which is addressed through the climate crisis. The increasing scientific and technological developments in the world is resulting in an increasing human well-being, but also in environmental consequences. Sustainability has emerged as a response to this. In

order to understand the environmental problems we currently are facing, it is important to understand the social, cultural and economic systems that gave rise to these problems (Bergmann, 2012). It is crucial to consider the deeper level of the *cause*, rather than continuously fighting only the *effects*. This includes social systems allowing for over-consumption and environmental destruction. It is important to develop skills in order to work with nature to make the best use of the ecosystem, which as a matter of fact is the system that fulfilled human needs long before discovering fossil fuels (Bergmann, 2012) .

There are several issues connected to 'sustainable development', which is known as the pathway to sustainability. The environment must be understood as part of the development process, and not be taken as free to use (Ljungberg, 2007). The Brundtland report (1987) defined sustainable development as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (p. 37). The term 'sustainable development' and its use has been addressed as an oxymoron, targeting at how the term contradicts itself (Birkeland, 2012). The term implies green development as something that exists with a need to create more of it. This ignores the context which presents how development already has exceeded beyond the Earth's capacity of ecological resources. Consumption patterns can help to explain the 'sustainable' and 'unsustainable' development.

2.1.2 Consumption

The primary cause of environmental problems is overconsumption on excessive levels. Consumption is, on several points, still a necessity in the world; personally, socially and economically (Watson, 2012). In order to understand the term sustainability, I believe one also need to understand the term 'consumption'. Consumption especially refers to the fourth pillar of sustainability, which is the cultural pillar.

The term can be perceived as a broad field, but has also been theorized, especially in high-income countries, as a culture of excess, consisting of overproduction and waste (Evans, 2019). Consumption has been defined by Wilhite (2008, p. 3) as "*the acquisition and use of things*". The term also has been provided with more complex definitions, among others Campbell's definition of consumption as "*involving the selection, purchase, use, maintenance, repair and disposal of any product or service*" (2007, p. 102). These definitions show how consumption is and has been perceived in different ways and to different extents.

Consumption can be everything from eating your breakfast, sleeping in your bed, scrolling on your phone, taking the bus, to shopping for a new clothing item. Consumption is everywhere, and all people take part in it every day.

The patterns of consumption in high-income countries are currently unsustainable, in relation to the resources which are being consumed (Sahakian & Wilhite, 2014). Wellbeing is also a term which can be discussed in relation to consumption patterns. The floating meaning behind "need" often can confuse consumption in correspondence to social norms and constructed normalities (Guillen-Royo, 2010). The planet is in need for a sustainable environment, which is an environment where humans can meet their own needs, without harming the natural balance of the planet. This requires a conscious sourcing of nature, extracting only the resources that is necessary, in order to keep all life in balance.

Systems of provision (SOP) covers the processes of distribution and retail in addition to production, and can be crucial in the understanding of consumption. The patterns of consumption emerge from complex connections of structures, agents, processes and relations, which are specific in time and location (Fine, 2013). In addition to consumption, it's relevant to understand production, and how the two relate to each other. Bauman answers in an interview that "*All production is consumption (...) and all consumption is production (...)*", adding that one activity without the other would be unthinkable (Rojek, 2004, p. 291). Sustainable consumption and production (SCP) suggest that in order to reduce the environmental impacts of consumption, a crucial part is to improve the environmental aspect of the production processes (Evans, 2018), such as the choices and considerations of materials.

2.2 Materials

As with consumption, people engage with products and materials in some way every day. Awareness around materials can act as a way of empowering learners to become active citizens by leveraging their consumer power, and thereby effect change. Material awareness is therefore an interesting topic to engage with in the context of creating awareness around sustainability (Watson, 2012).

The Intergovernmental Panel on Climate Change (IPCC) agrees to the science on climate change, saying that consumption habits, production processes, and materials are out of balance with nature and its resources (CHANGE, 2007). Nature cannot keep up with the rate of material exploitation, environmental degradation and toxic chemical pollution. The Earth's spheres of air, organisms, water and soil are all affected by this (Watson, 2012). Life cycle assessment (LCA) is a tool for understanding the impact of the environment, where a material product is evaluated from cradle to grave (Ljungberg, 2007). LCA allows for evaluating impact though six stages; extract from material, manufacturing, packaging, transportation, product user stage and product disposal stage (Ljungberg, 2007). The materials involved in the different stages mainly causes the environmental impacts. LCA is not 100 % accurate in considering different productions, breaking down or recycling methods. Even though a material or product itself can be viewed on as "sustainable" does not necessarily mean that its whole life cycle is.

Living in a globalized world, materials are produced, shipped and consumed all across the world, and embodied impacts goes unnoticed at the point of consumption. Before industrialization, raw materials were known as cheap and available, since they were found right out in nature. As demand has increased with people's standard of living, raw materials have become more difficult to extract and production more expensive. The small part of consumption where the buyer purchases a product is only the visible element in the vast system. Once the buyer purchases the product, they are connected to a global web of activity (Watson, 2012). Most of the activity and implications of a product is invisible to the consumer. Gaining material awareness can give a power to make this web visible through knowledge and imagination, in order to then act on this understanding. I will further present my understanding of materials for this thesis.

2.2.1 What I talk about when I talk about materials

Can anything be considered a material? Does a material have to be tangible, or can it be presented through an intangible form? Can a material be both visible and invisible, digital and analogue? There are several different terms and angles considering materials and what the term incorporates. A material can be considered as a physical substance that has some specific properties of its kind, and can also be perceived as a substance without a form but with the options of being shaped and proportioned (Vallgårda & Redström, 2007). Anthropologist Tim Ingold (2007, p. 1) addresses materials as "*the stuff that things are made of*", and later on (2012) discusses materials in relation to *materialism*, *the material world* and *material culture*. As these are terms that can be discussed from several angles, they can be hard to provide a designation for. Either way, additional to discussing these challenges, Ingold provides some provisional definitions. He defines materials as *"matter considered in respect of its occurrence in processes of flow and transformation"* and materiality as *"(a) the "brute materiality" of the physical world; (b) the ways this world is appropriated in human projects"* (2012, p. 439). By this, materials can be understood as the actual matter of an object or a substance, while materiality concerns how materials exist within the human society.

Energy as material

To explore and address how broad the area of materials can be understood and perceived, I will explore the example of energy as a material. Pierce and Paulos (2010) explore energy as materiality. As they propose a design approach, they address how energy are concerned to be *intangible*, *undifferentiated* and *available*. Energy is explored as something tangible, applying the definition of materials as something objective. Both energy and materials can be considered social, cultural, political and symbolic. Energy is suggested as an immaterial materiality, which is not less real or significant than tangible matter.

Digital as material

Such as energy, digital materials can also be considered an immaterial materiality. As digitalization is revolutionizing the world, it can be beneficial to look at how digital artefacts and systems can be considered "materials". Agustí-Juan and Habert (2017) have analyzed three case studies that uses 'digital fabrication' as an innovative construction process. Results

from the LCA presented criteria to develop a greater understanding of digital processes and help designers make better informed and more sustainable choices in implementing digital fabrication. Out of three case studies conducted, Agustí-Juan and Habert (2017) points out that two of them highlighted low impact of digital fabrication compared to materials production. As the environmental impact of a building project greatly depend on the design choices of material use, integration of digital technologies can help to create approaches to reduce these impacts (Agustí-Juan & Habert, 2017). Technological approaches can help to address how resources can be used efficiently to offer new possibilities in design.

2.2.2 Materials in design

Materials are related to design, where design traditionally evolved from the study of materials and designers had the role of shaping materials (Anusas & Ingold, 2013). This does not mean that all materials are shaped by designers, as material can design itself through interfering with other elements through its process. Ingold (2007) presents an example of a stone in order to investigate it as a material. He finds how the stone is different after picking the stone up after leaving it outside for a while, as it has gathered moisture. He presents how the substance of the stone cannot be understood apart from its changing surroundings as the medium.

From the perspective of a designer, thoughts and perceptions are shaped by materiality: materials can adjust a reaction to a product or a space (Aguirre-Ulloa & Paulsen, 2017). How a product is designed will decide most of the environmental impacts that the product will cause during its life cycle. The choices of materials influence the energy which is put into the product (Laurenti et al., 2015).

Experiencing materials

But how can we gain a deep understanding of materials in practice? Miodownik (2007, p. 1639) wrote that "*It is becoming simply impossible for individuals, and indeed organizations, to have such in-depth knowledge across the spectrum of materials*". Metaphysical reasons result in the selection of a material to often not be easy, for instance due to "feelings" for a certain material (Ljungberg, 2007). In the article "Toward designing new sensoaesthetic materials" Miodownik (2007) talk about material libraries, which have existed since 1997. This is a kind of library, that instead of presenting books, presents materials with physical

access to samples in order to achieve an available hands-on sensory interface. One example is the materials library of Kingston University (see Figure 2), which presents 'ecosmart materials', focusing on recyclable and renewable materials (THE REMATERIALISE PROJECT, 2002). This is an example on how materials can be available for designers and architects in their processes of considering and getting to know the several options of materials, by breaking down the need of central repositories to access information. Material libraries can help to act as an interface between the producers and the users of materials, in addition to an interface between the arts and science (Miodownik, 2007).
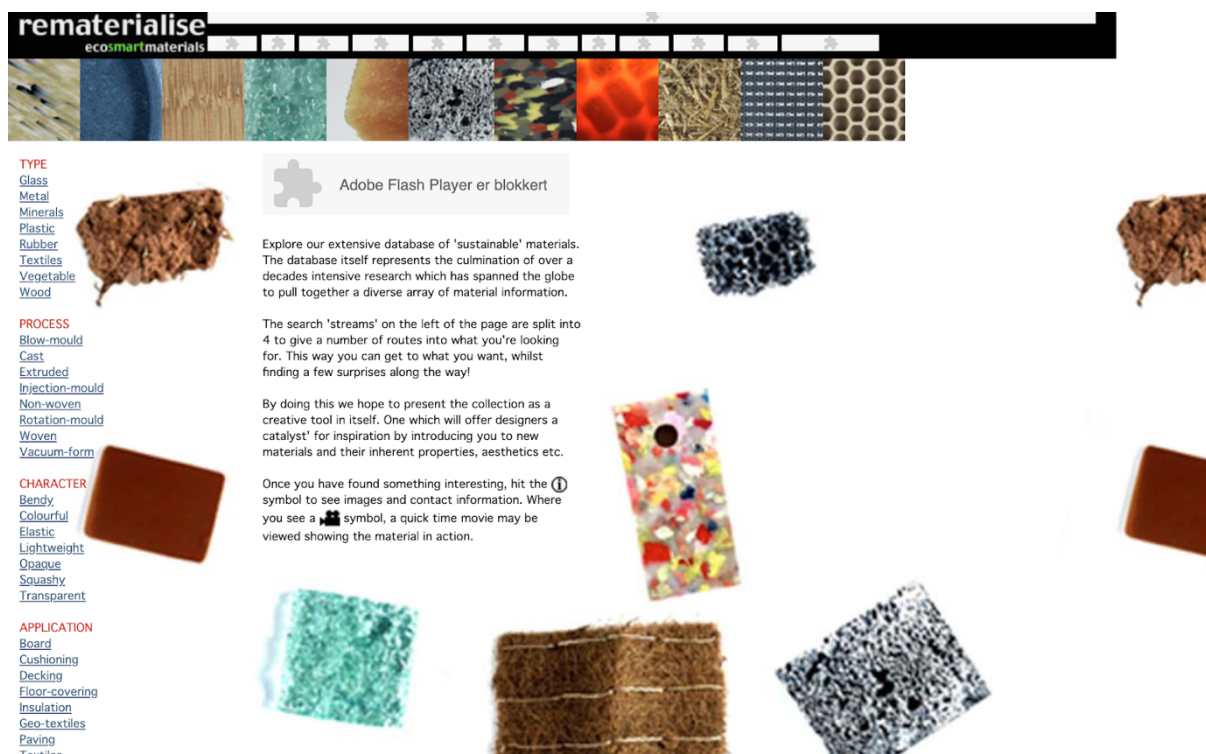
Figure 2: Webpage of Kingston University's materials library "rematerialise" (THE REMATERIALISE PROJECT, 2002)

In the article "Democratic Cardboard" Turrini (2017) explores 'cardboard design' which was developed between 1960 and 1990 as an alternative to the modern materials and aesthetics. Cardboard objects present a sustainable process, where short and circular production chains are activated (Turrini, 2017). Cardboard becomes a metaphor for sustainability and contributes to raise awareness and responsibility towards environmental and social issues. The material shows a connection between permanent and temporary, where it aims for cyclic regeneration and redesign. Experiencing materials can be related to 'sensoaesthetic' elements of a design. As material experience aims to focus on the active role of experiences with and

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through materials (Barati et al., 2017), sensoaesthetic has the purpose to understand how people interact with materials, in order to improve a design (Miodownik, 2007). Sensoaesthetics look outside the physical aspects of materials, and rather focuses on the sensual, aesthetical, psychological properties (Miodownik, 2007). Sensoaesthetics concerns structures which value human comfort, inspiration and satisfaction, such as buildings, interior, clothes and urban spaces. In order to design sensoaesthetical structures, one must understand people's needs and desires. Miodownik mentions how sensoaesthetic properties of materials are often subjective, so there is not much research linked to it.

A method exploring how material experiences can be designed is Material Driven Design (MDD) (Karana et al., 2015). The material driven design method is presented with some premises. Firstly, how the materials are expected to shape and affect the user experience should be taken into consideration. To design with a material entails an understanding of the material and its qualities. Exploration of the material is advised, in order to gain an understanding and to be able to compare to other materials. A thorough understanding in the design process is also required, like understanding the domain and creating and selecting concepts (Karana et al., 2015). The method presents 'experience' as the expected outcome of the design project. 'Material experience' is defined as the experience that people can have *with* and *through* the materials of a product. This experience can consist of different experimental components, being *aesthetic (sensorial) experience*, *experience of meaning (interpretive)*, *emotional (affective) experience*, and *performative experience* (Karana et al., 2015). These components are closely intertwined, where they depend on subject, context, object and time. This means that material experience help to shape people's practices around an artifact through the material (Barati et al., 2017). Barati and Karana (2017) present a concept of prototyping experience of materials. 'Experience prototyping' has the aim to get a sense of the real experience and to be able to reflect on them as a designer. This type of prototyping facilitates understanding, exploiting and communication through the design process (Barati et al., 2017). The concept can help to explore and communicate the qualities of a material.

2.2.3 Summary

Exploring materials in relation to sustainability and consumption patterns, have laid the grounds to further explore the case of the Life Science Building. Exploring a definition of

materials, with the example of energy and digital materials provide the broad area which materials will hold throughout the thesis. The possibilities and relevance of materials in design will help to navigate further explorations, especially in investigating how materials are experienced. In exploring the Life Science Building, I will first involve one group of stakeholders representing architects to explore how materials are manifested throughout the building process. Further, materials will be mapped out to visualize their relations within the context of the building, in order to explore the dialogue of materials. Chapter 3 presents the case of the Life Science Building.

3   The Life Science Building

This master project is part of the ongoing collaboration between the Sustainability & Design Lab at the Department of Informatics (IFI) and the Science Library of the University of Oslo. As part of this collaboration, master students at IFI were invited to implement a master project at the new Life Sciences building that is currently under construction. The collaboration allowed us to visit their project office where we were invited into the building using augmented reality. In exploring materials in public spaces, I will apply the Life Science Building Project as a case.

The aim for the building is to create a research and learning environment that encourages interdisciplinarity by connecting different fields and disciplines in order to understand life and its processes. The life sciences refer, in this context, to pharmacy, medicine, chemistry, and biology, with additional fields of research, such as nano- and biotechnology, big data and artificial intelligence. Interdisciplinarity will help to work with challenges with illness, sickness, food production, biotechnology, climate and environmental changes (Universitetet i Oslo, 2021a). As the building will house 1000 employees and 1600 students, it also allows for cooperation with business, public sector, Oslo University Hospital and innovation environments. The Life Science Building is of great significance in the initiatives for the innovation district Oslo Science City (Universitetet i Oslo, 2021a).

3.1   A building as a public space

To contextualize the Life Science Building as a case representing a public space, I will address what it means for a building to be a public one.

3.1.1 Navigating a building

Buildings are complex systems, where great amounts of materials, energy and money are invested (Kraftl, 2010). The significancy of buildings can also be rooted into how they affect practical routines and daily lives of people, and evoke emotional responses. Kraftl (2010) discusses the geography of architecture, where buildings are addressed to be geographical settings where space is made, negotiated and experienced. Buildings can be defined by its

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materiality, as material is what they are designed, used and made of (Dean, 2017). Dean (2017) differentiates architecture from a building, where a building is addressed to be physical, social and cultural. The composition of material and space represent the physical, its intended functions and use represent the social, and the cultural is represented through the meaning which is carried by form and name. Jenkins (2002) addresses how a building has social, cultural, economic, and technological influences, where conceptualizing the materiality might be crucial to create a narrative to explore its interrelatedness.

3.1.2 Navigating the public

The social and spatial organization of a city can be interpreted by looking at the distinction of public and private. A public space presents openness and inclusiveness, across both social, legal, and physical boundaries. With the expectation of accessibility, both strangers and citizens can visit with few restrictions (Madanipour, 1999). The term 'public space' is perceived broad, presenting everything from streets, parking lots, parks, to libraries - it holds many layers. Public spaces like museums, libraries and restaurants propose a specific use and significance, which comes with its own set of restrictions (Madanipour, 1999). A broad assumption in differentiating the public from the private is that the space outside of a building can be perceived as public and the space within a building can be categorized as either private or semipublic, according to its social structures (Jenkins, 2002). Thus, the Life Science Building might be categorized as semipublic. Addressing the fluctuations of defining public spaces, I will further categorize it as a public building.

How space within a city is managed and organized determine how individuals can move around. Madanipour (1999) states how the future of cities are threatened by privatization of space and social fragmentation. Competition in the world economy leads to the environment of a city to attract both investors, employees, and tourists (Madanipour, 1999). Paddison and Sharp (2007) discusses the end of public spaces, where the inclusiveness and accessibility of public spaces in local areas are questioned to be threatened. Recapitalization of space is discussed and defined by *«the logics of commodification and the need to establish order, the imprint of which is made apparent through the privatisation of public space and the spread of new measures for its control»* (Paddison & Sharp, 2007, p. 88), where it targets the group of tourists, capitalists and professionals engaging in the economic competitiveness of the city.

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Materials in public spaces

Anusas and Ingold (2013) discusses how public spaces are often obscured by their location and how their surfaces are often weaved together. The design of public spaces does not help to gain an understanding of how people are linked to their surroundings through energetic and material networks. Looking at how the surfaces are woven together in a network of matter; human, material and environmental relations can be considered (Anusas & Ingold, 2013). Exploring materials through the context of public spaces can help to address their relations to the visitors of the building. Through exploring public spaces, materials can be mapped in order to create an overview of the building as a system (which is done in Chapter 5.3 and 0). Through exploring materials, one can map out relations and dialogue of materials within this context. Materials can be explored regarding their future and history, which can open up to an understanding of whether there is a distance between the reality and the idea of the building. Through understanding the vision for the building, one can further explore which actions are being taken in order to reach the goals.

3.2 The project

The Life Science Building (LSB) is being built by Statsbygg and is drawn by Ratio Arkitekter. The building is planned finished in 2025 (Universitetet i Oslo, 2020, 2021b, 2021c), with the size of 66 700 square meters, making it the largest university building in Norway (Universitetet i Oslo, 2020). The engineering group of Ratio Arkitekter won their plan- and design contest for the building in 2014 with their project VEV (WEAVE) (Universitetet i Oslo, 2020).

The Life Science Building, which Figure 3 illustrates, is promoted as a sustainable building, where it is certified as a sustainable building in the class 'BREEAM Excellent' (Statsbygg, n.d). 'BREEAM' stands for Building Research Establishment Environmental Assessment Methodology, and has the five levels: Pass, Good, Very Good, Excellent and Outstanding (NGBC, 2012). The certification is based on environmental presentation in the ten categories: management and administration, health and indoor environment, energy use, transport, water, materials, waste, land use and ecology, pollution, and innovation (NGBC, 2012). Statsbygg (n.d) also states their goal for the project of reducing the greenhouse gas emissions with 50 % for materials, energy and transportation, compared to a standard building within the same

building category. The project is stated to have the energy goal of being an "almost zero energy building" (Statsbygg, n.d).

Figure 3: Life Science Building Project

3.3 Materials in the Life Science Building

To get a deeper understanding and insight of materials for the building, I did a key informant interview (Crang & Cook, 2007; Marshall, 1996) with an interior architect for the Life Science Building, who is a discipline leader in materiality. Through the interview, I got an understanding of how materials were considered and chosen, and what they represented. This section about materials is based on the data from the interview.

The interior architect describes the building as a workshop, and how this is reflected through rough materials. Technical devices and structures are highly present, as for instance in connection to labs. The materials for the Life Science Building are chosen based on colors and materials which are already represented through the buildings at Blindern campus. This is done in order to represent the context and connection it holds to the campus for University of Oslo at Blindern. Material elements from Blindern campus have been adapted through several iterations, where the base materials have been chosen through several studies, card indexes, and testing in 3D models.

A set of materials dominate and reoccur throughout the Life Science Building. The four main materials are tiles, linoleum, concrete and wood, as illustrated in Figure 4. Linoleum is flexible and represents the palette from Blindern campus. Wood improves the environment through providing warmth and contrast. Tiles and concrete recur as robust, where tiles additionally help to balance the wood. The chosen materials help to create harmony and variation in structure, as well as underlining that it is a public building.

Figure 4: Material palette for the Life Science Building

Sustainability has been considered throughout the whole process. As the Life Science Building corresponds to the level of 'BREEAM Excellent', it follows some criteria within environment, building and accounting. In complying to BREEAM, some dilemmas occurred. The tool is perceived both as challenging and interesting, where for instance the economic qualities has been an issue. BREEAM states a standard on 60 years as a starting point for life expectancy, while an architect for a building would wish for it to remain great past 60 years. An example of a dilemma is how wood is very good as a sustainable material, but also very costly. The tool values plaster over tiles, due to the standard life expectancy set on 60 years. The art of creating a building requires a need to constantly weigh out and balance the factors of environment, quality and economy.

3.4 Defining the system

The Life Science Building is applied as the case to represent a public building. As it is complex in both its physical sizing and building project, I will present some limitations to its scope. The building will be defined as a system which it will be further mapped and explored, according to theory presented in Chapter 4.

In applying a complex building such as the Life Science Building as the case, its physical focus will be the common areas on the first floor. The common areas regard the entrance hall, library, and other open spaces. Figure 5 shows the plan for the first floor, where common areas are included, while Figure 6 shows visual representations of some common areas. As a public building, its common areas present an inclusive space. In holding a variety of visitors, the common areas can represent an impression of the building though its materials.
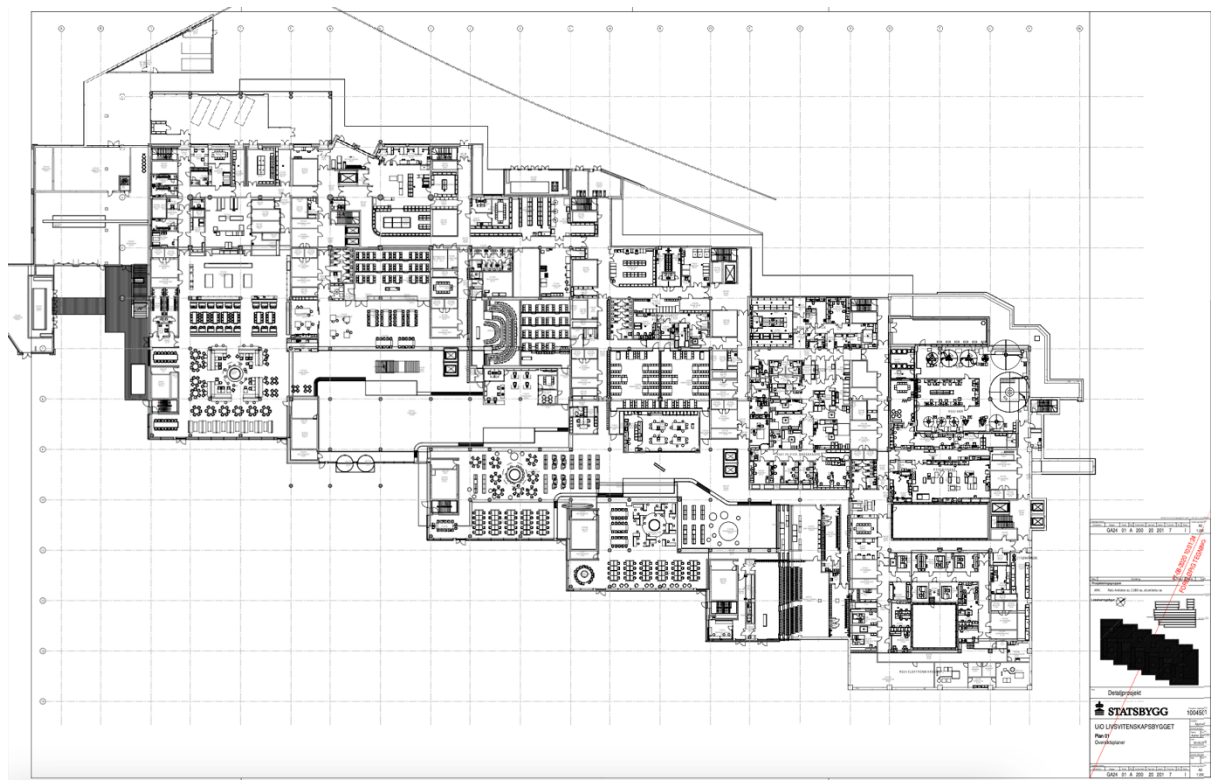
Figure 5: Floor plan of first floor in LSB

Figure 6: Illustrations of common areas in LSB

4 Theoretical and methodological considerations

In the previous chapter, I presented the Life Sciences Building as a system. Further, I will present how we can think with systems. Systems Thinking is both a theory and a research approach. In this chapter I will first present Systems Thinking, by describing its origins and its relevance to design and materials. With applying Systems Thinking to my project, I will further explore what it means to think systemically when it comes to design and materials, within the case that I have chosen as my system. I will then describe a more applied perspective on Systems Thinking, namely Systems Oriented Design, and present it as the thesis methodology (Section 4.5), followed by description of the methods I have used to collect my data and to analyze my data (Sections 4.6 and 4.7). I will end this chapter with a reflection on Ethics.

4.1 History of Systems Thinking

'System' as a concept has been found as a useful explanatory tool in several subject areas; amongst others engineering, economics, anthropology, geography, psychology, ecology and natural sciences (Checkland, 1999). Today, Systems Thinking has a big role in dealing with environmental issues, organizing global corporations, and computer networks (Kay, 2008).

Modern Systems Thinking emerged from systems theory, which was founded by Ludwig von Bertalanffy through his general Systems Thinking in the work of evolutionary biology in the 1920s (Kay, 2008). Through developing systems theory, he aimed to provide an alternative to the reductionist methods. Von Bertalanffy distinguishes between three categories of Systems Thinking, which is technology, science and philosophy (Hammond, 2005). General Systems Thinking values context, feedback and its connectedness, through exploring interactions, relations and patterns (Kay, 2008). Connectedness explored a way of understanding the whole, where parts of a system cannot be fully understood independent from its relations to the other parts.

Systems Thinking had its origin in natural systems, and was followingly adopted in mechanical and human systems, such as its adoption to the field of cybernetics (Kay, 2008).

Checkland later adopted Systems Thinking into management sciences. He refers to 'Systems Thinking' as the *process* of thinking using systems ideas, rather than 'Systems Theory' which is understood by many as 'the theory *of* systems' (Checkland, 1999). Jones (2014) describes Systems Thinking as the guidelines for Systems Theory in practice, emphasizing how Systems Theory has been applied as a technique to raise social awareness of complex systems.

Systems Thinking can be distinguished by two different viewpoints, being 'hard' and 'soft' Systems Thinking (Checkland, 1989). Where 'hard' Systems Thinking is related to more technical problems, 'soft' systems has been more applied to fuzzy situations that are hard to define, often involving people or culture (Checkland, 1989). As the traditional management sciences accepted the current structures promoting for inequality within wealth, status, authority and power, soft system thinkers wanted an alternative to this (Jackson, 1991). Hard Systems Thinking was also critiqued for being pretentious and for following functionalist assumptions, pointing to how 'hard' Systems Thinking was ineffective in many problem situations where few real-world problem situations were presented (Jackson, 1991).

4.1.1 So, what is a system?

In order to understand how to think with systems, it is also important to understand what we talk about when we talk about systems. There are endless variations of systems, where examples can be political systems, computer systems, living systems, human systems, or whole systems. These are just a fraction of the endless systems that exist. Boardman and Sauser defines in the book 'Systemic Thinking' (2013, p. 103) a system as *"a collection of parts and relationships that forms a whole that is somehow different, having its own personality as it were"*. According to this, a system can be both simple and complex, big or small. Kossoff (2015) explains the term "holarchy", as a system which is in itself whole, but still also a part of a greater whole. Figure 7 (Kossoff, 2015) shows some holarchies in the natural world, which present systems that are considered systems themselves, at the same time as being part of a greater one.

Holarchy in the natural world
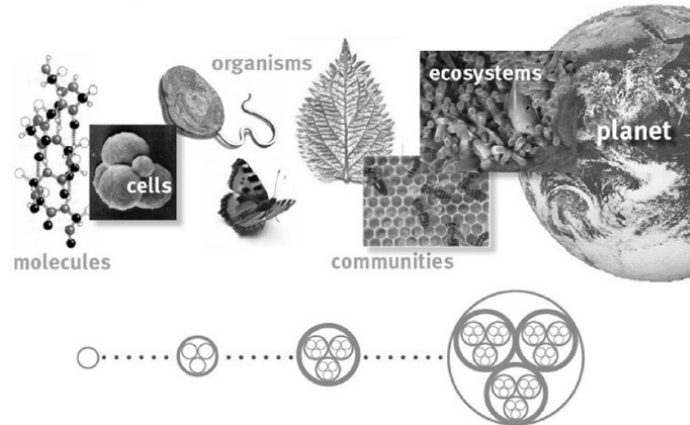
Figure 7: Holarchy in the Natural World (Diagram by Terry Irwin)

Even though holarchies are explained and defined in the context of the natural world, its concept can also be adjusted to more societal systems. One example on a societal system as a holarchy is a building, as illustrated in Figure 8, stating the Life Science Building as a system which exists within the greater system of the Earth.
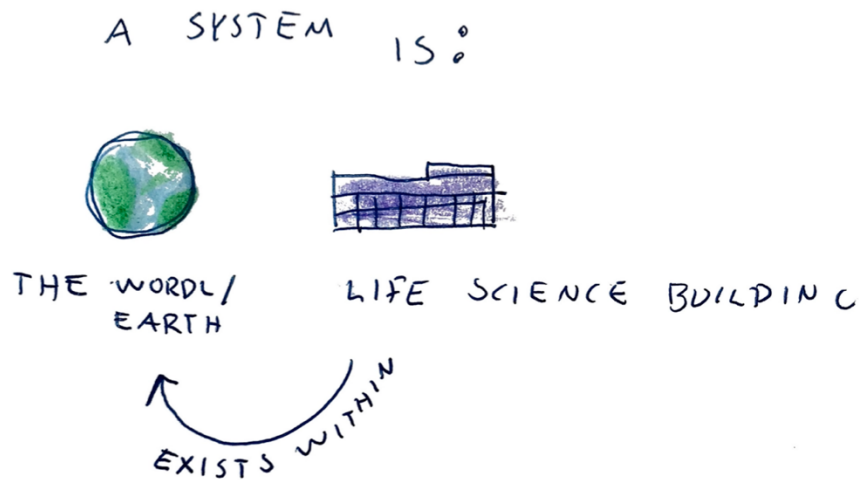
Figure 8: Illustrations of systems

Complexity has been viewed as anything we do not understand, such as wicked problems, because of the great aspect of elements that are interacting (Holling, 2001). Both holism and Systems Thinking welcomes the complex aspect, with the aim to broaden our understanding of the world.

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4.1.2 Holism

Systems Thinking depends on considering the whole and their parts, in addition to the interrelationships between them (McConnell, 2002). A recurring saying within the area of Systems Thinking and similar theories is "*the whole is greater than the sum of its parts*" (Capra & Luisi, 2014). McConnell (2002) discusses what is incorporated into the "greater" or "more" of the statement. He states that what makes the whole greater than the sum of the parts often regards the interactions that occurs between these parts. In exploring these interactions, it can help to understand the relationship between the whole and the parts (McConnell, 2002). One example explains this by using the contrast of taking apart a stone wall versus a human body (McConnell, 2002). In the case of dissembling a stone wall, it can easily be put together again and still have its function, whereas for a human body the interactions between the parts are as important as the parts are themselves, and can therefore never be made into a human being again after being taken apart.

New approaches to problem solving is crucial to address wicked problems, also referred to as 'systems problems' (Irwin, 2018). Earlier disciplines concerning a solution-based approach has not evolved to cover the complex crisis of climate change, economies, politics, urbanization and globalization (Jones, 2014). As opposed to the reductionist way of thinking that has dominated in the west for centuries, Systems Thinking is associated with an holistic approach (McConnell, 2002). Holism can be traced back from Aristotle's time, whereas the earliest detailed descriptions of holism is by Jan Christian Smuts from 1926 (McConnell, 2002, p. 1), who emphasizes the holistic view to be "*the key to all or most of our great problems*". Bruce Edmonds coined the term 'pragmatic holism', in order to cover the middle ground of the considered opposites of reductionism and holism (McConnell, 2002). Also Jackson (2006) sees the need for holism and reductionism to complement each other as equals.

4.2 Critical Systems Thinking

Critical Systems Thinking aims to facilitate and help to navigate on how theories, methodologies and methods within Systems Thinking can be applied together (Jackson, 2006). This means that Critical Systems Thinking aims to understand the strengths and weaknesses of the different approaches, in order for them to be applied together in an

intervention. Creative holism can help to understand the area of Critical Systems Thinking, as it welcomes multiple paradigms, methodologies and methods. Creative holism provides some direct guidelines, in which presents the four phases of creativity, choice, implementation and reflection (Jackson, 2006).

Critical Systems Thinking (CTS) can be referred to as the third wave of systems thinking, after the first which emphasized a quantitative and scientific approach, and the second emphasizing human relations and participation (Stephens et al., 2010). The third wave focuses on participation in and attention to how choices in the variety of systems methods are made in a critical and systematic way. There are five "commitments" presented within the field of Critical Systems Thinking, being *critical awareness*, *social awareness*, *methodological complementarity*, *theoretical complementarity*, and *human emancipation* (Jackson, 1991; Stephens et al., 2019). Critical awareness presents the assumptions and values which is inherited in system designs. Social awareness regards the social practices and rules created in society. Human emancipation emphasizes the concern of people's wellbeing and potential. Methodological complementarity expresses the need for different methodological tools and principles in order to facilitate for different human emancipation. Theoretical complementarity regards the openness to knowledge and appliance of different theories in order to maintain relevance (Stephens, 2012). Midgley (1996) merged the five commitments into three he considered crucial, being *critical awareness*, *emancipation*, and *methodological pluralism.* Critical awareness regards the act of constantly re-examining assumptions that are being taken for granted. Emancipation act as an assurance that the research aims for improvement, where 'improvement' is defined locally. Lastly, methodological pluralism is described by appliance of several research methods, while being aware of strengths and weaknesses (Midgley, 1996).

4.2.1 Feminist Systems Thinking

Developing methods and methodologies that are capable to deal with the increasing environmental uncertainty and complexity can be a challenge within Critical Systems Thinking. Feminist Systems Thinking can be understood as a branch of Critical Systems Thinking, which provides a greater approach to deal with challenges regarding amongst other sustainability (Stephens, 2012). Stephens et al. (2010) describes the framework for Feminist Systems Thinking, with the points *gender sensitivity, value voices from margins, incorporate*

the environment into research, pluralistic methodology and *to undertake research towards social change*. Gender sensitivity is important in order to avoid assumptions based on knowledge and data from solely the male gender. Including gender sensitivity in Feminist Systems Thinking can help to broaden the context and thereby avoid systemic bias in knowledge. To value voices from the margins will help to gain insight from different perspectives, including non-human perspectives, to engage to social change. Acknowledging how the environment needs to be incorporated into research is important to re-evaluate how hierarchy and superiority is woven into systems. Pluralistic methodology aims at selecting methods and methodologies in consciousness of diverse people and contexts. For Feminist Systems Thinking to undertake research towards social change regards to actively promote and achieve sustainable social changes. This is done through focusing research practices in local contexts, to avoid change from based in hierarchical systems (Stephens, 2012).

The points included in the framework for feminist systems can relate to design justice and its principles, which is a social movement with the aim to provide a more equal distribution of the benefits of deign (Costanza-Chock, 2018). The framework of Feminist Systems Thinking is relevant in order to explore the dialogue between materials and people within a building, by giving voices to visitors, architects and materials. Emphasizing how oppression can be experienced on three levels, which are personal, community and systemic levels, I emphasize in my project the importance of feminism as an act of inclusiveness and lifting voices, with an aim to provide a broader range of participants.

4.3 Materials and Systems Thinking

"For resilient architecture and urbanism to meet the challenges of global warming head on, what is needed is systems thinking: an in-depth, interdisciplinary approach which recognises that change is constant." (Weisz, 2018, p. 25)

In discussing the development of urban areas, Birkeland (2012) addresses ecologically sustainable development as an oxymoron, as the term development recognizes a need to build more by utilizing ecological resources. Systems Thinking provides a lens to view how a building connects to social, economic and material systems. This can provide an understanding of how a building exists within a city and how materials exist within a building.

Through looking at buildings and spaces as landscapes, Tress and Tress (2001) argue for the importance of defining the landscape that is being researched. Their work presents five dimensions of the transdisciplinary landscape concept , being *landscape as a spatial entity*, *a mental entity*, *a temporal entity*, *a nexus of nature and culture*, and *as a complex system* (Tress & Tress, 2001). The term 'landscape' is used among several research areas, where landscape architecture is one of them (Tress & Tress, 2001). The dimension of a landscape as a complex system, which points to applying systems thinking in order to explore and understand the complex reality (Tress & Tress, 2001).

The theory of Systems Thinking have been weaved into the field of architecture and buildings. Sadler (2008) discusses the architecture of the whole in relation to the 'Whole Earth Catalog' as a case, which is a magazine with a holistic and ecological focused view. He discusses 'whole design' and its ever relevance to sustainability. The Whole Earth Catalog did not understand design as something specific, but rather something that exist everywhere and as "*a system among systems*" (Sadler, 2008, p. 110). As Sadler (2008) critically discusses the Catalog as architecture itself, he states how it also ensures its readers and participants that the problems of ecology cannot scale down to one building and its architect. Buckminster Fuller, who was a philosopher, inventor, and technocrat, is associated with new architecture thinking, with among others his projects 'the Dymaxion House' and 'Spaceship Earth' (Lewis, 2019). With his work labelled as 'techno-utopian', Fuller connects the areas of ecology, the environment, and architectural design.

4.4 Design and Systems Thinking

Design has been proposed as an approach to tackle global problems (Nardi, 2019). These global problems can be considered wicked problems. W*icked problems* is a concept coined by Rittel and Weber, and is found both in theories of Systems Thinking and design (Jones, 2014). Wicked problems are complex situations which cannot be approached with classic problem solving. These complex situations often involve social and environmental issues (Jones, 2014). The need for sustainability due to globalization led to a pressure within the field of design, which has changed the design profession (Sevaldson, 2017). In order to avoid repeating previous mistakes, it is important to understand design and its systemic nature. Hammond (2005) addresses how a challenge in the 21st century for thinking with systems is to figure out how to combine the insight from the several branches of Systems Thinking over

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the past decades. Design contributes to Systems Thinking by creating holistic solutions and bringing design approaches to complex problems.

Systems Thinking and design were first blended in Design Thinking within the management profession, where Design Practice bridged into empirical science in the situation of defining systems at large scales (Jones, 2014). The aim within Systems Thinking and Design Thinking both related to understanding the whole of a problem (Darzentas & Darzentas, 2015, 2014). Sevaldson (2017) have explored possibilities within Systems Thinking and design, which are shown in Figure 9, where one possibility presented is Systems Oriented Design. This approach is illustrated in the figure by the red dot near 'design practice', and it will be followingly presented as a methodology.
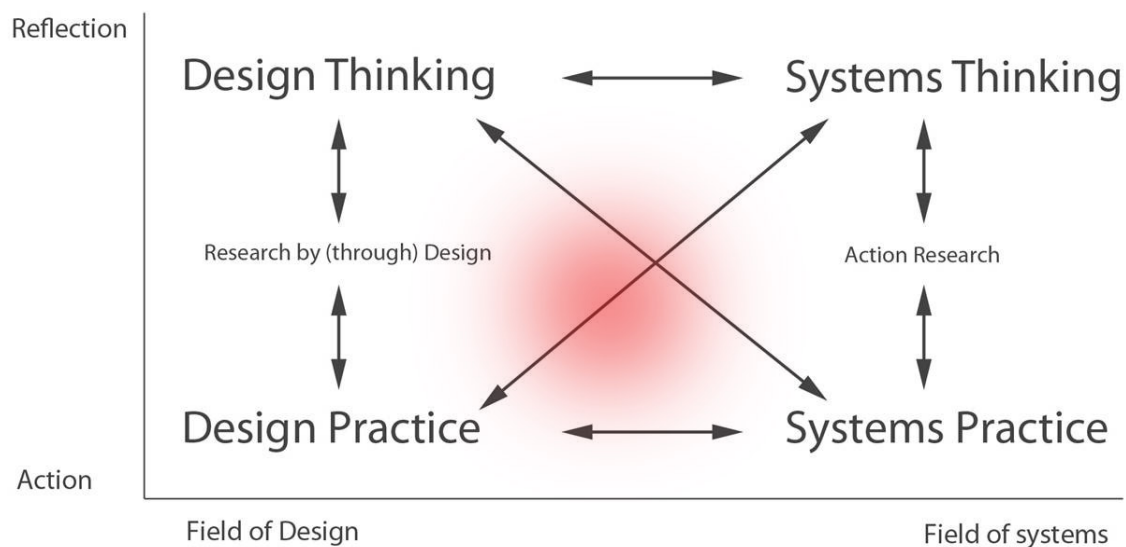
Figure 9: "Field of possibilities in Systemic Design. SOD located at the red dot" (Sevaldson, 2017)

4.5 Systems Oriented Design

Systems Oriented Design (SOD) is an applied version of Systems Thinking, and was coined at the Oslo School of Architecture and Design by Birger Sevaldson, where it developed from Design Thinking and Design Practice (Sevaldson, 2011). SOD builds forth on perspectives of modern systems thinking, such as Critical Systems Thinking and Systems Architecting (Sevaldson, 2011).

Systems Oriented Design is an approach within design to deal with the complexity of the challenges that the Earth is facing (Sevaldson, 2013). SOD aims to incorporate approaches for tackling wicked problems into the area of design (Sevaldson, 2013). As Sevaldson (2013, p. 3) states, "*SOD looks at modern systems thinking which deals with the dynamic complexity of real world problems in a pragmatic way*". It is crucial to relate to problems on a systemic level, as complexity evolves where objects are interrelated (Sevaldson, 2013). To engage in systemic complexities is important to provide solutions which considers ethical, sustainable, social, cultural and technological issues (Sevaldson, 2013).

The approach SOD aims for the designer to understand relations and details within a holistic overview (Sevaldson, 2013). Design is applied as a way of thinking, where the product or service is being explored beyond the object of itself, presenting only a symptom of the system which makes the object part of reality (Sevaldson, 2013). Sevaldson (2017, p. 3) describes the main role of System Oriented Design as "*to shape design and compose artefacts within systems, as systems and in systemic context*". These artefacts can be material or immaterial, relations or objects, social or political contexts. Systems Oriented Design is based on visualization and visual thinking as a tool for communicating (Sevaldson, 2011). One central technique of SOD is GIGA-mapping, which is an extensive form of mapping through multiple layers with the result of framing a system (Sevaldson, 2011), which will be further explained in Section 4.6.4. As Systems Oriented Design is an approach which suggests a practical way to deal with reality, it will help me to concretize thinking with systems in a design process.

The terms *Systemic Design* and *Systems Oriented Design* are both used to discuss the interrelationship between systems thinking and design. As there is no general agreement on a name or term regarding design and systems theory (Jones, 2014), I will proceed with applying the term Systems Oriented Design.

4.5.1 How to think with systems

Through applying Systems Oriented Design as methodology, I will further address what thinking with systems incorporates for my project. In exploring dialogue between people and materials within the context of public spaces, I will elaborate on the two focuses of *manifesting materials* and *experiencing materials*. I will explore how materials are *experienced* by involving the role of *visitors*, and I will explore how materials are *manifested* by involving *architects*.

«(...) buildings are made "whole" by understanding how space and materiality are designed and constructed, then how they structure (including through physical bounds), and finally how they are restructured through interpretation» (Dean, 2017, p. 82)

Exploring manifestation and experience of materials will help to understand and define my system. As holism regards looking at relations of a whole, I will bring further its concepts such as ecosystem, to help define my case as a system. Additionally, I will take further the concept of holarchy, in order to help explain the many possible system structures. Even though it is important to include details in Systems Thinking (Sevaldson, 2013), it is also important to define the current system. I will therefore understand my system of focus as a "holarchy", where the methods applied will provide for different perspectives. These applied perspectives are manifesting and experiencing materials.

For *manifesting* materials, I will explore how awareness of materials exists within the building process. In exploring the building process, I will involve key informants such as architects. For the part of *experiencing* materials, I will explore whether and how awareness arises and exists in a public space through the role of a visitor. Exploring materials in public spaces using Systems Thinking, I will explore the system of the Life Science Building as case. The focuses of manifesting and experiencing will help to establish an understanding of the building as a system, by providing two different lenses. As each focus is represented by a role, SOD will help me map out these two roles, in order to further map them together by exploring their relations. This will help to gain an understanding of the building as much as *a whole* as possible. I will followingly explain which methods I will apply in order to gain an understanding of these relations.

4.6 Methods for data gathering

To explore the research question "*How can we understand the dialogue between people and materials in public buildings?*", using The Life Science Building case, different methods have been conducted. As the research question breaks down to the two focuses of manifesting materials and experiencing materials, I will also discuss the research methods in relation to this. I will hereby explain the methods conducted; interview, observation, GIGA-mapping, and collaborative booklets, both their independence and their relation to each other.

The collaborative booklets and the public space observations contribute to gather data on how materials are experienced in public spaces, by exploring the role of visitors. The GIGA-mapping workshop and the key informant interview contribute to collect data on how materials are manifested, with a more specific focus on the Life Science Building and through involving key informants. This relation is seen illustrated in Figure 10.
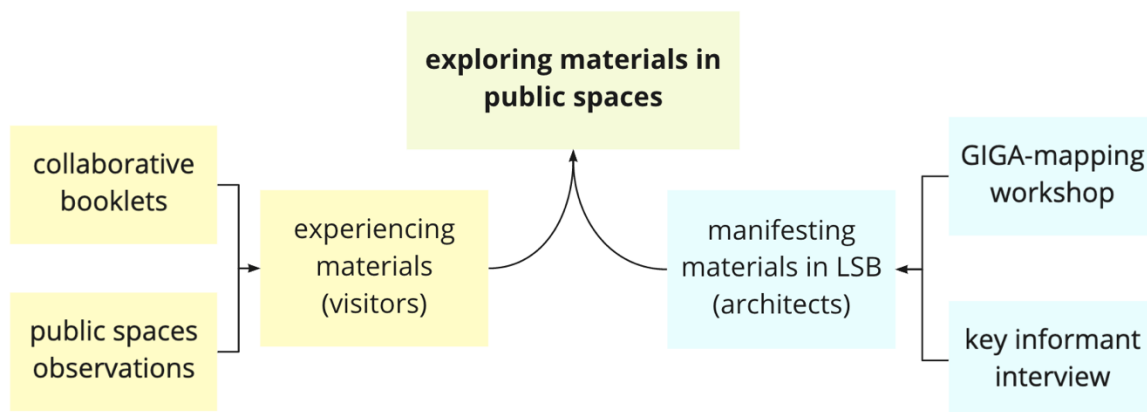
Figure 10: Methods' relation to sub-questions

Building on the two categories of 'manifesting materials' and 'experiencing materials', where manifesting materials is more directly concerned with the specific applied case, the methods can all together be presented as how specific they deal with the Life Science Building. The observations of public spaces explore the theme the broadest in relation to the case, then collaborative booklets approach the case closer, the GIGA-mapping workshop gets more specific, and lastly the key informant interview accesses the case closely. Figure 11 illustrates how broad or specific the different methods explore the Life Science Building as the case.
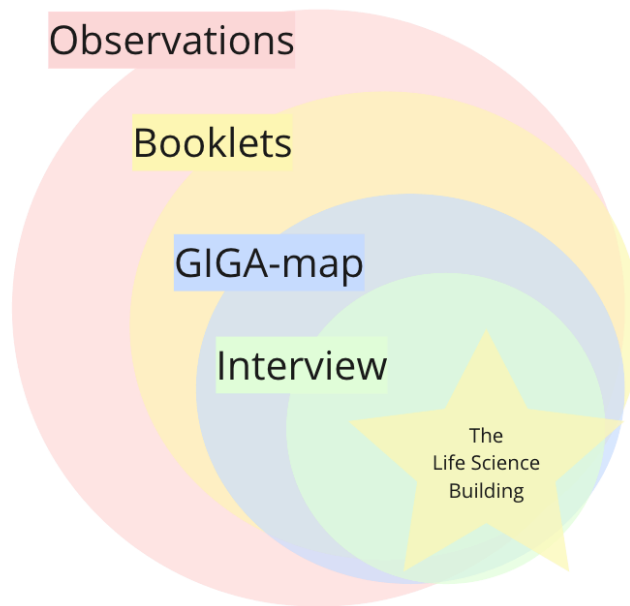
Figure 11: Applied methods regarding exploration of the case

All methods contribute to exploring materials in public spaces, whereas the interview and GIGA-mapping explore The Life Science Building as the case presenting a public space. The interview will help to address the project of the Life Science Building, while the GIGA-mapping will open up for discussion and questioning of the system of materials within the Life Science Building. The observations investigate the application of materials in public spaces, and the booklets are used to explore awareness and future visions for public spaces in the context of their materials.

4.6.1 Key informant interview

A key informant interview is an interview conducted with a person holding expert knowledge within a certain field (Crang & Cook, 2007; Marshall, 1996). In this study, a key informant interview is conducted to gain insight into the process of the Life Science Building regarding the chosen materials for their palette, from the point of view of an interior architect who is involved in the project. The interview is used to provide a description of the case, and to map out and delimit the system of The Life Science Building, which is presented in Section 3.3.

Implementation

The interview was semi-structured, where some set questions or themes were talked around without holding a strict order (Crang & Cook, 2007). The questions concerned materials in the Life Science Building and investigated the process of how materials were chosen and considered, in addition to their aims and challenges.

Initially, the interview was planned to take place at the Life Science Building project office, to be able to discuss the materials while looking at samples of them. Due to Covid-19 restrictions this was not possible at the time, which led to the interview to be conducted digitally through Zoom.

4.6.2 Collaborative booklets

The collaborative booklets explore how people interpret public spaces and how they envision their future within it. The booklets encourage the participants to explore their visions and dreams and further map out how this can manifest in the future. With this method, I wanted to explore values within public spaces through a tangible probe, which also represents materials in action through its format.

Conducting fieldwork in a pandemic means having to avoid interactions in-person and face-to-face (Ahlin & Li, 2019). Ahlin and Li (2019) discusses doing fieldwork in a pandemic, where they amongst other methods discusses probes. One suggested possibility is sending analogue probes by mail and using postal services to communicate with participants. Inspired by this article on alterations for doing research in a pandemic, I went further to explore the possibility of using physical probes as a method to gather data.

There have been many interpretations of probes, and their scale of appliance is broad in the HCI community (Boehner et al., 2007). Probes as tools within design can be used to inspire, gather data or contribute to collaboration, including tasks for exploration or description (Mattelmäki, 2008). Probes are known as a method for data collection in similarity to a questionnaire, but also stated to be more of a collection of approaches, rather than one specific method (Mattelmäki, 2008). Cultural Probes was explored as the first approach of probes by Gaver et al. (1999), which aimed to gather response for inspiration through a distance, where materials such as maps, cameras and postcards were involved. Probes value uncertainty, exploration and subjective interpretation, as the approach recognizes how knowledge have

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limits (Gaver et al., 2004). As Gaver et al. (2004, p. 55) states: "*The Probes simultaneously make the strange familiar and the familiar strange, creating a kind of intimate distance that can be a fruitful standpoint for new design ideas*". An aim for probes is to conduct a design process where participants are engaged and empowered through creating ideas from their reflections and experiences (Mattelmäki, 2008). Figure 12 shows the process of results created through probes, including both the designer and the participant, as presented by Gaver et al. (2004, p. 55) in their figure presenting that "*Probe result are the result of a multi-layered process of expression and interpretation*". The process involves interpretation and expression of the probe by both the designer and the participant.
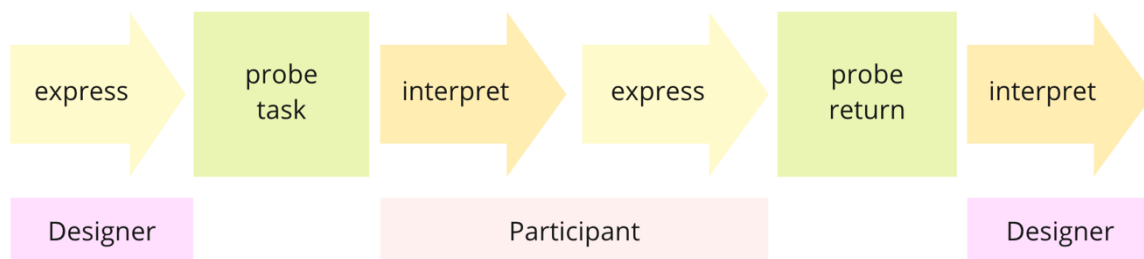
Figure 12: Redesign of probe result illustration (Gaver et al., 2004, p. 55)

The booklets enables collaboration and participation, where co-design allows participants to have an active role in the process (Mattelmäki, 2008). The design of the booklets opens up for exploration for change, through envisioning the future.

Background

Following the method of probes, I will describe 'Zine culture' and 'Bespoke booklets' as some inspirations to present the concept behind the collaborative booklets.

Zine culture

A great inspiration for the booklet method is similarities that are found in zine culture. Zine culture have contributed to inclusive expression, and been created and discussed in relation to feminism (Chidgey, 2006; Nijsten, 2016; Sinor, 2003). Stephen Duncombe (1997), professor of media and culture, describes zines as "*noncommercial, nonprofessional, small circulation magazines which their creators produce, publish, and distribute by themselves*" (p. 6). A zine

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is often political and goes against mainstream culture, where opposition to consumer culture is found both in the content and the labor of zine-making (Sinor, 2003).

Imaginary design workbooks

Blythe et al. (2018) explored a design workshop through using 'Imaginary design workbooks', and discussed the relation between constructive and critical design. A design workbook is a document that is used to present design ideas, concepts, illustrations and materials (Gaver, 2011). Through images and annotations, the imaginary design workbook explores spaces within design without being too specific, allowing for concepts to emerge to extremes organically (Blythe et al., 2018). The workbooks explore the space of a "home hub", concerning technology in the home, and thereby proposes for critical thinking of the "post-privacy" era. As can be seen an example of on Figure 13, the books were designed by hand, where imagines were glued in, different symbols included, and collages and sketches made though watercolors and metallic tape (Blythe et al., 2018). Much like a zine, the handmade workbook was scanned in order to give out copies to participants.

Figure 13: Figure from workbook "Imaginary to Real Workbook", (Blythe et al., 2018)

Bespoke booklets

Not far from the method of design workbooks, Desjardins, Key, Biggs and Aschenbeck (2019) presents 'Bespoke booklets' as a design research method. The method aims for

communication and envisioning, by looking into speculative design, future studies and Research Through Design (Desjardins et al., 2019). The bespoke booklets open up for co-speculation between designers and participants in order to envision alternative futures (Desjardins et al., 2019). Envisioning the future in detail can help to gain insight, both by the creative process of stating a specific vision and by sharing the vision with others (Desjardins et al., 2019).

The bespoke booklets were positioned in the homes of participants, which Desjardins et al. (2019) argued for to make creation of future concepts closer to situated future practices. Feminist concepts were used in order to analyze and critique the method, acting as a lens to promote for the qualities *collaborative*, *post-functional*, *situated* and *partial* (Desjardins et al., 2019). The method is explained to both value individual voices and collaborative explorations of future visions, where the collaborative approach takes root in participatory design and co-design (Desjardins et al., 2019). In addition, the method also balances between abstract visions and situated engagements (Desjardins et al., 2019), allowing imagination and sensory experiences to meet. Letting myself inspire and learn from the bespoke booklet method, I will for my collaborative booklets have focus on the balance of individual and co-creation aspect of future vision, in addition to the balance of the abstract and situated. The future vision is a central theme within the booklets, where it will be incorporated into the activities which are presented for the participants to explore. Looking towards the future will help exploration of dreams, in order to concretize these visions in a given context.
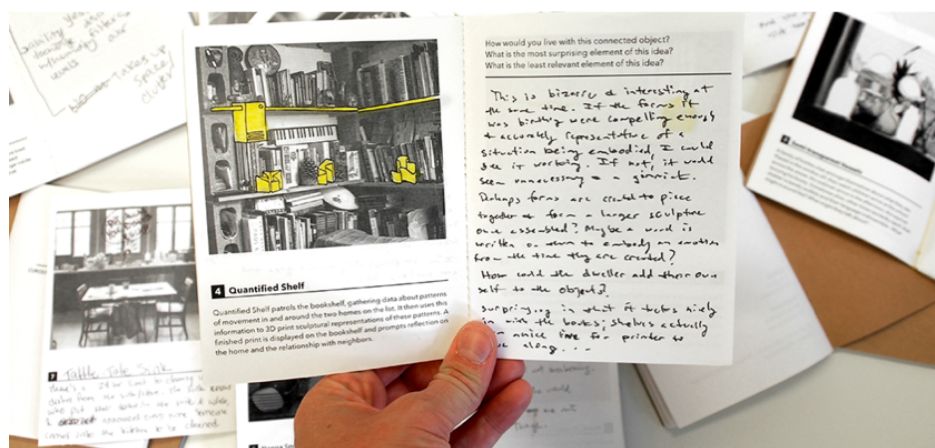
Figure 14: Bespoke booklets (Desjardins et al., 2019)

Implementation

I find great inspiration from the bespoke booklets as both a method and material artifact for experimental engagement, as it overlaps several of my focuses, including Critical and Feminist Thinking, collaborative methods, envisioning and materials. For implementation of the collaborative booklets, I will firstly address its material and participatory aspect, and followingly explain the process and design of the booklet.

Material and participatory aspect

Through working with materials, a method of handmade collaborative booklets would allow for the physical and tangible aspect of materials to represents themselves to the participants. As Sinor (2003) states for zine-making, a raw look showing of tape or imperfect edges, is often preferred as a reminder for the reader that there is a creator behind the book and its text. Making it by hand instead of printing a digital version might strengthen the relationship for a materials-awareness mindset. Creating and writing in the booklet by hand, both for me and the participants, will allow for a deeper connection and understanding of the task (van der Velden, 2021).

I wanted to open up for people to answer in their preferred form; either if its written text, lists, sketches, gluing in a photo, or other kinds of illustration. As Ahlin and Li mentions, one has to be careful not to include too complex tasks that makes participants feel overwhelmed (Ahlin & Li, 2019). The booklets state a low threshold of the activities, and that participants are welcome to answer the question they want, in what way they want. For it to not feel too open, the tasks will aim at guiding a thinking process.

Participation within the use of probes have been emphasized, as it has been argued for the implementation of the probe to be in too much in control of the designer (Boehner et al., 2007). Others argues for probes to give participants a voice and allow to interpret their experiences (Boehner et al., 2007). In including probes as a of method, it is crucial to reflecting on its participatory aspect, and where participation might be lacking. Presenting the booklet as collaborative, by among others presenting the text "*A collaborative project by Siv and _____*" on the cover of the booklet, might make it feel more engaging for participants. My aim for the method was to provide participants with a more engaging and creative method, than for instance a digital questionnaire survey. By taking part in the producing

instead of the endless consuming, the participants might be more engaged in the information they are part of (Yang, 2010).

Design of the booklet

For the process of designing the booklet, I explored what areas I wished to keep in focus, and how specific I wanted these areas to be presented. In addition to which content to include in the booklets, I explored different physical materials to glue in to represent the theme of materials. Figure 15 shows some pictures from the process of incorporating different materials into the booklets.
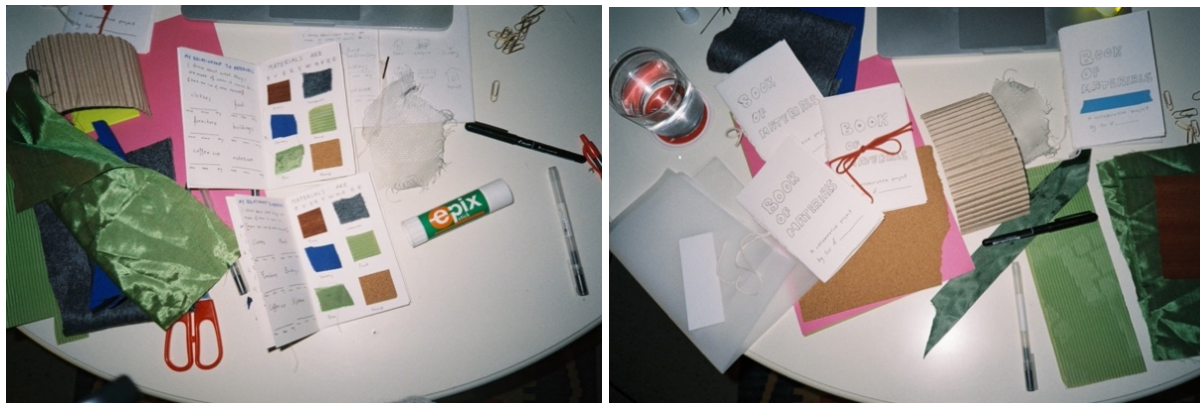
Figure 15: Process of making the booklets

The Collaborative Booklet

Further is presented the design of the booklets which were sent out to the participants. The different pages are explained in the consecutive order, from cover to cover.

The booklets incorporate a visible handmade style. Some of the booklets have different colors in the bindings thread, which also functions as a lace to tie around the book, securing different material which the booklet may hold inside. Shown in Figure 16, the cover presents the title 'BOOK OF MATERIALS'.
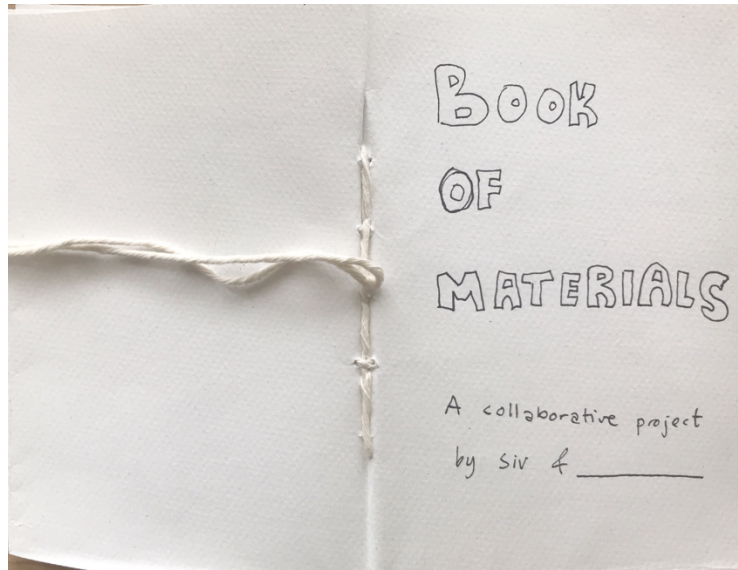
Figure 16: Cover of the booklet

When opening the booklet, some instructions and information about the project is presented. This is to make it clear for the participants on how the process of the project is conducted. As seen in Figure 17, the few first pages present some information about me as the sender and encourage the participant to do the same. By providing the headline 'About me' for the section of where the participant is to present themselves, the aim is for the participant to feel more included being part of the project. In the section asking for information about the participant, I encourage them to provide their city or country of residence, hometown, age, in addition to some things they enjoy doing.
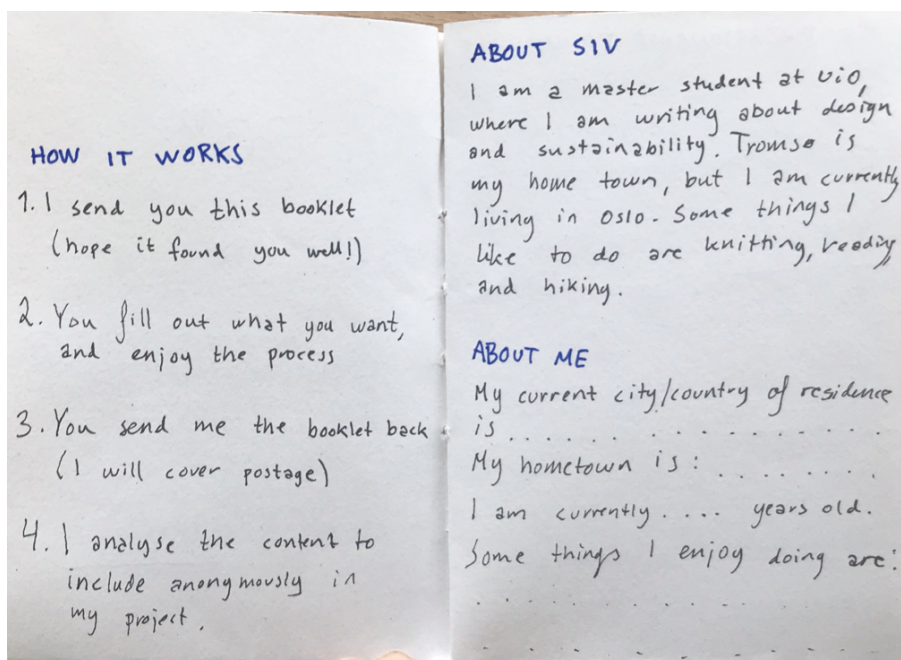
Figure 17: Information about process, Siv (me) and me (you, the participant)

Next page is provided with the headline 'My relation to materials', presenting the activity where the participant is asked to state their awareness of the materials regarding different objects, as is seen in Figure 18. The objects included in the activity is 'clothes', 'food', 'furniture', 'buildings', 'coffee cup' and 'notebook'. These objects are in order to get the participants to start thinking about how they perceive materials. Even though I am not working with all these objects directly, they are included to present materials in everyday life.

After the activity of relation to materials, there is a page with the text 'MATERIALS ARE EVERYWHERE'. On the same page is provided different materials which present things from an everyday life. The materials are not actually the objects that they are presented, but rather has the aim to encourage for reflection on what a material can be. By different materials in different textures and colors, the objects 'trees', 'house', 'computer', 'bus', 'jewelry', and 'food' are presented. The aim is to make a statement on how materials really *are* everywhere, and to enlarge a potential definition which is already set. As this page is visible next to the previous explained page, I do not exclude how this page can give an inspiration to provide answers.
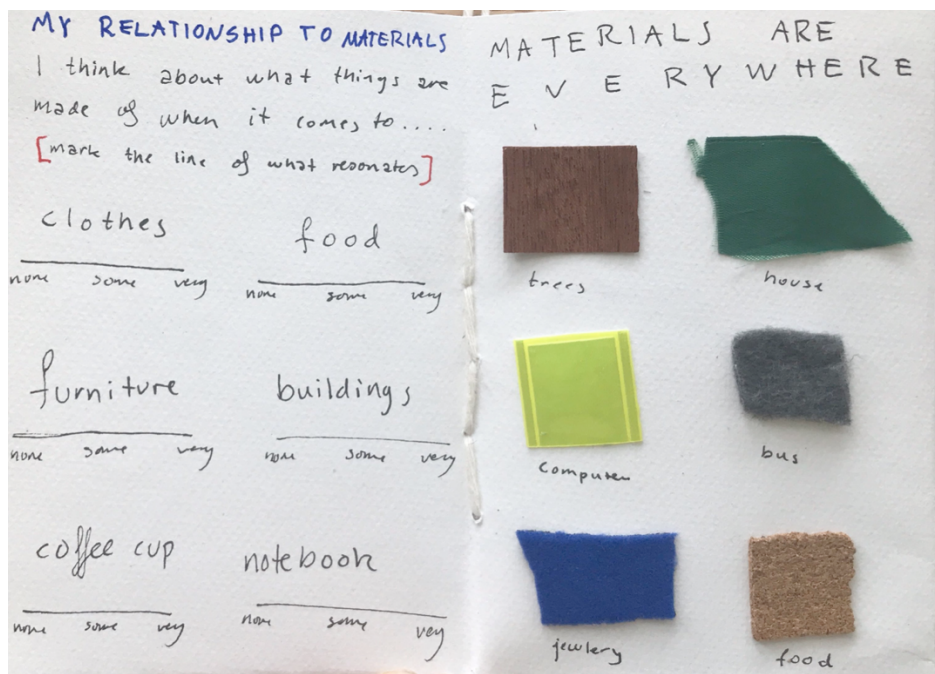
Figure 18: Relationship to materials

After the booklet presents materials and relation to them, its next pages present some sentences of questions for reflection, as seen in Figure 19.

"Why should we care about what things are made of?
Why should we try to get to the ground, the bottom, of things?
The history and future of an object can tell us stories.
We can explore these stories by bringing awareness to our surroundings."

The meaning for this text is to aim a bit deeper into the thoughts and reflections of participants, before the next page encourages them to think of a public space in which they enjoy in some way. The page then asks 'Ready?', as an aim for the participant to have a place in mind before turning to the next page. With the question asked by McCarthy and Ciolfi (2008, p. 250) in mind, *«How does a building like Tate Modern become a personally significant place?»*, this task aim to explore how public buildings can be perceived personally significant, and in which way.
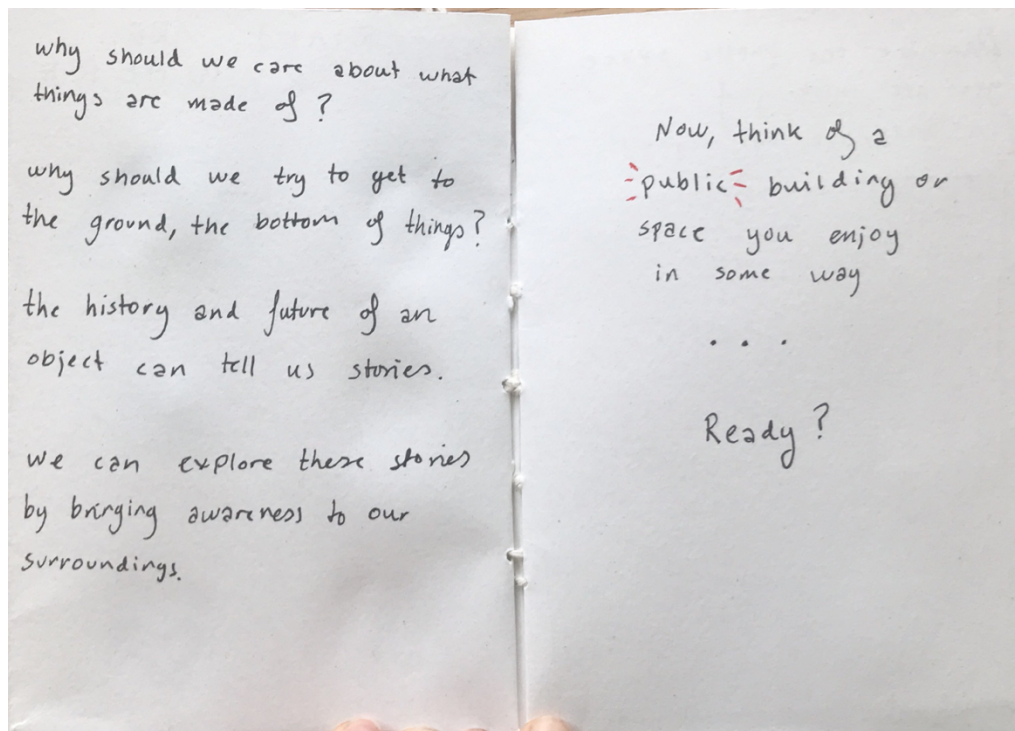
Figure 19: Food for thought, encouragement for reflection

As the participants declares themselves as "ready" by thinking of a public building they enjoy, the next page asks them to describe the space in which they were thinking of. The booklet states how all formats are welcome, for instance by use of words, drawings or keywords. The next page then encourages to choose a favorite concept within the building to explore, either it is a favorite room, furniture, artwork or something else. Then, this favorite is asked to be elaborated on with the focuses of "what it is", "its qualities", "its perks", and "its room for improvement". These activities are shown in Figure 20.
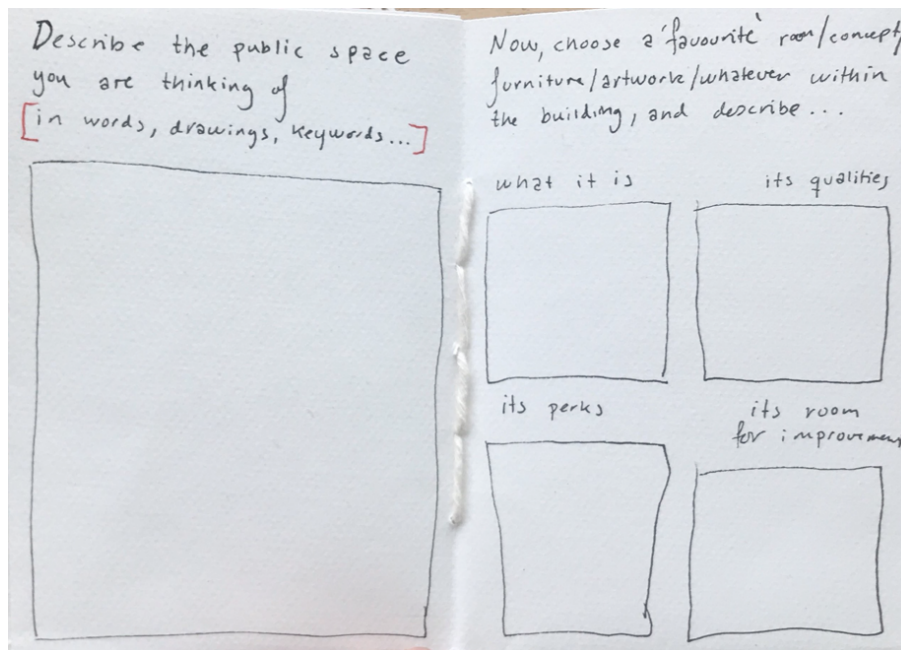
Figure 20: Description of public space

After asked to describe their public space, the participants are on the next page asked to envision the future they want, as seen in Figure 21. The question 'What does it look like?' aims for the participant to illustrate their future. Followingly, the next page asks the participant about their biggest "Dreams for the Future". These dreams are explained to include everything from on a personal, societal, or planetary level.
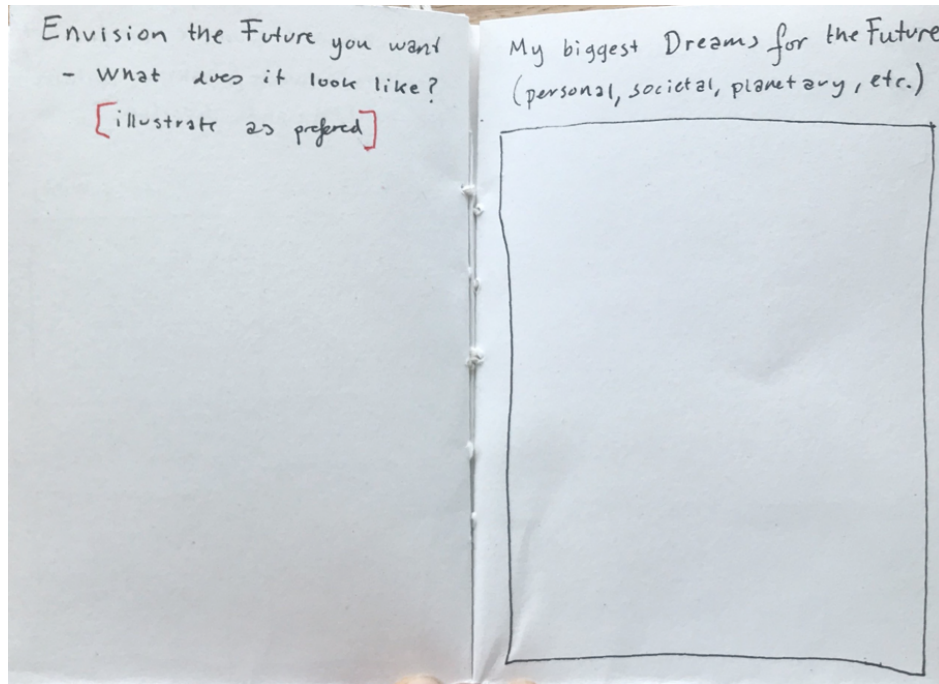
Figure 21: Envisioning dreams for the future

The next page in the booklet asks the participant to map out their dream(s) on a timeline, where 'today' and 'the future' is already stated (seen on Figure 22). The activity regards the earlier exploration of the public space, where the prompt is 'How can Dreams manifest and be implemented in this space?'. As the booklets promote for envisioning in general, this activity also engages the participants to do so. Envisioning can be used as a tool in order to explore sustainable futures (Donella, 1993; Robinson et al., 2011), which aims at transforming abstract thoughts into specific visions. Such visions can be presented through for instance words, text, sketches, or other illustrations.
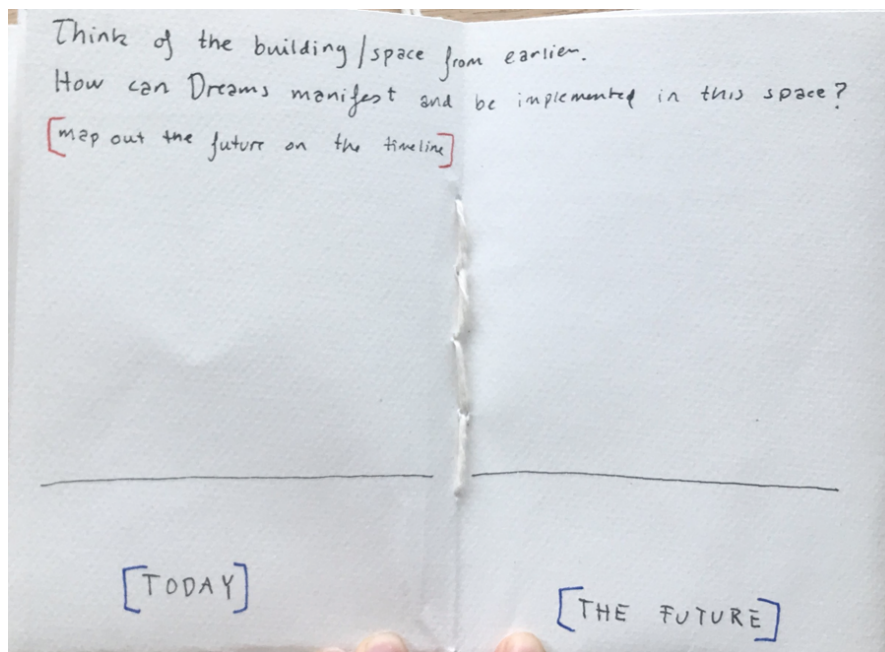
Figure 22: Manifesting dreams for the future

The last page thanks the participant for their contributions (see Figure 23). Additionally, it is asked whether the participant wishes to contribute with a material. The material is stated to be welcomed in any form, with the example of a piece of newspaper or a leaf. The aim for this last activity is to incorporate their surrounding of their everyday life into the content of the booklet. Aguirre-Ulloa and Paulsen (2017, p. 5) states how "*everyday materials, such as wire, yarn and elastics, may reduce the threshold to experiment with complex processes and allow a wider audience to participate in co-creative practices*". As this material can be anything and doesn't have to correlate to the public space in earlier activities, the possible contribution of material will represent how "materials are everywhere", as stated on the second page, seen on Figure 18.
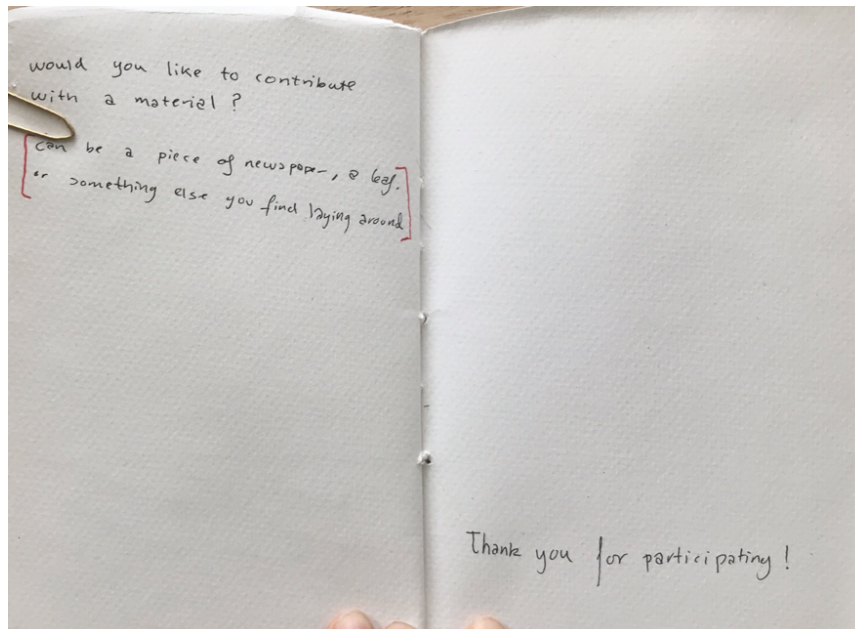
Figure 23: Thank you and contribution of material

The overall aim for the activities in the booklet is to encourage for reflection and illustration of visions, through exploring materials in the context of a public space that holds value for the participant.

4.6.3 Public space observation

Observation is a way to address complexity, as Sevaldson (2013) addressed in the development of Systems Oriented Design, where innovation was achieved through breaking prejudices and schemata. The public space observation explores public spaces with materials in mind and examine broadly how buildings present themselves to a visitor. As the Life Science Building is a case to present public spaces, I wished to explore materials in public spaces in a more general manner. Observation of other public spaces was also a method to explore the tangible within the building, as the Life Science Building isn't planned finished for another four years. Exploring other public spaces also allows me to approach the case in what it is representing through a broader lens.

The observations conducted are participatory, which implies the researcher to immerse herself into patterns of a culture or community (Crang & Cook, 2007). Observation in itself aims at watching how activities are unfolding within a given culture or community, where the acts detached by recording the surroundings by taking notes or collecting other materials (Crang & Cook, 2007). To be participatory in an observation also implies to create relations to people who can guide the researcher within the community (Crang & Cook, 2007). My interpretation for this project is to create relations directly to the public spaces as communities, rather than through people within it. In the same way as a building can be interpreted and defined as a system or holarchy, the buildings that are being observed can be defined as "cultures" or "communities".

An aim for participatory observation is to understand the relation between the researcher and the researched intersubjectively, withholding both the objective and subjective elements (Crang & Cook, 2007). As a participatory observer, I engaged in the surroundings, through for instance exhibition and installations. It is important to evaluate and understand how the researcher is not only immersed into the community which is the researched space, but additionally also how she is immersed in communities outside the defined space of study, and what these effects means for the research process (Crang & Cook, 2007). This closely refers to systems thinking and SOD, where systems are connected and related to each other.

Implementation

Before looking specifically on the Life Science Building, I wanted to explore different public spaces, in order to understand what public spaces represents and what values they hold. These public spaces are buildings that invite to participate in some sort of community or to everyday activities. This is relevant to explore as the Life Science Building is going to host students, professors, as well as employees in different companies. Immersing myself in the role of a visitor lets me explore and envision the values which might also be present through materials in the Life Science Building.

Such as for the collaborative booklets, I was interested in the aspect of everyday life according to the materials in the spaces. In conducting the observations, I was still in a phase of exploring materials on a broad level. I focused on the building as a whole, general impressions, the activities and social aspects available, in addition to the memorable, specific materials outside and within the buildings.

The observations were done in Tromsø and in Oslo. While observing, I took notes by hand in a notebook while visiting the spaces. Firstly, I walked around and tried to be conscious of the feelings, knowledge and thoughts that the building shared. While experiencing the spaces, I additionally took pictures for future reference to analyze back on details.

4.6.4 GIGA-mapping workshop

GIGA-mapping allows to work with complexity, where knowledge is visualized to gain a better overview of a system (Sevaldson, 2011, 2013). As shown an example of in Figure 24 (Sevaldson, 2011), the process and output of GIGA-mapping can remind of an "information cloud", where solutions might derive from. Instead of being a tool for ordering and simplifying things, GIGA-mapping aims for mapping to embrace the complexity of problems in reality (Sevaldson, 2011). A designer can learn from the system and its reactions by creating designs to provoke it. Creative provocation aims at designing complex pictures rather than trying to model the true system. GIGA-mapping is one way to create complex pictures.

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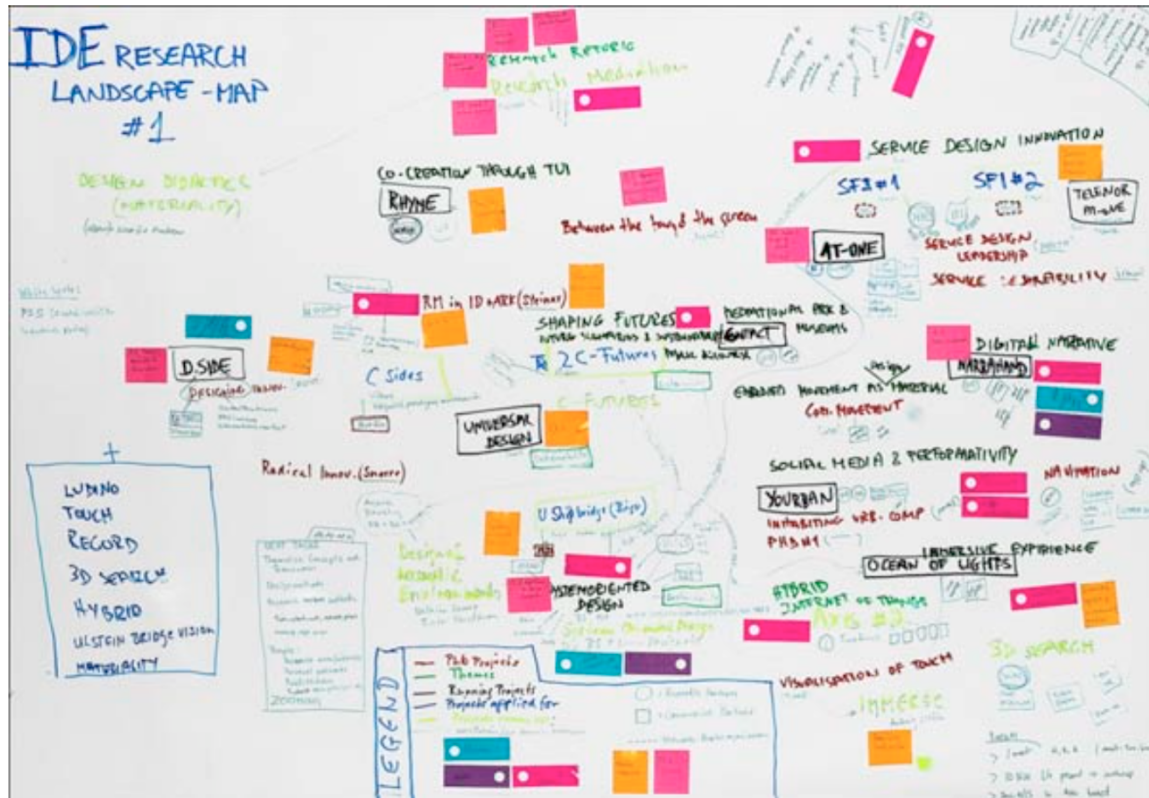
Figure 24: GIGA-map example from Sevaldson (2011)

Through conducting a GIGA-mapping workshop, materials within the case of the Life Science Building are explored. Applying GIGA-mapping as a method to gather empiric data, allows for mapping out the systems of materials, through participants' experiences and knowledge of how materials exist within public spaces. By using the Life Science Building as a case, I explored materials both within the case of the building, but also within what it represents as a public space being built new with a great budget.

Implementation

I recruited some of the participants for the workshop through the collaboration with the Life Science Building project. Additionally, I asked other people with relevant background and experience. This included both artists and professionals working with materials and buildings. I also wanted to include some participants who could represent the "inhabitants" of the building, where I invited a few PhD-students working within life science. Seven said yes to participate, while two people remained tentative. I aimed for at least five participants for the workshop.

As a program for the workshop, I planned to first have a short introduction to explain the project and the method of GIGA-mapping. I did not expect participants to have previous experience with GIGA-mapping nor did I expect them to have detailed knowledge of the Life Science Building. Some of the invited participants had worked close with the building for several years, while some had just heard of it through media.

Due to the pandemic situation, the workshop was planned to be a digital one. I chose to use Zoom and Miro as tools. Zoom covered the conversations and gave me possibility to share my screen and give the introductory presentation, while Miro allowed for collaborating together to create the GIGA-map. These two tools were planned to be used simultaneously by each participant. For the GIGA-mapping activity, I planned to divide into groups using the 'breakout room' function in Zoom, to allow more participation in discussions.

Pilot

During the week before the workshop was planned, I did a test workshop with two of my supervisors and one classmate. This was to get more comfortable in using the digital tools Zoom and Miro in relation to hosting an event, in addition to get feedback on the content of the introductory presentation and the workshop in general. I included one classmate in the test, who was not familiar with either my theme or the method of GIGA-mapping, for her to give feedback on whether or not the workshop was easy to follow and possible ideas for improvement.

Presenting the case of the Life Science Building

For the participants who had accepted to attend the workshop, the knowledge of the Life Science Building varied. I wanted for the workshop to both welcome the knowledge of the people who had been working closely with the building in addition to the more general experiences by people working within life sciences who could represent the future inhabitants of the space. Therefore, in addition to present the building itself and my delimitation of it (first floor, common areas), I also presented its approach to represent other public spaces.

By building new with a great budget, the Life Science Building can show a reflection of current topics. It can represent the present time, and currents within our society. The vision for the building is presented to be among others the themes of sustainability, innovation,

interdisciplinarity, and international competition (Universitetet i Oslo, 2021b, 2021a), as also described in Chapter **Feil! Fant ikke referansekilden.**. With these values presented, I wanted to state the question of what the materials can represent, in relation to this. A picture was included in the presentation to show that the building is not finished, as is seen on Figure 25, and that none of the participants for the workshop had actually yet explored the building in its physical form. To state this perspective, I wanted to open up and welcome for the abstract level of contributions to the map. I included a slide presenting what the definition of materials could hold, including the examples of; *interior*, *nature*, *building materials*, *available equipment*, *furniture*, and *design of spaces*. The purpose of this was to welcome broad definitions as well as specific details, and to show that they all belong in the GIGA-map (Sevaldson, 2011).

Figure 25: Photo of current situation of building LSB

Miro workspace

In the Miro workspace, I made a starting point for the GIGA-map (see Figure 26). This was made in advance of the workshop, where I had placed the main activity "Exploring materials in The Life Science Building" in the middle. Some themes were included as a starting point, presenting "nature", "aesthetics", "inhabitants", "sustainability", "technology", "light" and "time". These themes were presented as "rooms", where I also included some blank sections to "make a room". The rooms represented concepts, rather than actual rooms within the building. This was to state the dominating importance of concepts rather than hierarchy in GIGA-maps (Sevaldson, 2011). In this way, several of the rooms can be connected to different themes, as an aim was to not create restrictions, but rather open up for discussions. For the main theme presented in the middle of the map, I also stated "Where do you want to go?", to support the ideas of the different rooms and to state the freedom of focus for the mapping activity.
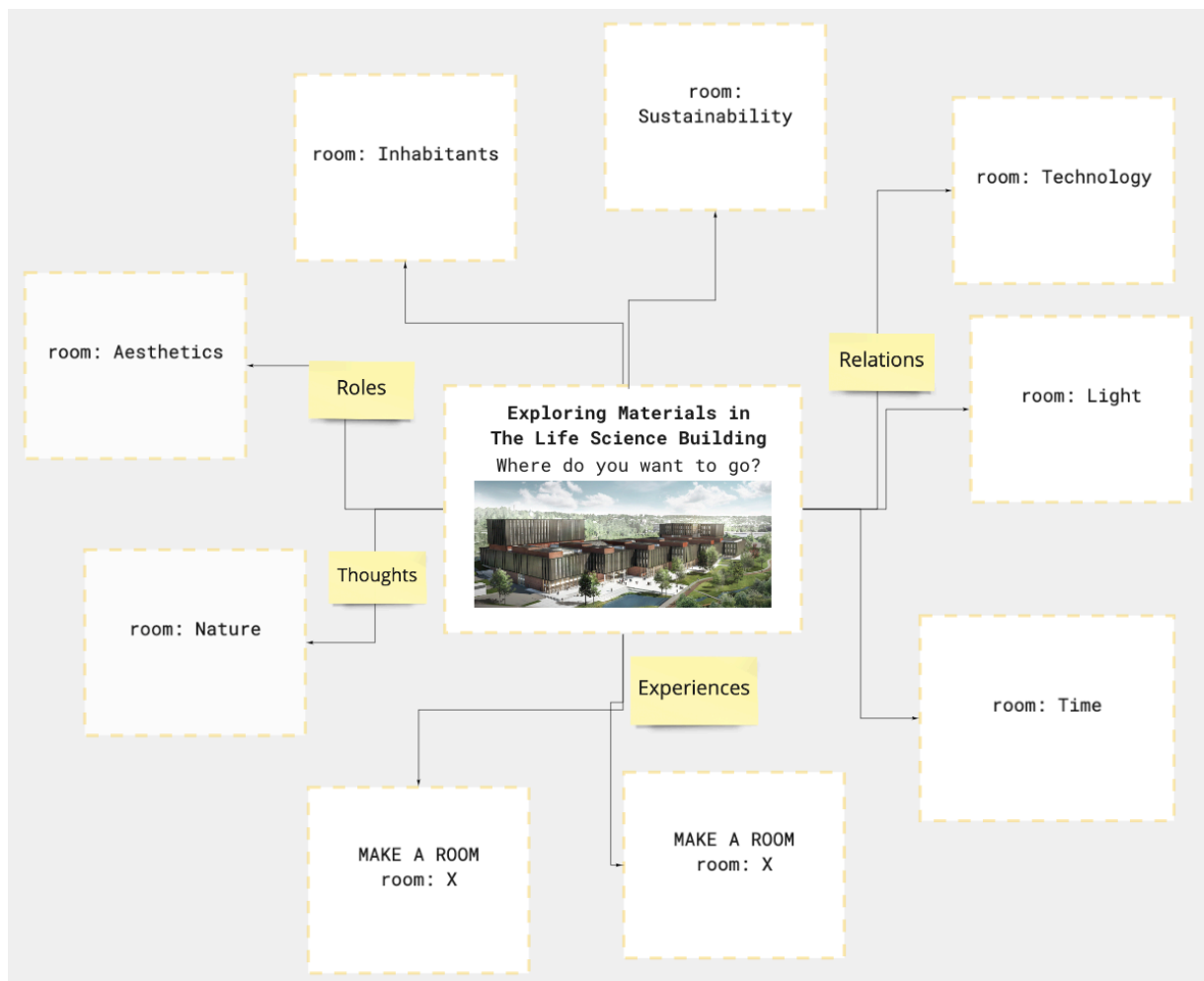
Figure 26: screenshot of starting point for GIGA-map

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4.6.5 Merged findings and meta-analysis

As part of my Systems Oriented Design (SOD) methodology, I will merge the findings of the methods to understand the complex context of materials in the Life Science Building and other public buildings. Together, these methods will connect insight and information regarding materials within the case representing public spaces, as is illustrated in Figure 27. Presenting the findings from the different methods into one overview will allow to maintain a holistic overview, while accessing details and addressing interrelations, which is an aim for a systems oriented designer (Sevaldson, 2013).
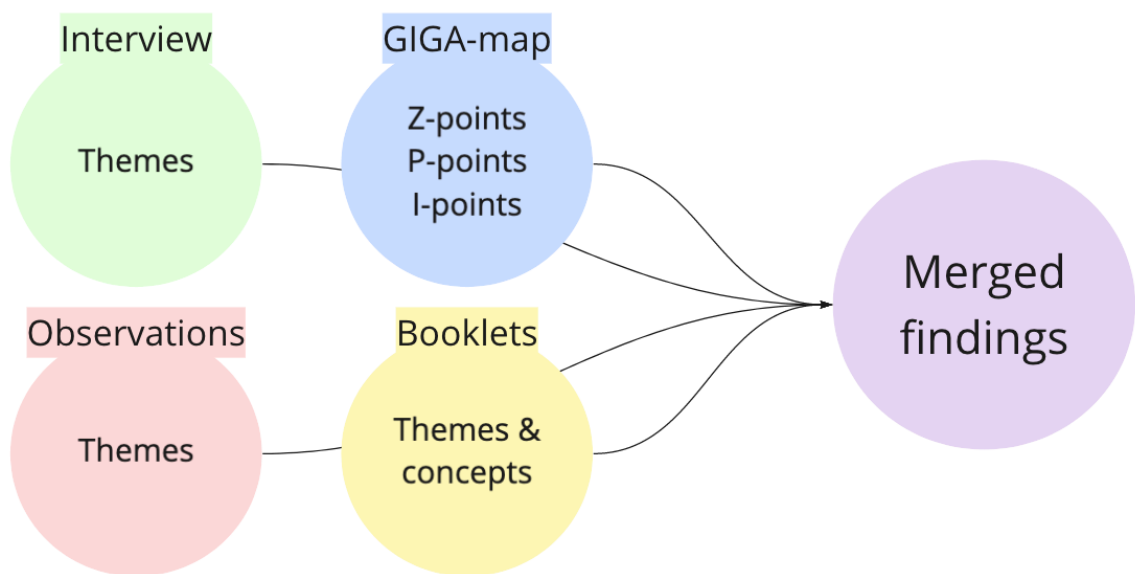
Figure 27: Merging findings from individual analyses of the methods

To proceed with a thematic meta-analysis (as is explained further in Section 4.7.1) of the GIGA-map, booklets and the observations, I printed out the results and analyses on paper (see Figure 28). This gave a more comprehensive overview, which allowed me to map out and categorize the themes I had from previous analyses.
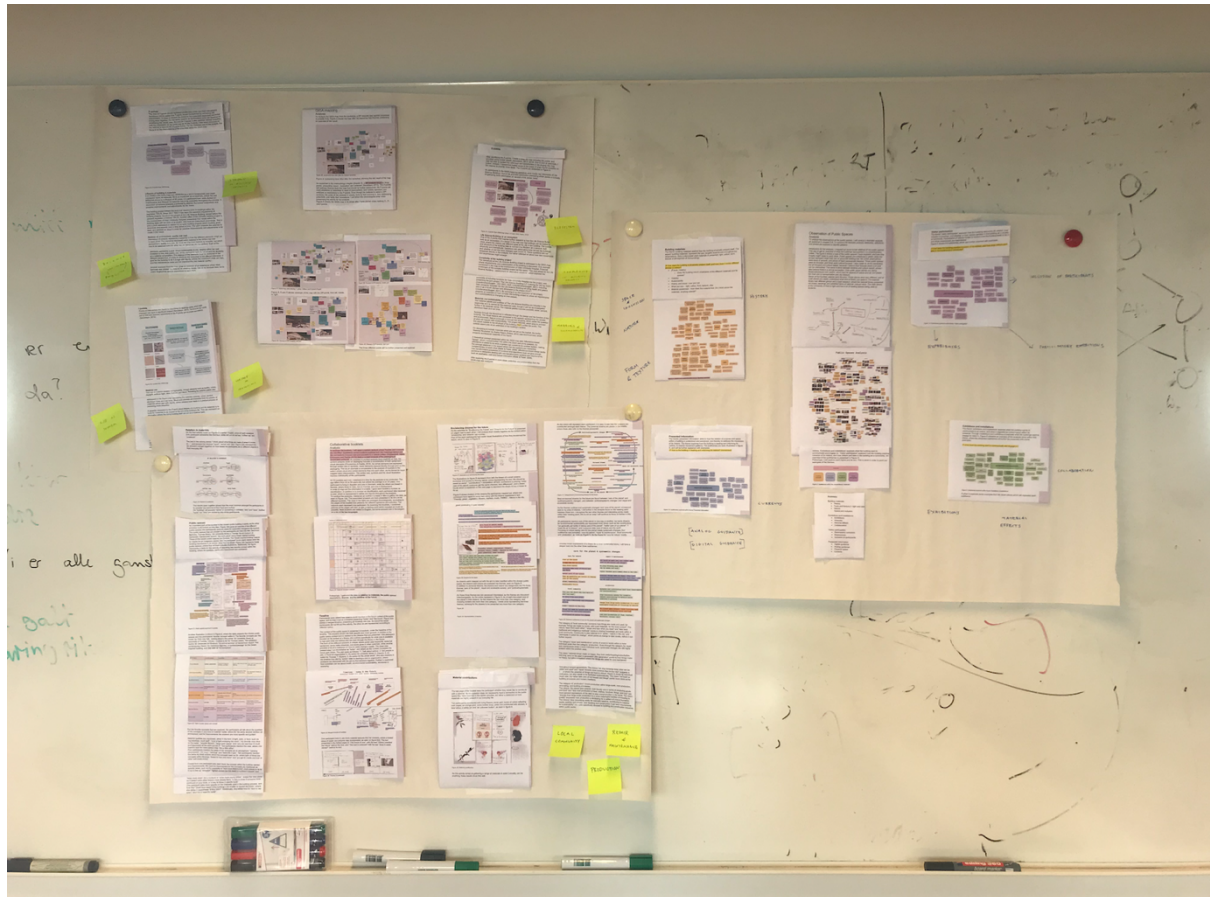
Figure 28: Process of merged analysis

4.7 Methods for analysis

For the data analysis, I will use three different methods, covering both deductive and inductive approaches, which will be further explained. A thematic analysis is conducted on the key informant interview, the observations, and in order to merge my overall findings. To analyze the booklets, I will apply a content analysis, in which themes and concepts are identified. To explore the findings of the GIGA-map I will apply a ZIP-analysis, an established way to analyze GIGA-maps.

4.7.1 Thematic analysis

Thematic analysis is a method to identify patterns and themes in qualitative data (Braun & Clarke, 2006). A theme represent some sort of meaning or pattern (Braun & Clarke, 2006). Judgement and flexibility is required of the researcher in order to decide what a theme is

defined by (Braun & Clarke, 2006). The research question should remain in focus, rather than quantifiable descriptions identified within the patterns (Braun & Clarke, 2006). Themes can be identified in either in an inductive or a deductive way. For the inductive approach the data is coded outside of a specific frame, and patterns emerge from the data itself (Braun & Clarke, 2006). For the deductive approach, the data is coded within a more specific frame of the research question (Braun & Clarke, 2006).

For the key interview, the focus for the analysis is to get an overview of materials and their process in The Life Science Building project. As it was a semi-structured interview, some topics were given in advance, while other questions were very open, allowing for themes to emerge throughout the interview. To analyze the observations, I will explore materials as the general theme. I will further identify different aspects of the theme, based on the field notes, photos, and reflections. This makes the analysis an inductive one, where themes emerge along with the analysis.

In order to merge my findings of the four methods for data gathering, I will conduct a thematic meta-analysis. Supporting the research area focusing on materials and sustainability, I will here conduct a more deductive analysis, applying the spheres of sustainability as the 'theory' (Braun & Clarke, 2006). The deductive analysis is done on previous inductive ones, allowing for an open exploration to further outline a more specific aim. This aim is shown through the spheres of sustainability as the applied meta-analytical framework.

4.7.2 Content analysis

As thematic analysis is one kind of content analysis, I will for the collaborative booklets apply the generic content analysis, as described by Lazar et al. (2017) and Festila and Chrysochu (2018). The choice of conducting a content analysis rather than a thematic one for the booklets is due to the more tangible and visual format of the booklets. With the format of the booklets being more complex, it increased the need for a method to analyze details of the content in a more precise manner.

A qualitative content analysis explores both the meanings behind and the connections between text and concepts in a cultural artifact (Krippendorff, 2004). Content can be categorized into either media content or audience content (Lazar et al., 2017). While media content covers content such as publications, websites and newspapers, audience content

concerns feedback received either directly or indirectly from a given group (Lazar et al., 2017). Feedback as audience content can be gathered through interviews, observations or multimedia studies (Lazar et al., 2017).

Coding is a technique for analyzing the content, where different themes or concepts are identified as categories (Lazar et al., 2017). Coding can be conducted either priori (deductive) or emergent (inductive), The priori approach to coding is based on categories that are identified in advance for the analysis, where for the emergent approach to coding the themes or categorized are identified during the analysis (Lazar et al., 2017). Emergent coding qualitative data is analyzed without a model which guides the process of the analysis, but rather explore concepts or ideas along the way, until categories are refined (Lazar et al., 2017). As the booklets contain tasks which are both broad and specific (as seen in Section 4.6.2), some tasks will be analyzed with an inductive approach while some with a more deductive one.

Chrysochu and Festila (2018) implement a content analysis of the packaging of sustainable products. As opposed to content analysis done explicitly on text, the content analysis done on packaging includes a consideration of both verbal and visual elements, as is shown on Figure 29 (Festila & Chrysochou, 2018). As verbal elements are expressed through written text or symbols, visual elements express identity through print on the packaging. This approach is very appropriate for the analysis of booklets to the extent where visual and verbal elements flow into each other, as the format for input suggest open interpretation. The written text, symbols and the visual illustration express individuality of the participants.
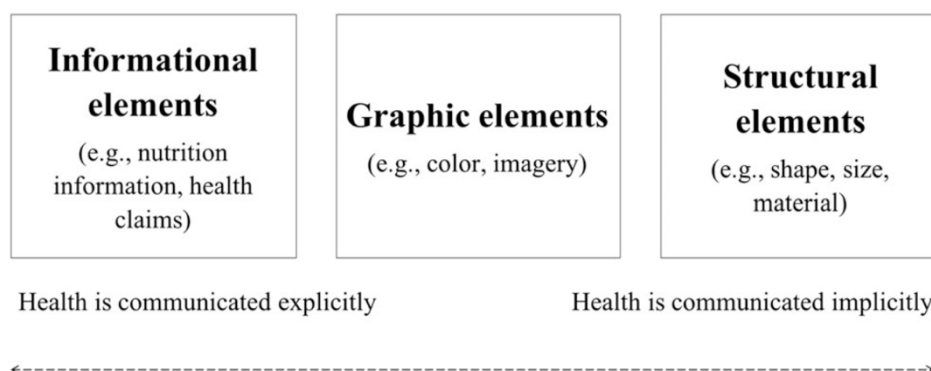
Figure 29: Example from article, "Figure 1, Classification of package design elements" (Festila & Chrysochou, 2018)

4.7.3 ZIP-analysis

The letters in 'ZIP' stand for Zoom, Innovation and Potential and is the preferred method to analyze GIGA-maps (Sevaldson, 2013). The 'Zoom' and its Z-points are used to point out themes on the map that should be further researched. 'Innovation' or 'Intervention' represents the I-points, which are identified where new solutions or relations are discovered (Sevaldson, 2013). The term 'Potential' can mark a problem or a "pain point", also meaning there is room for improvement. Potential can also exist outside of "problems", where the P-point can present an inspiration for improvement nevertheless (Sevaldson, 2013). The 'Innovation' point also includes intervention and idea, which aims at linking problems to solutions, or applying links through new lenses and relations. Instead of changing the system structurally, interventions try to tweak the system (Sevaldson, 2013).

4.8 Ethics in Systems Thinking

Tuan and Shaw (2016) map out the ethics of Systems Thinking, focusing on three social agreements, namely consensus, accommodation and toleration are discussed. Consensus addresses the assumption of that people have common ways of what should be done and how. This assumption decreases the diversity of thoughts and thereby also creativity. Another agreement is accommodation, presenting collectivism by how decision-making is done on the basis of the common, while also preserving individual opinions. This presents a vicious circle, where benefits for the whole eventually return to individuals. Toleration as an agreement value differences and tensions, going against values of modern technology to be accurate and precise. These three agreements are valued in Systems Thinking, where participation facilitate for toleration, inspire for people to act ethically and to protect happiness (Tuan & Shaw, 2016). Through this thesis, accommodation shows through exploring layers of the building as a system and different ways materials are perceived and explored. Both consensus and toleration are considered through involving different stakeholders and methods to avoid for presenting only one "truth".

4.8.1 Research ethics

In addition to considering ethics within Systems Thinking as the applied theory, research ethics has also been considered throughout the process. Prior to conducting the research

methods, I sent an application to Norsk senter for forskningsdata (NSD), including consent form (see Appendix D) and guides data gathering. The application was accepted before involving participants to gather data. Ethical considerations were also addressed within gathering data. As the participant observation included myself as the observer, it is important to recognize how the understanding of information can be constructed or contextualized, either conscious or subconsciously (Crang & Cook, 2007). Regarding the methods for interview, workshop and booklets, it is important to reflect on my role as a researcher and facilitator within the context of participation.

In Chapter 5 **Feil! Fant ikke referansekilden.**, I will present and analyze the results, moving from the more broad explorations of the Life Science Building as the case to the more specific.

5   Results and analysis

In this chapter I will present my findings organized around the three main methods for data collection: observations of public spaces, collaborative booklets, and GIGA-mapping. In order to create a structure in the large amount of data I have collected, I will use three different methods for organizing and analyzing the data: thematic analysis for the observations, content analysis for the collaborative booklets, and ZIP-analysis for the GIGA-map. The chapter also presents merged findings of the previous presented methods through a thematic meta-analysis. The discussion of these analyses can be found in Chapter 6.

5.1 Observations of public spaces

This chapter describes the result and analysis of the observations of public spaces.

5.1.1 Results

In total, 15 public spaces were observed in a period of two months. Several of the observations was at schools and libraries: *University library of Tromsø*, *the Medicine and Science library at University of Oslo*, *Library of Humanities and Social Sciences at University of Oslo*, *Kunsthøgskolen i Oslo*, *Arkitektur- og designhøyskolen i Oslo*, *Deichman main library in Bjørvika* and *the National Library in Oslo*, where the last two libraries did not have connection to a school. Four observations were done at culture focused spaces: *Árdna at University of Tromsø*, *the Norwegian National Opera and Ballet*, *the student house in Oslo Chateau Neuf* and *Klimahuset*, where the two latter is also connected to the University of Oslo. Lastly, *Nordnorsk Kunstmuseum, Astrup Fearney Museum* and *Kunstenerens Hus* were art focused spaces, while *Nationaltheatret train station* was a platform for transportation.

Some of the spaces had more restrictions than others, and can be considered as more of a semi-public space (Jenkins, 2002). For instance, the Astrup Fearnley Museum and Kunstnernes Hus required payment in order to access the exhibition spaces. Nordnorsk Kunstmuseum had free entrance for students and Klimahuset offered free entrance for students at University of Oslo.

A summary of the fieldnotes from each observation can be found in Appendix B.

5.1.2 Analysis

To analyze the observations of the public spaces, I will conduct a thematic analysis, as explained in Section 4.7.1. To conduct the thematic analysis, fieldnotes, reflections, and photos are used to identify patterns.

After conducting the 15 observations, I analyzed them according to themes that appeared central in my notes and reflections. The analysis is conducted with 'materials' as the overall theme, where the themes for 'building materials', 'presented information', 'exhibitions and installations', and 'visitor participation' emerged. These themes can be seen illustrated in Figure 32. To identify the subthemes within the observations for each public space, I used Miro as a tool to map out an overview for each space. The overview consisted of coded themes from the observation notes and reflection, in addition to photos representing these themes.

Figure 30 provides an overview of the analysis process, where details of the map will be shown for each sub-theme. The colors of the elements in the map correspond to the sub-topics presented above. Overlapping of the circles do not interpret a specific common, but exclusively to specify an overview of what elements remain within each public space.

Figure 30: Analysis of Public Spaces Observations (see Appendix A or link for more detail:
https://miro.com/app/board/o9J_lajiAns=/)

As the observations are conducted from a perspective of the visitor role, the overall theme
'materials' incorporates interpretations of how I experienced the spaces. The theme 'building
materials' explored how the building is physically presenting itself, and how it evokes

different senses in visitors. The theme 'Presented information' explored movement and how the building is leading and informing its visitors. 'Exhibitions and installations' as a theme explores what the building want to communicate and engage to. Lastly, the theme 'Visitor participation' explores how the building practice inclusion of its visitors, and how visitors part-take in the building as a community.

Followingly, I will explore each theme and its aim, by presenting some examples within the themes.
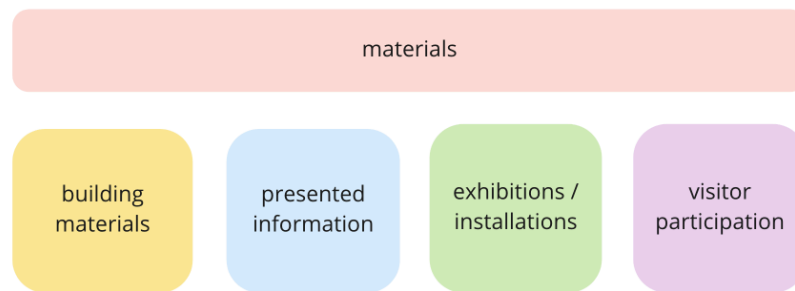
Figure 31: Themes explored within the observations

Building materials

The theme 'building materials explore how the building physically present itself. The aspect 'building materials' represent the raw, tangible experiences throughout the observations. Here is discussed what materials present, by their light, color, form, texture or atmosphere of surroundings.

Figure 32: Subthemes explored within theme 'Building materials'

The category for 'building materials' was grouped into several themes; space and inclusion, nature, history, color, light and texture and form. This can be seen in Figure 32. Further, I will address some of the themes in detail.

As the theme for 'building materials' explored how the building physically present themselves to a visitor, I will give some examples within the subcategories 'form and texture', 'space and inclusion', 'history' and 'nature'. What is presented further within the themes are examples which will illustrate the patterns that constitute a theme.

HISTORY

I found that several of the buildings represented their period of time through their physical materials, with an emphasize on either the modern or the old, in addition to its transitions and maintenance throughout time. An example is Kunsthøgskolen i Oslo (KHiO), which presented clear marks of the modernized, but where the old distinguished itself in its presence (as seen on the photo in Figure 33). The old brick buildings are connected with glass roofs, gathering the parts of the old fabric into one community as a school. Another example on an older workshop that has transitioned into a school is Arkitektur- og designhøgskolen i Oslo (AHO), where the atmosphere and facilities of workshops are highly present throughout the building, while at the same time the school is presented as an open community of craftmanship.

The National Library presents an interrelation of old and new through its content and surface of the building. An example from the building is the exhibition 'Enlightened', which passes on knowledge of events through national culture. As the building itself has a long history, the content within communicates a relation between the new and the old by combining cultural events, historic artifacts, a modern café, and by invites all people as visitors.
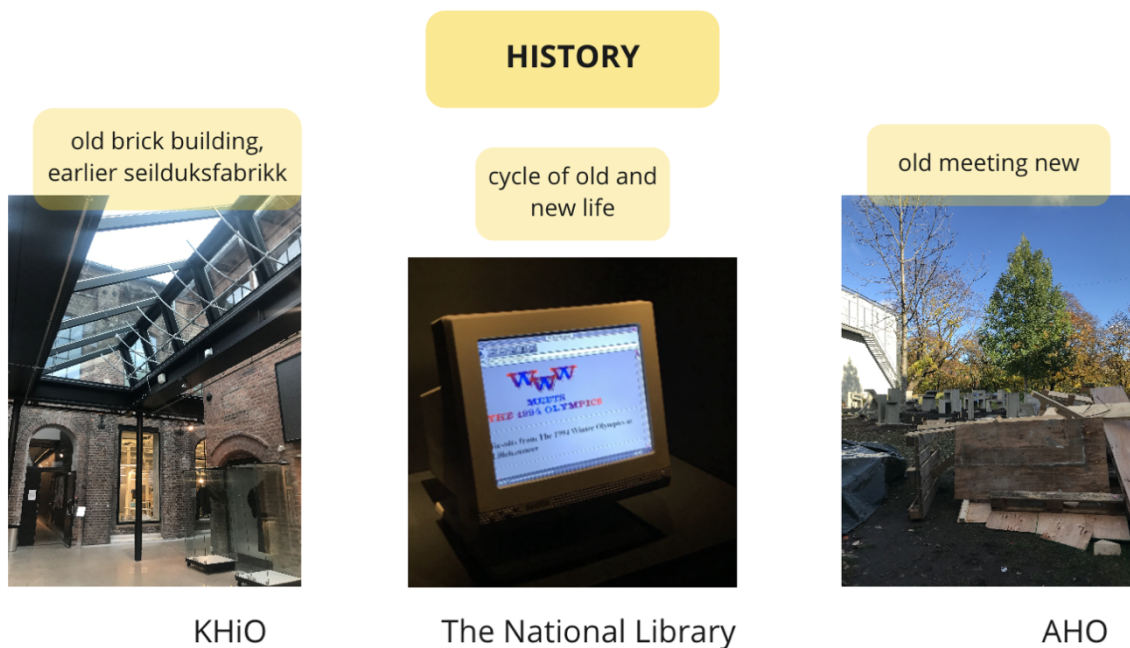
Figure 33: Subtheme 'history' within 'Building materials'

FORM & TEXTURE

Form and texture communicate how the building materials are presented visually and tangibly, through form, texture, color and light, as illustrated in Figure 34. The theme 'form and texture' incorporates in this section the subthemes 'color' and 'light' from Figure 32.

One example is an exit in Nationaltheatret train station leads you through a corridor which is dominated by dark colors from the materials concrete and steel. One passage through the exit presents a colorful area, which acts in contrast to the otherwise grey station. The station is also dominated by circles and spirals, which are seen in the roof and through the exit corridors. Deichman Bjørvika presents a variety of forms, colors and furniture in different variations of material. As an example, the roof is presented with a beehive pattern, where the angles of the several floors bends to let in light and overview. A third example on form and texture is presented in the library of humanities and social sciences at University of Oslo, where the entrance hall has light, marble floors, high ceiling, and light let in by the great windows.

Figure 34: Subtheme form and texture within 'Building materials'

NATURE

The subtheme 'nature' explores how the building materials relates to its natural surroundings, or how the building encourages its visitors to, illustrated in Figure 35.

One example is Deichman Bjørvika presenting the circular exhibition of 'Grønlikaia' on the ground floor of the library. The exhibition invites nature inside in order to engage visitors in the project. Real plants are incorporated into the exhibition inside, representing the local climate in which Grønlikaia will hold. Another example which explores how nature is represented through building materials are Árdna at UiT. The building materials used to build Árdna are closely related to the local nature, which is presented visible through the building itself. Árdna blends into its natural surroundings, where local materials, methods and symbols are integrated within the local context.

Figure 35: Subtheme nature within 'Building materials'

SPACE & INCLUSION

Space and inclusion explore how building materials contribute and encourage for inclusive spaces, where some examples are illustrated on Figure 36.

The building of AHO presents a transparent and visual process of the materials, where knowledge and experiences are shared. The workshops and outside area within the school are separated with glass walls, contributing to an overview of the school as a whole. The Astrup Fearney Museum is built as a flow from the inside to the outside surroundings. The building connects itself to the bridges of Aker Brygge, the ocean and surrounding grass parks. It contributes to a good view of the city from normal perspective. Inclusion of its surroundings connects the building to the city and its people. The library of humanities and social sciences at University of Oslo forms a space which asks for quiet and slow movement, where the slow- and quietness increases with the floors of the building. As the lower and the ground floors allows for a broader inclusion of movement and noise, visitors who values stillness are invited further up in the building.
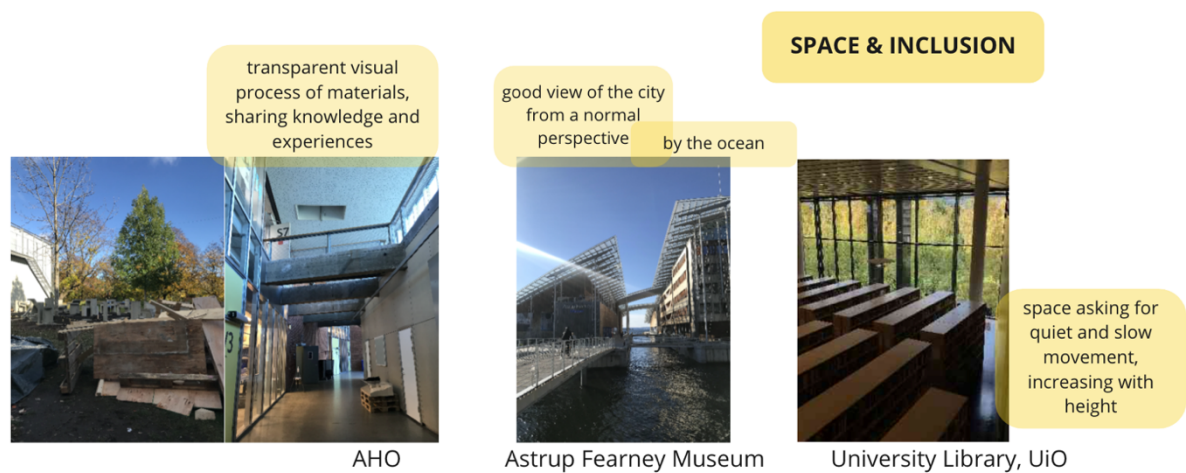
Figure 36: Subtheme 'space and inclusion' within 'Building materials'

Exhibitions and installations

The theme 'exhibitions and installations' explores what the building wants to communicate to its visitors, and what is regarded as current topics within its presence. Through installations and exhibitions is explored what the buildings want to engage its visitor in. Figure 37 presents an overview of the analysis done within this theme, where the presented subthemes will further be presented with some examples.
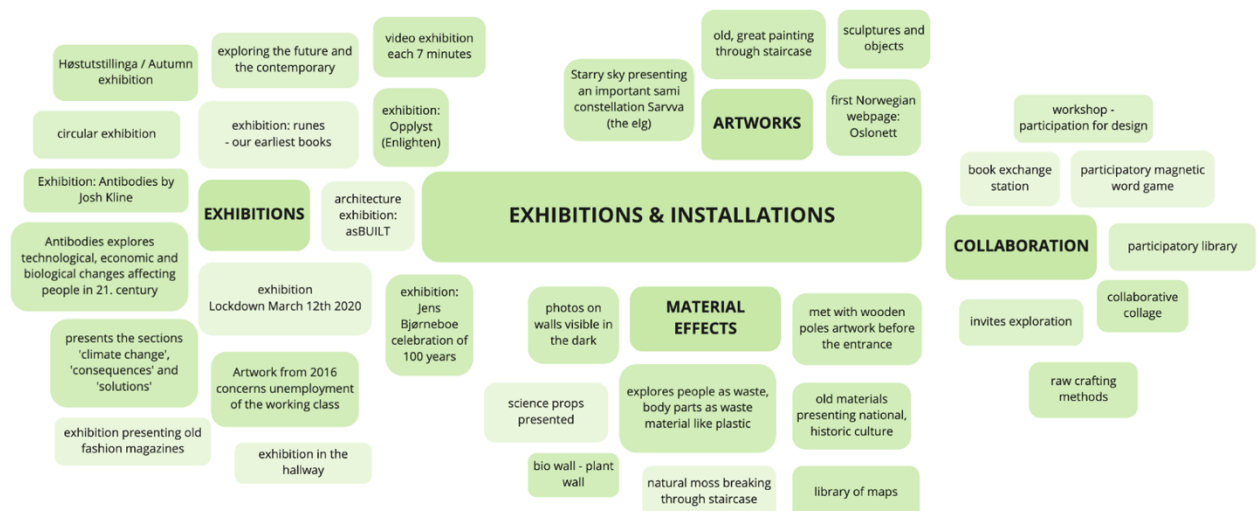
Figure 37: Subthemes explored within theme 'Exhibitions & Installations'

EXHIBITIONS

One subtheme addresses the exhibitions featured in the buildings. This subtheme addresses the specific exhibitions which were presented by the buildings, as illustrated in Figure 38.

One example of an exhibition is 'Lockdown March 12th 2020' at the university library at UiO, which features the cover of the student newspaper reading "CANCELLED: lectures, field trips, internships, events, the semester?" and exhibits forgotten objects from the same date. Klimahuset presents a permanent but interactive and tangible exhibition exploring climate change, its consequences and solutions. Astrup Fearney Museum presented the exhibition 'Antibodies' by Josh Kline, which explored technological, economical and biological changes affecting people in the 21. Century. One artwork concerns unemployment of the working class, which being from 2016 addresses relevancy to the current Covid-19 situation.

Figure 38: Subtheme 'exhibitions' within 'exhibitions & installations'

ARTWORKS

More detailed than exhibitions, the subtheme 'artworks' addresses how single artworks communicate to the visitors of a building, shown in Figure 39.

At the national library, there is an old great painting on the walls through the staircase leading up to the second floor. This artwork communicates the timeline and content of the building.

At Nordnorsk Kunstmusem several sculptures and objects are presented throughout the museum. The museum presents art by northern Norwegian artist focused in the local context. One artwork is 'R19' by Trond Ansten, which is an artwork made by slaughter waste of cod, presenting a timeline of visual catch reports from the sea ice near Tromsø.

Figure 39: Subtheme 'artworks' within 'exhibitions & installations'

MATERIAL EFFECTS

By the subtheme 'material effects' explores how materials, which are not necessarily presented as an exhibition, can contribute to communicate currents, either the effects emerge naturally or displayed by people. Examples on this theme is shown in Figure 40.

An example of an effect which emerged naturally is at AHO, where moss was breaking through the holes in the outdoor staircase. At the platform at Nationaltheatret train station there was a plant wall, or "bio wall", stating a contrast to the otherwise dark area. The science library at UiO presented some science props throughout the library, where different globes, animal skeletons and material of Einstein were presented.
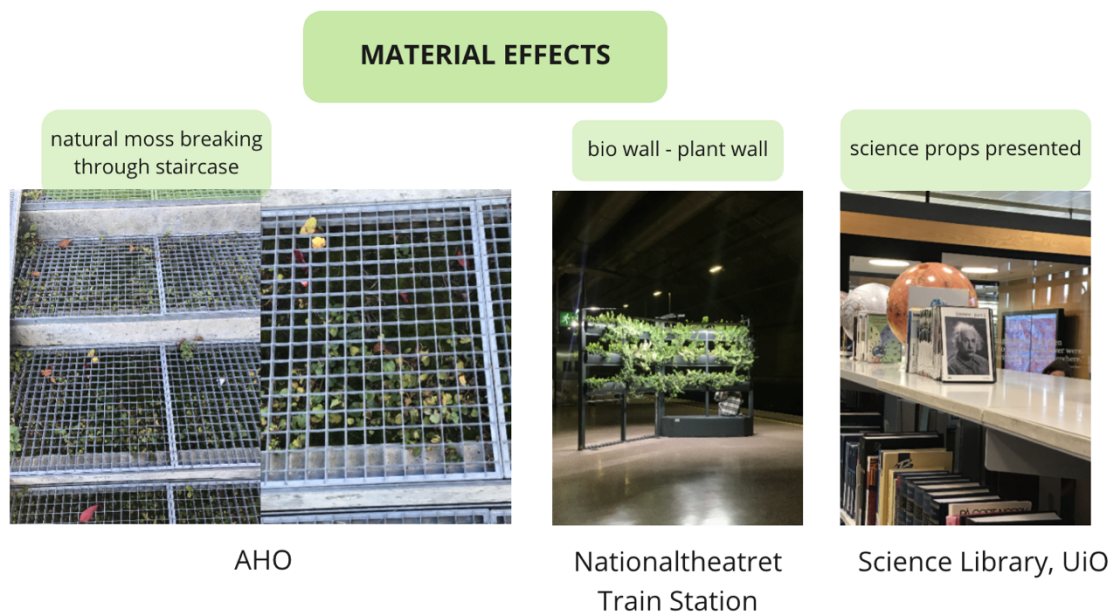
Figure 40: Subtheme 'material effects' within 'exhibitions & installations'

COLLABORATION

The subtheme 'collaboration' within exhibitions and installations explored how the presented areas in focus invited visitors to engage, as shown in Figure 41.

The contemporary library at Deichman Bjørvika suggested for its visitors to contribute with writing in a book and be part of a participatory and collaborative project. At Nordnorsk Kunstmuseum the makerspace allowed for raw crafting methods and be part of a collaborative collage, by disposing tools and craft materials.

COLLABORATION

participatory library

raw crafting methods

collaborative collage

participatory magnetic word game

Deichman Bjørvika   Nordnorsk Kunstmuseum   Science Library, UiO
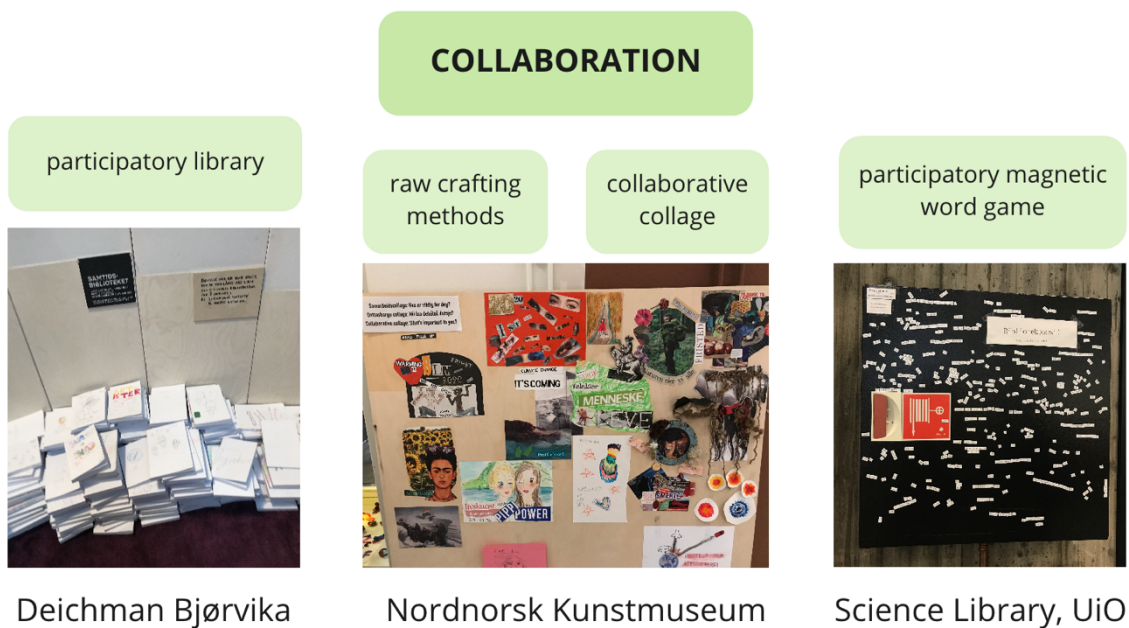
Figure 41: Subtheme 'collaboration' within 'exhibitions & installations'

Visitor participation

The theme 'visitor participation' explores how the building welcomes its visitors, how inclusion is practices, and whether or how visitors partake in the building as a society or community. Participation of visitors invites to explore how the building feels to be in and which experiences are materialized. Figure 42 shows the subthemes, which are further explored with examples.

Figure 42: Subthemes explored within theme 'Visitor participation'

PARTICIPATORY EXHIBITION

The subtheme 'participatory exhibition' explores how visitors are engaged through exhibitions of the buildings, as shown in Figure 43.

At the makerspace at Nordnorsk Kunstmuseum is presented available tools and materials, while it engages for "craftivism", which is activism through crafting. There are possibilities both to contribute to collective artworks or to make individual ones. Another example is the circular exhibition at Deichman Bjørvika, motivating inhabitants of the building to participate with ideas to the new area of Grønlikaia. The exhibition had seating areas and papers which were ready to fill out, allowing the visitors to write and deliver their ideas. The exhibition area also presented a seed bank existing of the different plants which were going to be transferred to Grønlikaia.

PARTICIPATORY EXHIBITION

Skaperverksted / Makerspace

presents availiable materials and tools

craftivism

Grønlikaia - participatory exhibition

Nordnorsk Kunstmuseum

Deichman Bjørvika

Figure 43: Subtheme 'participatory exhibition' within 'visitor participation'

EXPERIENCES

The subtheme 'experiences' focuses on how the participation of visitors evoke emotions and motivates experiences. Some examples are illustrated in Figure 44.

The exhibition at Klimahuset is experiences as confrontational, as the installations presents hard facts through different media, using both text, pictures, and sound in different scales. "The Void" was a presented exhibition at Deichman Bjørvika allowing the visitors to explore a space alone, by presenting the space as hypnotizing and dreamlike. Moving and colorful patterns are covering the whole room, which is illuminated through use of mirrors.

EXPERIENCES

confrontational exhibitions

exploring a space alone

hypnotizing / dreamlike

The Void

Klimahuset
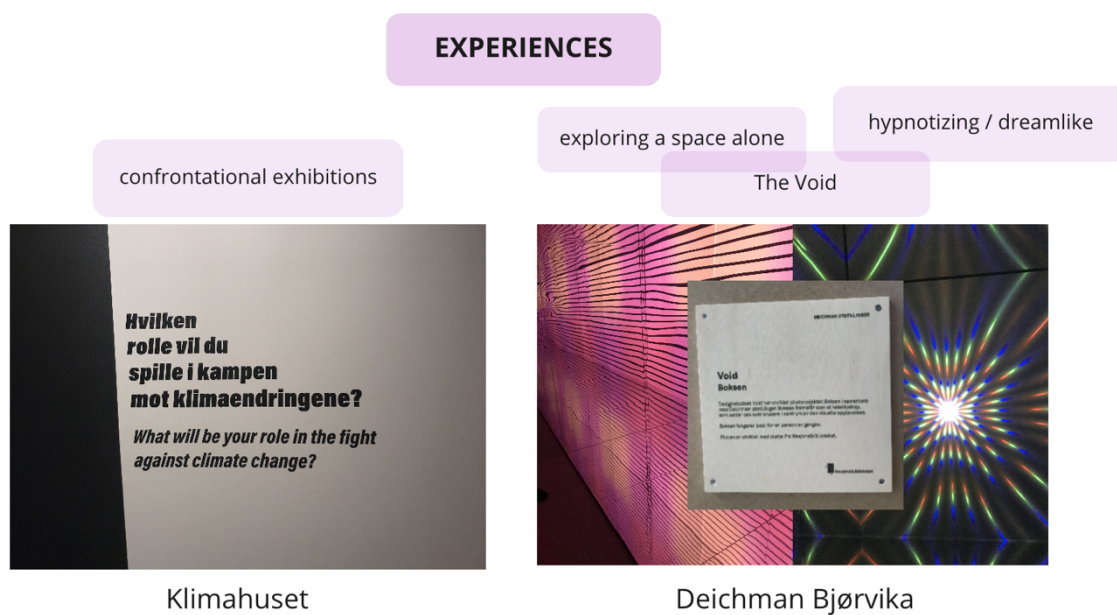
Deichman Bjørvika

Figure 44: Subtheme 'experiences' within 'visitor participation'

INCLUSION OF PARTICIPANTS

'Inclusion of participants' explore how the spaces invite the visitors to its building, which is illustrated in Figure 45.

At Deichman Bjørvika, everyone is welcome, and there are people in all ages, featuring families, children, students and elderly. Nationaltheatret train station does in contrast not invite people to stay for long, as there are a few seating places which are not meant to get too comfortable in. The space is perceived as adapted to people who are hungry, thirsty or in love, as the location presents two kiosks and a flower shop. AHO is a building for its inhabitants, where the visitors move focused with a purpose, showing that they know their way around. Students take use of the workshops and the materials, as is typically done within the context of a school.

INCLUSION OF PARTICIPANTS

space does not invite people to stay for long

adapted for people who are hungry, thirsty or in love

visitors: all ages, families, children, elderly, young & students

a building for its inhabitants

students walking through and using the space and workshops

Nationaltheatret Train Station

Deichman Bjørvika

AHO

Figure 45: Subtheme 'inclusion of participants' within 'visitor participation'

Presented information

The theme 'presented information' aims to how the relation of purpose and space within a building is understood and perceived, and thereby to address the movement of its visitors. The theme explores how the building is leading and informing its visitors, to explore movement patterns. The subthemes are seen illustrated in Figure 46, and will be further explained with examples.
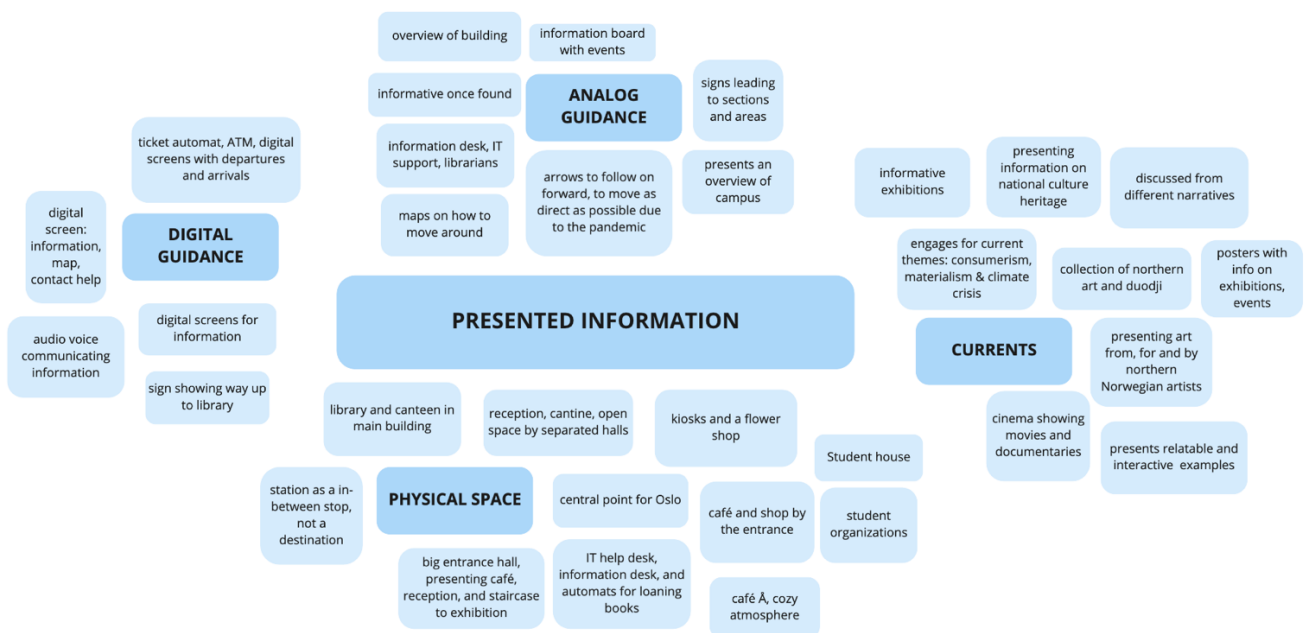
Figure 46: Subthemes explored within theme 'Presented information'

DIGITAL GUIDANCE

The subtheme 'digital guidance' presents how information is presented digitally through the buildings, as shown in Figure 47.

Nationaltheatret train station has digital ticket automats which travelers can interact with to buy tickets, ATMs, and digital screens showing departures and arrivals of trains and connecting transport. At Deichman Bjørvika, there is a digital screen presenting information on where you are and what the library offers, a map showing your position in the building, and an audio voice communicating information of house rules.

DIGITAL GUIDANCE

ticket automat, ATM, digital screens with departures and arrivals

Nationaltheatret Train Station
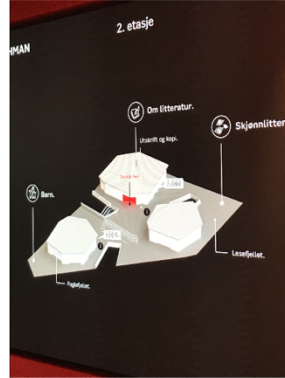
digital screen: information, map, contact help

audio voice communicating information

Deichman Bjørvika

Figure 47: Subtheme 'digital guidance' within 'presented information'

ANALOG GUIDANCE

Analog guidance concerns information which is presented through non-digital formats, where some examples are shown in Figure 48. Nationaltheateret presents a map on how to move around in Oslo, whereas University of Tromsø present a tangible map of the buildings of campus.

ANALOG GUIDANCE

maps on how to move around

presents an overview of campus

Nationaltheatret Train Station

University of Tromsø

Figure 48: Subtheme 'analog guidance' within 'presented information'

PHYSICAL SPACE

'Physical space' covers what the buildings incorporate of services, and how these might communicate to their visitors, illustrated in Figure 49.

Kunsternes Hus presents a big entrance hall, a café, reception and a staircase leading up to the exhibition. This facilitates how the spaces encourages their visitors to move throughout the building. The university library at UiO presents a map when arriving the library, on how to find your seating area, which is mandatory to reserve within arrival due to Covid-19 restrictions. Additionally, the space has facilities such as an IT help desk, information desk, and automats for loaning books.

Figure 49: Subtheme 'physical space' within 'presented information'

CURRENTS

'Currents' represent how themes are presented in order to lead the visitors in a certain direction within the building, shown in Figure 50.

The makerspace at Nordnorsk Kunstmuseum engages by asking the question "What is important to you?" to explore current themes such as consumerism, materialism & the climate crisis. At Klimahuset there is presented relatable and interactive examples on current issues, which are being discussed form different narratives, both the consequences and the solutions.
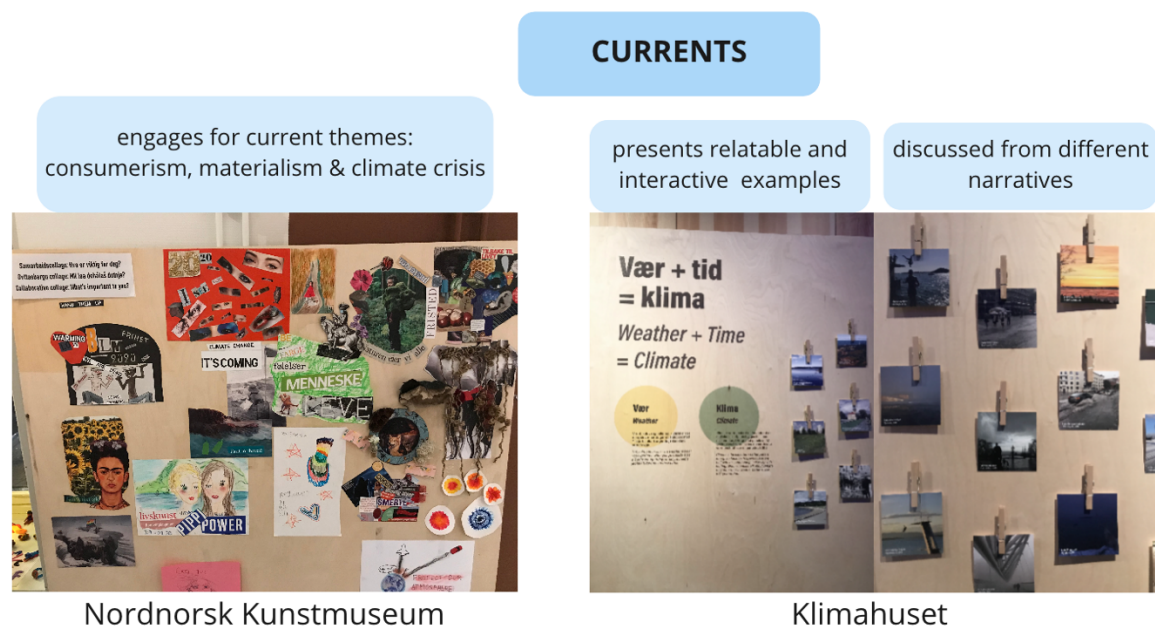
Figure 50: Subtheme 'currents' within 'presented information'

Summary

Seven of the fourteen spaces were libraries. These places were very different, and at most places you easily understood what kind of library you were in. The science library had different globes and a bear skeleton, where the national library presented old books, paintings and exhibited items of national, cultural value. The main library at the University of Oslo was light and had a lot of reading spaces used by students.

Through the analysis of the observations, four themes were identified with sub-themes. The theme 'Building materials' were identified with the subthemes 'history', 'form and texture', 'nature', and 'space and inclusion'. The theme 'exhibitions and installations' were identified with the sub-themes 'exhibitions', 'artworks', 'material effects', and 'collaboration. The theme 'visitor participation' was identified with the sub-themes 'participatory exhibition', 'experiences', and 'inclusion of participants'. The theme for 'presented information' was identified with the subthemes 'digital guidance', 'analog guidance', 'physical space', and 'currents'.

These themes will be revisited in Section 0 for a meta-analysis.

5.2 Collaborative booklets

This chapter describes the result and analysis of the collaborative booklets.

5.2.1 Results

Of 10 booklets given and sent out, I received 8 in time for the analysis to be conducted. The age of the participants differed from 22 to 53 years old, but where the average was 28 years. One participant is living in Sweden and one in Denmark, while the others are based in Norway, whereas three in Oslo, two in Tromsø, and one in Kristiansand. Most booklets are answered in English, but some answers are in Norwegian or Swedish, or a mix of them.

Table 1 shows an overview of the data gathered through the booklet analysis. Not all tasks were completed by all participants. For instance, one informant did not answer the first activity about relations to materials (see booklet page in Figure 18), where other informants answered for only some of the six types of materials. One participant did not answer on the timeline activity (see booklet page in Figure 22), and one informant did not contribute with a material (see booklet page in Figure 23).

Where the participants in the booklets were to think of and describe a public space (see booklet page in Figure 20), the eight answers were somewhat different from each other. One participant did not specify what kind of place the public space was, outside of the headline "my workplace" and its specific descriptions. Another participant described what seemed to be a dream place, stating the general description "Greek inspired building".

Table 1: Overview of results from booklets, see Appendix A or link for details:
https://miro.com/app/board/o9J_lajiAns=/

The results, as shown gathered in Table 1, will be further analyzed.

5.2.2 Analysis

In order to map out the information in a table, I gave each booklet a number as identification. In addition to a number as identification, each participant also received a color, which is represented in tables and figures for the analysis.

To conduct the analysis, I designed an outline of a table in Miro to get an overview of the data, as shown in Table 1. The associated answers are in the table presented to its ID's of the booklets. The rows in the table are arranged consecutively, according to the pages of the booklet that present the different questions and activities. The columns each represent one participant. By scanning the booklets, I combined pictures of the pages with text, to gain a

starting point which included as much as possible. For more detail of Table 1, see provided link in Appendix A.

Followingly, I will present the gathered data and its analysis of relation to materials, the public spaces' descriptions, dreams, and the timeline of the future.

Relation to materials

On the first activity (seen earlier on Figure 18), seven of eight answered. One participant answered the first four, while leaving out the last two, "coffee cup" and "notebook".

The text in the activity state "I think about what things are made of when it comes to…", and present the choices "none", "some" and "very". Figure 51 represent the six answers merged together on how aware the participants are of different objects in their everyday life.
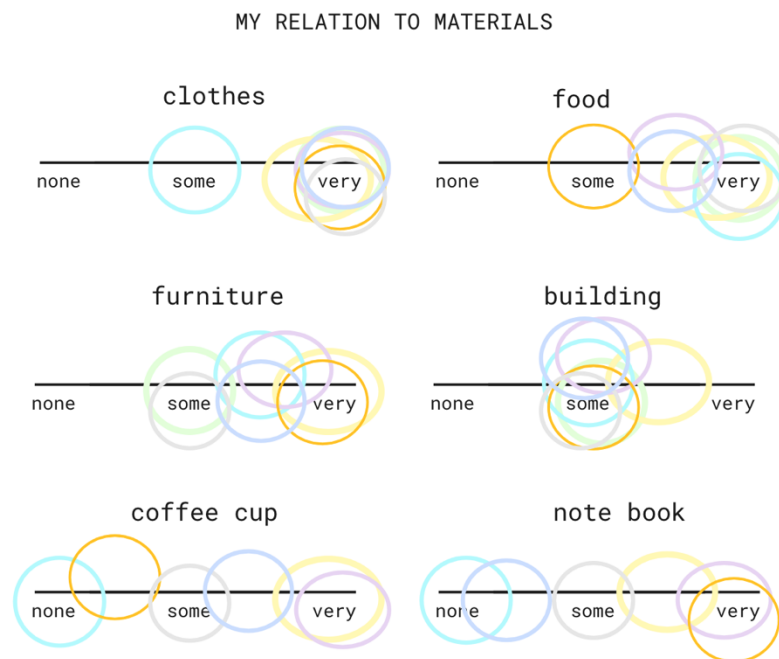
Figure 51: Relation to materials

The gathered results shows how the most common amongst the participants is to consider the material of their food and clothes. On "building", all answered "some" or between "very" and "none". Neither "none" nor "very" are circled by any of the participants for "building".

A chosen public space

An important part of the booklet is the chosen public building or space, as the other activities build further on this idea. Figure 52 provides an overview of the different public spaces the participants used as cases for exploration throughout the booklet.

The public spaces that are chosen by the participants are Oslo City Hall, Deichman Bjørvika, Tromsø library, the university library in Tromsø, the art museum at Sørlandet, Gardemoen airport, "my work place" and a "Greek inspired building". Three of the seven public spaces are libraries. The "Greek inspired building" seems to be an imaginary space, and "my workplace" is not clearly stated what the building represents in its whole, other than its details. As shown in Figure 52, four of the answers include illustrations.

Oslo City Hall

It's made by bricks (murstein), I love the color on them, it is very warm and looks extra beautiful in the morning/evening sun. It's mighty-looking. Because it is so big - and modest - bricks aren't that fancy. I also love the inside of course, with all the paintings and colors. It all feels very solid and timeless. And the skaters outside always brings life to it. Again - I like the contrasts between them and the important/fancy stuff going on inside + people get married there. It's also a scary building. It's so big, with sharp edges - (hunger games - capitol feeling)

The bricks

its qualities	its perks	improvements
longlasting, beautiful, timeless You can see how it's built, and appreciate all of the work put in.	I don't know how they're made, but I guess you need to extract stones from somewhere - :(	Hard to say when I don't know how its made - but a lot of stone must have gone into making it - so they could have made it a bit smaller or reused old bricks (if they didn't)

Seating place in the corner

its qualities	its perks	improvements
Both desk and armchair, good view like a little office.	the desk squeaks and it's a popular place so it can be taken.	tighten screws so it doesn't squeak. it's a bit dirty also sometimes so more clean.

University library in Tromsø

University library at UiT. Safe, accepting, stable, quite old and charming. Nice art and a lot to look at. Many to talk to. I use the house to get my school work done and then I become so happy that I jump and dance around. There's a little nature outside.

Tromsø library

Earlier cinema. The shell is reused. Big windows. 4 floors. A lot of light.

Library, a place to be

its qualities	its perks	improvements
Recycled building, big windows, much light.	Books to loan, share, not own and buy.	Loan more than books, tools, sport gear, dogs?

The arrival terminal

its qualities	its perks	improvements
wooden floor!!	its cozy, its soft and sound from suitcases is not bad.	its stressful at times, no place to sit :(

Gardemoen airport

It is not my fave place, but I really appreciate the wooden floor in the arrival port at the airport.

Sørlandet kunstmuseum

my current place of work
my favorite building in the city
old school building

The exhibition rooms

its qualities	its perks	improvements
Large open spaces, filled with art. Many different artists are being shown.	Calming. Gives you space to enjoy the art.	Could show more young artists

A room full of empty books where people can fill it in

its qualities	its perks	improvements
Make your own book. Continue on another book. Just read a book.	You get to create and look at other self made books	A way to know if someone have continued to your book, or a way to follow a specific book.

Deichman Bjørvika

The ceiling at Deichman Bjørvika. Aka The Beehive. All the different people/working bees going to the beehive to do their own things.
· A place for all types of people
· Go alone or with someone
· A place to work & relax
· A place to learn & create

Greek inspired building

...ek inspired building. Everything is made of marble. ...e windows covering the roof - letting a lot of light inside. ...re is an oasis in the middle of the building, with a pass ...e in the roof, which lets a lot of light down on the plants. ...untain. Ornaments in the marble on the floor ...ek/roman sculptures

A corridor/passage taking you from one room to another

its qualities	its perks	improvements
A lot of light entering the room. My fav color blue on the walls. Marble sculptures.	Calming atmosphere. Make me relax and take time to observe.	No, I dont think it need to be improved

"utsikten" = "the view"

its qualities	its perks	improvements
silent, good view, nice chairs, often no people	a place to focus, feels like a spa.	when people are there it echoes, maybe some isolation would be good.

My workplace

This is my workplace. It's a white-concrete building with stone and woodfloor and huge windows. It contain several of rooms and corridors, toilettes and offices, lamps, fire security people. visitor, children, all ages, old people, workers, politicans, guards, baristas, artists, students. It's located just by the sea.

Figure 52: Public spaces explored in booklets (see Appendix A or link for details: https://miro.com/app/board/o9J_lajiAns=/)

Building on the chosen public space, Table 2 shows the activity of describing a favorite concept within the building, where its qualities, perks and improvement are considered. The favorite concepts presented are 'the bricks' for Oslo City Hall, 'seating place in the corner' for University library at University of Tromsø, 'Library – a place to be' for Tromsø Library, 'the exhibition rooms' for Sørlandet Art Museum, 'the arrival terminal' at Gardemoen airport, 'the contemporary library' for Deichman Bjørvika, 'a corridor/passage' for the Greek inspired building, and 'the view' at 'my workplace'.

Table 2: Public space and concept

Public Space	Favorite concept	its qualities	its perks	improvements
Tromsø Bibliotek	**Library - a place to be**	Recycled building, big windows, much light.	Books to loan, share, not own and buy.	Loan more than books, tools, sport gear, dogs?
Greek inspired building	**A corridor/passage taking you from one room to another**	A lot of light entering the room. My fav color blue on the walls. Marble sculptures.	Calming atmosphere. Make me relax and take time to observe.	No, I dont think it need to be improved
Gardemoen airport	**The arrival terminal**	wooden floor!!	its cozy, its soft and sound from suitcases is not bad.	its stressful at times, no place to sit :(
University Library in Tromsø	**Seating place in the corner**	Both desk and armchair, good view like a little office.	the desk squeaks and it's a popular place so it can be taken.	tighten screws so it doesn't squeak. it's a bit dirty also sometimes so more clean.
Sørlandet Art Museum	**The exhibition rooms**	Large open spaces, filled with art. Many different artists are being shown.	Calming. Gives you space to enjoy the art.	Could show more young artists
Dunkers Kulturhus	**"the view"**	silent, good view, nice chairs, often no people	a place to focus, feels like a spa.	when people are there it echoes, maybe some isolation would be good.
Deichman Bjørvika	**A room full of empty books where people can fill in**	Make your own book. Continue on another book. Just read a book.	You get to create and look at other self made books	A way to know if someone have continued to your book, or a way to follow a specific book.
Oslo City Hall	**The bricks**	longlasting, beautiful, timeless You can see how it's built, and appreciate all of the work put in.	I don't know how they're made, but I guess you need to extract stones from somewhere - :(	Hard to say when I don't know how its made - but a lot of stone must have gone into making it - so they could have made it a bit smaller or reused old bricks (if they didn't)

The favorite concepts explored by the participants, the qualities regard a material matter, where for the perks several mention an atmosphere, and for improvements the answers are more specific and guided. Material qualities are mentioned, either in the form of light, color, or form: such as "big windows, much light", "a lot of light emerging the room", "my favorite color blue on the walls", "wooden floors!!", "large open space", and "you can see how it's

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built, and appreciate all the work put into it". Two participants mention the view, where one mention how the view makes it feel "like a little office".

Four participants mention the perks of the concepts as an atmosphere: "*calming atmosphere*", "*it's cozy*", "*calming*", and "*feels like a spa*". Two participants mention the perks as direct actions which the concepts open up for, where both of these are concepts within libraries: "*books to loan and share*" and "*you get to create and look at other self-made books*".

Except from one participant who didn't think the concept within the building needed any improvements, the room for improvement for the concepts are mentioned as specific ideas, such as the possibility to "*loan more than books*", more places to sit for it not to feel as "*stressful*", "*tighten screws* [on the desk] *so it doesn't squeak*" and "*keep more clean*", for a museum to "*show more young artists*", isolate the view place so it doesn't echo when there's more people there, "a way to know if someone have continued on your book, or a way to follow a specific book". One participant talks more specific on the materials used in the building process, and how they "*could have made it* [the building] *a bit smaller or reused old bricks*", where she states in parenthesis "*if they didn't*". Additionally, she added how it's "*hard to say when I don't know how it's made*".

Envisioning dreams for the future

The activities for "Envisioning the Future" and "Dreams for the Future" are presented on pages next to each other, and will be analyzed closely together as the content within 'envisioning' and 'dreams' can overlap. Four of the eight participants had made visual illustrations of how they envisioned the future, which is seen in Figure 53.
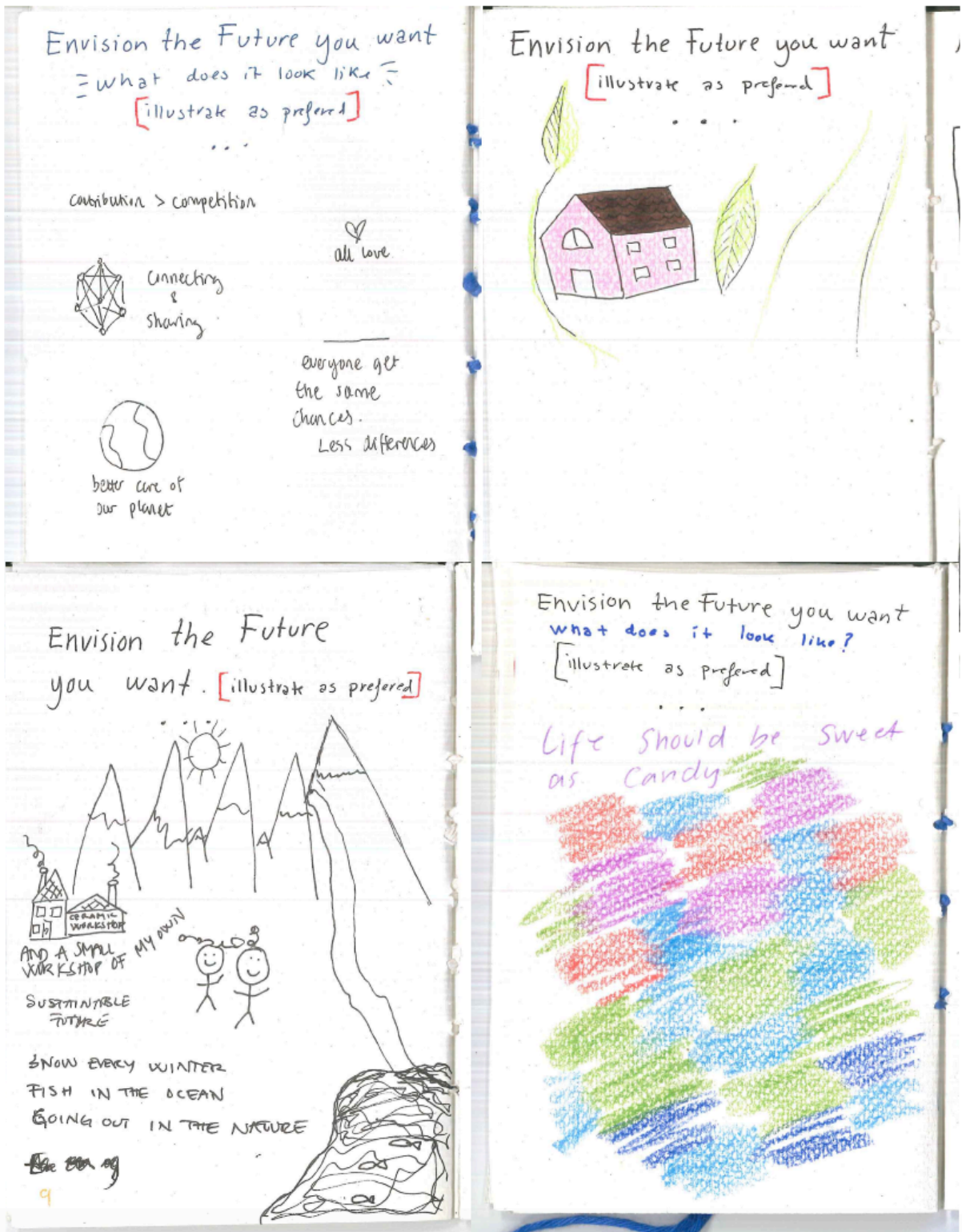
Figure 53: Illustrations on envisioning the future

The illustrations on Figure 53 represent the dreams of a small ceramic workshop and access to thriving nature, colors representing the text "*life should be sweet as candy*", "*contributions >*

competition, all love, connections & sharing, better care of the planet, everyone get the same chances, less differences", and a drawn house which is explained on the next page to represent the dream to buy a house to fix up.

Figure 54 shows clusters of the dreams the participants mapped out, where one participant have taped in some bark along with the dreams expressed in text "*Friendly, green, vegetation, flowers, markets, music, PARKS – Nature in the city, good commuting & open society*".

A just and accessible society for everyone. Where we take care of ourselves and the planet, together. Where living is an affordable thing to do and not everyone tired all the time :(

A more direct democracy
we stop exploiting, stop mining - we use and reuse what we have.

Wealth and access to food/shelter/love/everything is equally distributed.

Decolonisation - we stop extracting - but rather give back to places/people who have been colonised.

more focus on mental health
free education 4 everyone + opportunity 4 education

My personal dreams are to get a full time job in the art field, and to buy a cute little house to fix up with my boyfriend.

For society in general I hope fast fashion won't be a thing in the future, and that the planet gets greener, both literally and in terms of producing goods and food.

I hope the air is cleaner, and that people producing our things get a living wage, regardless of where they live.

Friendly, green, vegitation, flowers, markets, music, PARKS - Nature in the city, good commuting, open society.

That you can share and loan more of what you need.
That repair become more common than to buy new.
That we stop throwing away what can be eaten and used.
That we stop with renovating in todays manner solely for cosmetic reasons, contributing to massive amounts of waste, both publicly and private.

I wish for things to happen. Politicians who care and take action for the community. Drastic changes. I am willing to participate in a great voluntary work for the world and I really wish for this to happen.

Having a small production of ceramics, a little workshop where I can make ceramics for myself and friends ++

That we generally get better in taking care of the planet.

Generally a nice everyday life. With good food, love and walks in nature. And cabin trips with knitting and coffee.

A change in large-scale production of ceramics, to a smaller one, where we end up with fewer things but "better". And that it becomes more meaningful for people to invest in quality rather than mass-production.
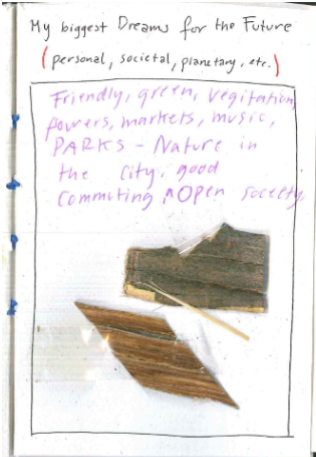
Figure 54: Dreams for the future

As dreams were mapped out with the aim to later manifest within the chosen public space, the dreams and visions are analyzed into themes, seen on Figure 55. In addition to personal dreams, the dreams and visions are categorized into the three themes 'care of the planet', 'equal and accessible society', and 'political/systematic changes'. These three themes can be perceived interrelated, as the themes are discussed interchangeably. As the dreams fit into more than one category, I made a circle representing the three themes, allowing for the

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dreams to be presented into more than one category. The personal dreams are placed in the middle, while they also refer to the themes presented.
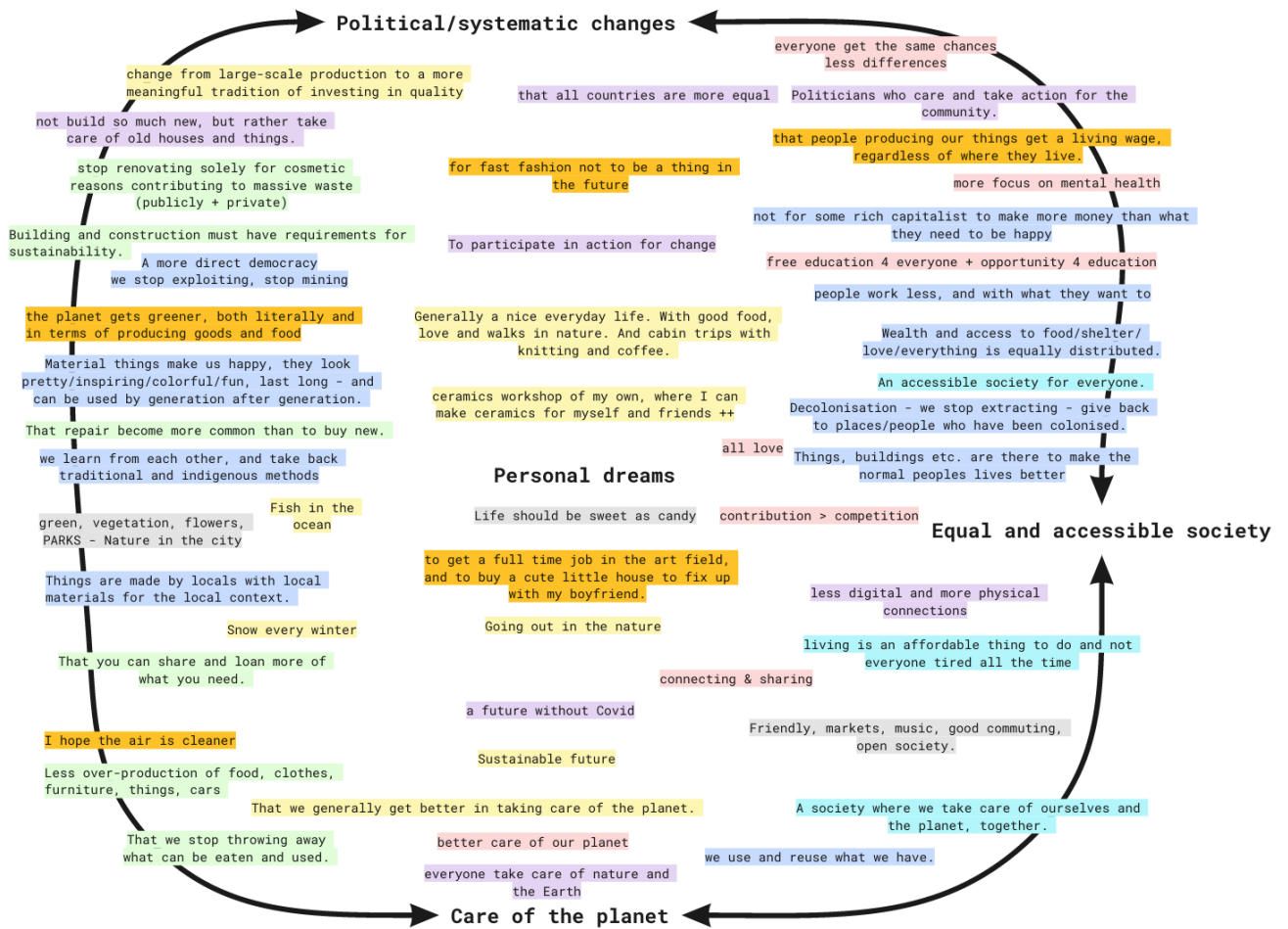
Figure 55: Categorization of envisioning dreams for the future

Most envisioned dreams for the future are found between 'care of the planet' and 'political/systemic changes', and between 'political/systemic changes' and 'equal and accessible society'. As the themes 'political and systematic changes' and 'care of the planet' correspond best to my area of interest, I will further in the analysis focus on the meeting point between these two. I recognize the two other themes and interesting points made within their meeting point, this is not an area I will continue to focus on further in this analysis.

All participants mention care of the planet in one way or another, but some dreams for environmental sustainability are expressed more direct, such as the contributions "*we generally get better in taking care of the planet*", "*better care of our planet*", "*I hope the air is cleaner*", and "*everyone take care of nature and the earth*".

Focusing on where taking care for the planet meet systematic change, four subthemes was extracted: '*care for nature*', '*repair & maintenance*', '*local community*' and '*production*', as seen on Figure 56. As the theme for 'care for nature' mostly includes broad expressions of a dream for a more sustainable future, I will have a deeper look into the other three subthemes.

care for the planet & systematic changes

care for nature

Fish in the ocean

I hope the air is cleaner

Snow every winter

everyone take care of nature and the Earth

better care of our planet

That we generally get better in taking care of the planet

green, vegetation, flowers

Sustainable future

repair & maintenance

not build so much new, but rather take care of old houses and things.

we stop throwing away what can be eaten and used.

repair becomes more common than to buy new.

Material things make us happy, they look pretty/inspiring/colorful/fun, last long - and can be used by generation after generation.

production

Building and construction must have requirements for sustainability.

stop renovating solely for cosmetic reasons contributing to massive waste (publicly + private)

change from large-scale production to a more meaningful tradition of investing in quality

the planet gets greener, both literally and in terms of producing goods and food

Less over-production of food, clothes, furniture, things, cars

local community

That you can share and loan more of what you need.

we learn from each other

take back traditional and indigenous methods

PARKS - Nature in the city

Things are made by locals with local materials for the local context.

participate in action for change

Figure 56: Extracted subthemes of care for the planet and systematic changes

The category of 'local community' concerns how things are made and used, for example "things are made by locals, with local materials, for the local context". The visions "learn from each other", "share and loan what you need" and "take back traditional and indigenous methods" points to sharing knowledge and tools within a local community. Community is also referred to in "parks – nature in the city" and "participate in action for change", which points at change to start locally, before it can further expand.

The category 'repair and maintenance' points at areas to tackle within a more individual scale than the category 'production'. Even through the category for repair and maintenance cover a more individual level, systematic changes are still highly present within the problem area.

The vision "material things make us happy, they look pretty/inspiring/colourful/fun, last long, and can be used in generation after generation" points to how things make us happy, but within a tradition where the things are cared for and maintained throughout several generations. The presented vision "we stop throwing away what can be eaten and used" and "repair become more common than to buy new" suggests a future where the potential of things and food is utilized. Repair is driven by individual motivation, but also needs to be facilitated systematically. The expression to "not build so much new, but rather take care of old houses and things" points more direct at the building processes and modern traditions.

The category of 'production' covers production within large-scale, over-production, renovating, and building processes. The two visions "the planet gets greener, both literally and in terms of producing goods and food" and "less over-production of food, clothes, furniture, things, and cars" are more general expressions of the wish to stop overproduction in the world. Expressing the vision to "change from large-scale production to a more meaningful tradition of investing in quality" points to production is facilitating for patterns of overconsumption. Some more specifically visions directed at building and construction industries within public sector are to "stop renovating solely for cosmetic reasons, contributing to massive waste, publicly and private" and "building and construction must have requirements for sustainability".

Timeline

Participants were asked how dreams could manifest in the future context of the public space, and to map it out on a timeline presenting "today" and "the future". Figure 57 shows a merged timeline, presenting all timelines into one. As one of the seven participants did not fill out this activity, the other six are represented according to different colors.

The context of the public space is presented in brackets, under the headline of the timeline. The answers shown are both specific and more general, in relation to the public space context and in relation to the dreams that are presented. One participant focused on its context of a

library, she outlines specifically for what now is available to loan and what she wishes she can loan through the library in the future.

The form of the different answers is unique, where some uses keywords, some full sentences, some make drawings, one some glues in other materials, while another provides a list of a battleplan on how to make change a reality. The listed plan present step 1 on the timeline as "today", and whereas the number increases the future gets closer. The plan goes as follows: "1. *Talk about actions, 2. Get people to join, 3. Form an organization 4. Do action for university library 5. Expand, 6. Do action for Tromsø, 7. Expand, 8. Do action for the whole world*". She also explains in the timeline how she by "action" refer to starting a club or organization, where problems are discussed with the aim to find solutions together. Further is explained how a problem can be about health, environmental sustainability, structures or economy.
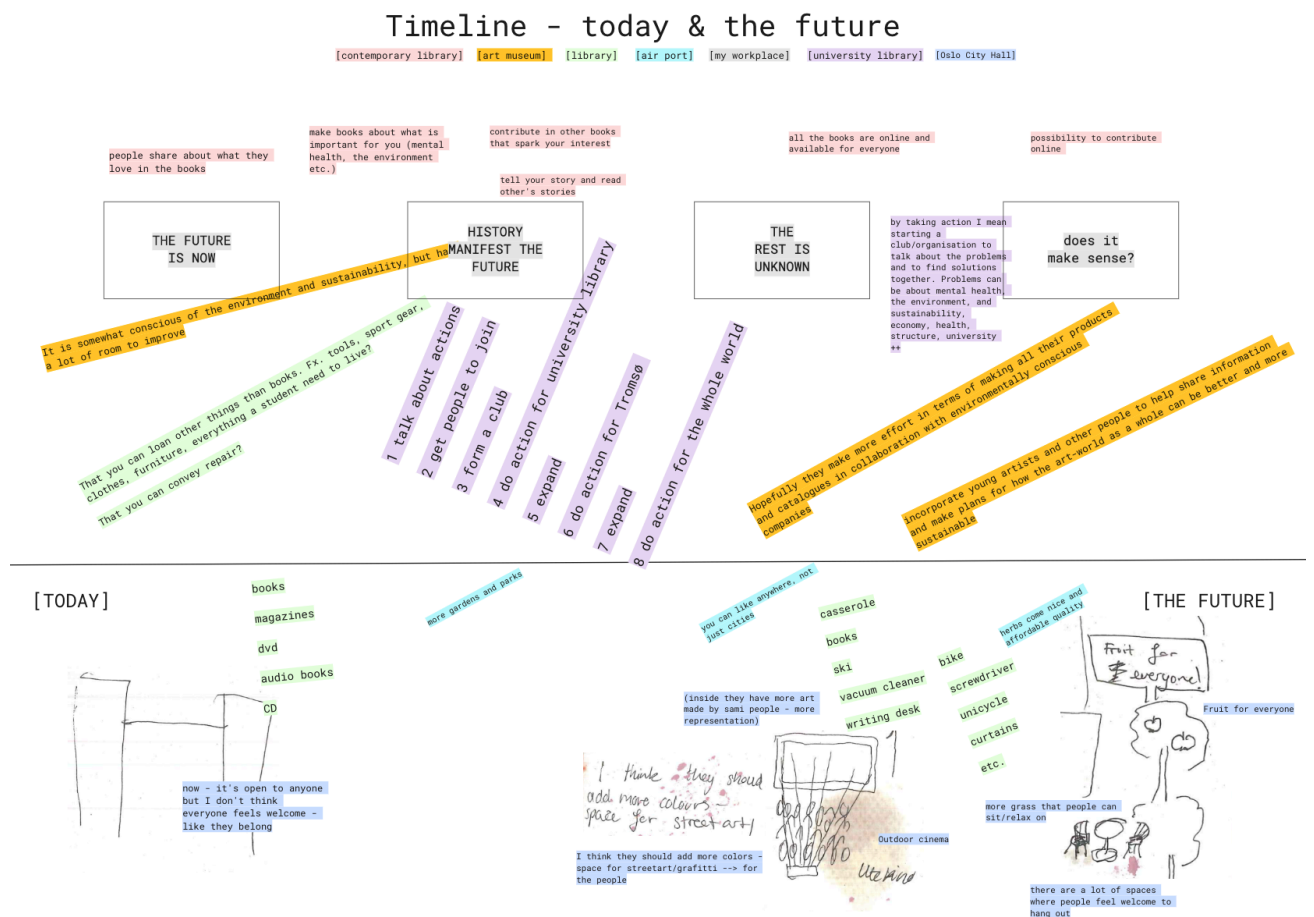
Figure 57: Merged timeline

One participant took in use more material textures into her answers, where a folded piece of paper and pictures was incorporated, as seen on Figure 58. The text presented in the folded paper is "*The future is now*", with the text "*History manifest the future*" behind the fold, and "*The rest is unknown*" with the text "*Does it make sense?*" behind its fold.
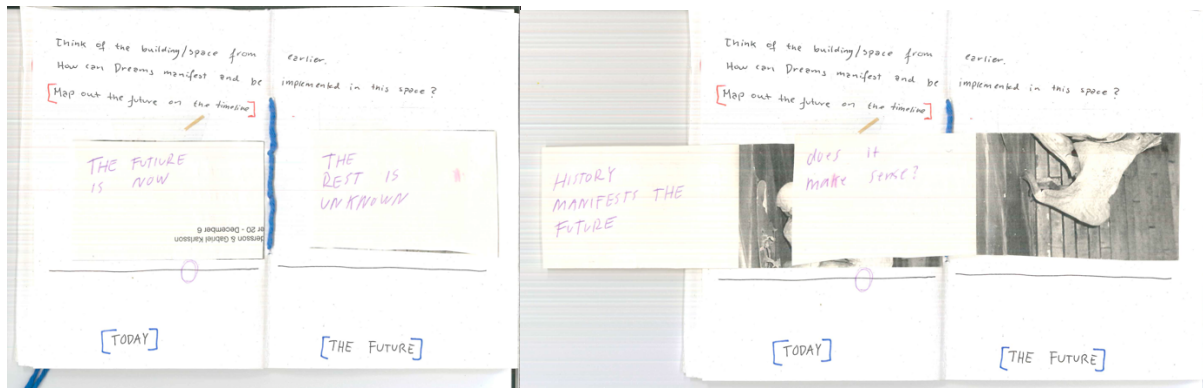
Figure 58: Example of timeline from participant

Material contributions

The last page of the booklet asks the participant whether they would like to contribute with a material. As this question does not necessarily have a connection to the public space they have explored in the earlier activities, but rather a statement on how materials are highly present in our everyday life. Two participants contributed with living flowers, some yarn, some oil colors reflecting both pages, an orange peel, some bubble wrap, while one contributed with stickers, a fake tattoo, a safety pin and "an unknown button", as seen in Figure 59.

Figure 59: Material contributions

As this activity aimed at gathering a range of materials to state it actually *can* be anything, these results show this well.

Summary

Following the structure of the booklet, the analysis started to address the relation to materials expressed by participants, before moving on to the more complex task for public spaces and envisioning a future. The task of envisioning a future was addressed in more detail, as it presented complexity of the booklet. Building on to the explored public space, it further aimed to map out the dreams envisioned on a timeline. The joint timeline represents a summary of the findings, followed by material contribution showing the vast nuances of what materials can represent.

For the activity of relation to materials, the 'building' was the one with the most neutral answer, where all participants circled the middle (some). As 'building' represent the object which is the most 'public'. One reflection is how a building has a stronger connection to

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public, than the other presented objects. As coffee cup and notebook is a bit more specific example, these present a bigger range within the results. Chances are that you have more power in choosing your coffee cup, food and clothes, than the buildings in which you visit or walk through in your everyday life.

The themes addressed in the analysis will be revisited in Section 0.

5.3 GIGA-mapping

This chapter describes the result and analysis of the GIGA-mapping workshop.

5.3.1 Result

As an overall reflection, the workshop was successful in its implementation, considering both technical aspects related to the digital tools and the participatory aspect of the mapping. Due to some incidents, two of the participants could not actively take part in the workshop as planned. This made it five active participants in the workshop, as I had included a buffer for when inviting. The participants present for the workshop was one leader of library of medicine and science at UiO, a senior architect for the department for planning and assessment at UiO, a civil architect and theme group leader for education environment for the Life Science Building, a PhD-student in sustainability and design research working with materials, and a researcher from SINTEF working with reuse of materials. As one of those who could not partake was a PhD-student in chemistry, it left me with only one participant presenting the "future inhabitants" of the building. Even though one PhD-student was active and presented 1/5 of the group, it could have been more balanced.

I had set off 1,5 hour for the workshop, while planning for the workshop to take one hour. The actual mapping of the workshop was planned to take about 30 minutes. In addition to some delays, I also found the participants were engaged in contributing to the map, so I extended the mapping time for an extra 15 minutes. The workshop still ran on ten minutes in time.

By presenting the Life Science Building as a case, where I highlighted the ideas and visions behind it, invited the participants who did not have detailed experience with the building to contribute. To welcome abstract ideas of the theme engaged for inclusion and variety.

My participation during the workshop was as the facilitator. I was open to participate to the GIGA-map in Miro, but wanted my role to stay flexible according to the engagement of participants. Once I made two groups in breakout rooms, I used some time to answer questions for each group. In the breakout rooms, I participated in discussions, listened to their viewpoints, and assured them of their information being valuable and engaging them to write down on the map the points they were discussing. Therefore, I did not actively partake in jotting down on the GIGA-map throughout the workshop, simply because I felt the map was developing organically by the participants.

Figure 60 shows the map after the workshop had finished, presenting an overview of the result.

Way-finding og identitets skapning

Synergi - faglig - speiles i byggets utforming og funksjon

Skape nye bevegelser / nye opplevelser

Grafikkonsept særegent for bygget - identitet

Materialbruk og tegnspråk er med å skape en stedets opplevelser

det lille rommet i det store rommet

Sammenhenger - Bygger store bygg for mange mennesker, men er et stort SYMBOL for hva samfunnet/UiO vil jobbe med - peker mot fremtiden

Oppdatert bilde

Tre og betong - materialene eldes med verdighet - blir vakrere og vakrere etterhvert - ekstremmotsatsje

Kontoret rett + opplevelse og møtested

Exploring materials in public spaces & The Life Science Building
Where do you want to go?

Oslo Science City

Avverting mellom kostnader vs. miljø og det visuelle

Figure 60: screenshot from Miro after the finished workshop (see Appendix A or link for more detail: https://miro.com/app/board/o9J_lajiAns=/)

5.3.2 Analysis

To analyze the GIGA-map from the workshop, a ZIP-analysis was applied (explained in Chapter 4.7.3). As explained, a ZIP-analysis focus on three points, presenting 'zoom', 'innovation' and 'potential' (Sevaldson, 2013). The Z-points will address themes from the map that should be further researched, the P-points will mark problems or potentials in need of improvement, and I-points represent new relations or resolutions to the P-points. Even though the analysis is called a ZIP-analysis, the order of the analysis is usually done by first zooming in, then addressing potentials, and lastly find innovations. I will follow this latter order when presenting the points for the analysis. Figure 61 shows the GIGA-map in its whole after I have placed notes marking Z-, P- and I-points.

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Figure 61: GIGA-map after placing Z- (pink), I-(Blue) and P-points (Purple), (see Appendix A or link for more detail: https://miro.com/app/board/o9J_lajiAns=/)

The three different points will be further presented and explored.

Z-points

After identifying the Z-points, I made a separate map including the points, presented in Figure 62. Some further details were then provided (Sevaldson, 2012, 2012). Due to limited resources, I was not able to contact key informant and stakeholders in developing this map further. Instead, I researched some of the areas and included more detail of what I found available on the internet. As the participants in the GIGA-mapping provided interesting details of Life Science Building, a curiosity awoke to gather more information on some of the points.
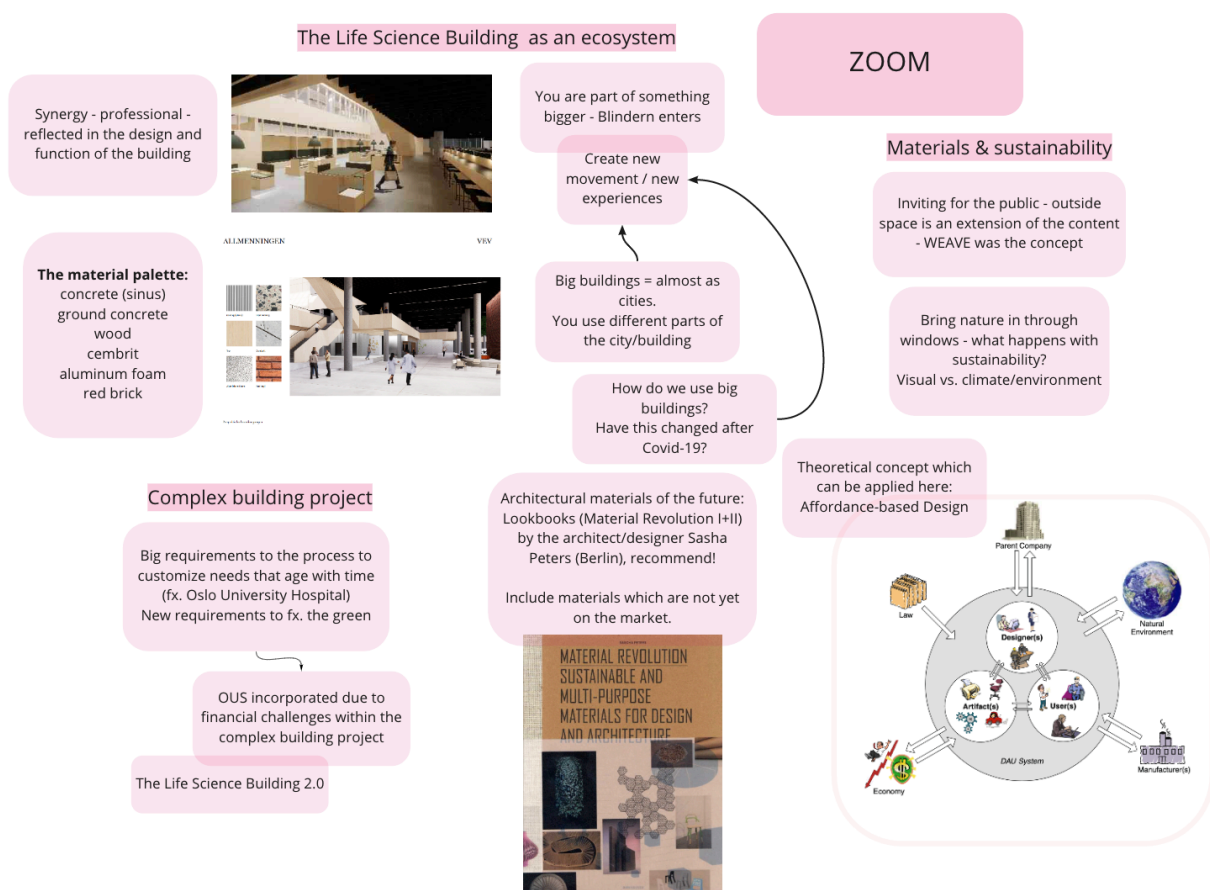
Figure 62: Z-points from GIGA-map (Maier & Fadel, 2009; Peters, 2012)

Life Science Building as an ecosystem

One of the Z-points that inspired further research is how the Life Science Building acts as an ecosystem. It is stated in the map how big buildings can be looked on as cities, where the visitors use different the city or the building in different ways. The outside and structure of the building help to connect it to Blindern as a campus, both physically and thematically. Questions are asked about how we use big buildings, and whether or not this have changed post Covid-19. These questions are not answered directly in the analysis, but rather reflected on about how new movements and experiences might emerge.

Complexity of the building project

The complexity of the Life Science Building project is addressed in the GIGA-map, where requirements and customization of the building is discussed. One example mentioned in the map is the incorporation of Oslo University Hospital. Financial challenges of the complex building project led the report "The road ahead for the Life Science Building – assessment for alternative solutions", which explored the possibility of including functions for Oslo University Hospital into the project, and presenting the joint project "The Life Science Building 2.0" (*OUS i Livsvitenskapsbygget*, 2021; Universitetet i Oslo, 2021c). Including Oslo University Hospital into the Life Science Building will bring health and patient care in as a fourth element and dimension to the project (*OUS i Livsvitenskapsbygget*, 2021). By zooming in on this expansion of the project, an example is presented on the complexity of the building project, where its requirements and customizations is changing as time passes.

Materials and sustainability

The material palette and qualities of The Life Science Building are included in the Zoom-map as it is central for the explored case, though it will not be investigated further in its separate sense. The material palette includes concrete, wood, cembrit, aluminum foam and red brick.

Synergy through the disciplines is reflected through the design and the function of the building. The visual aspects are compared to the aspects representing the climate and environment. Nature is brough in through the windows, which raises the question of what will happen with sustainability. The project WEAVE, which aims to connect the nature outside to

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the structure of the building, invites the public as the outside space acts as an extension of the building's content.

On discussing to include materials which are not yet on the market, the books 'Material Revolution' by Sasha Peters (2012) was recommended, which presents architectural materials of the future. A theoretical concept was also presented within the GIGA-map, which was 'Affordance-based Design', which I looked further into within the Zoom part of the analysis. An *affordance* is stated to be what a system can contribute for another system, making the concept relational in the aspect where the two systems are interacting complementary to each other (Maier & Fadel, 2009). Affordance-based design tackle how transformative processes of functions and algorithms does not give enough guidance to designers dealing with non-transformative systems and requirements, such as aesthetics, cost and human interaction (Maier & Fadel, 2009).

After exploring the Z-points in more detail, potentials and problematics from the GIGA-map was analyzed.

P-points

The map of P-points should represent problematic areas and their interrelations. Sevaldson (2012) states how P-points should be explored by consulting with stakeholders, in order to explore the problems and potentials separately and further linking them together. For the same reasons as stakeholders were not contacted for developing the 'zoom' map, the map for P-points is also explored without consulting with key informants. In the same way as for the Z-points, I also used available resources on the internet to explore the P-points further. For the 'Potential' part of the analysis, the focus is on the interrelations of the potentials within the GIGA-map. The explored P-points are shown in Figure 63.
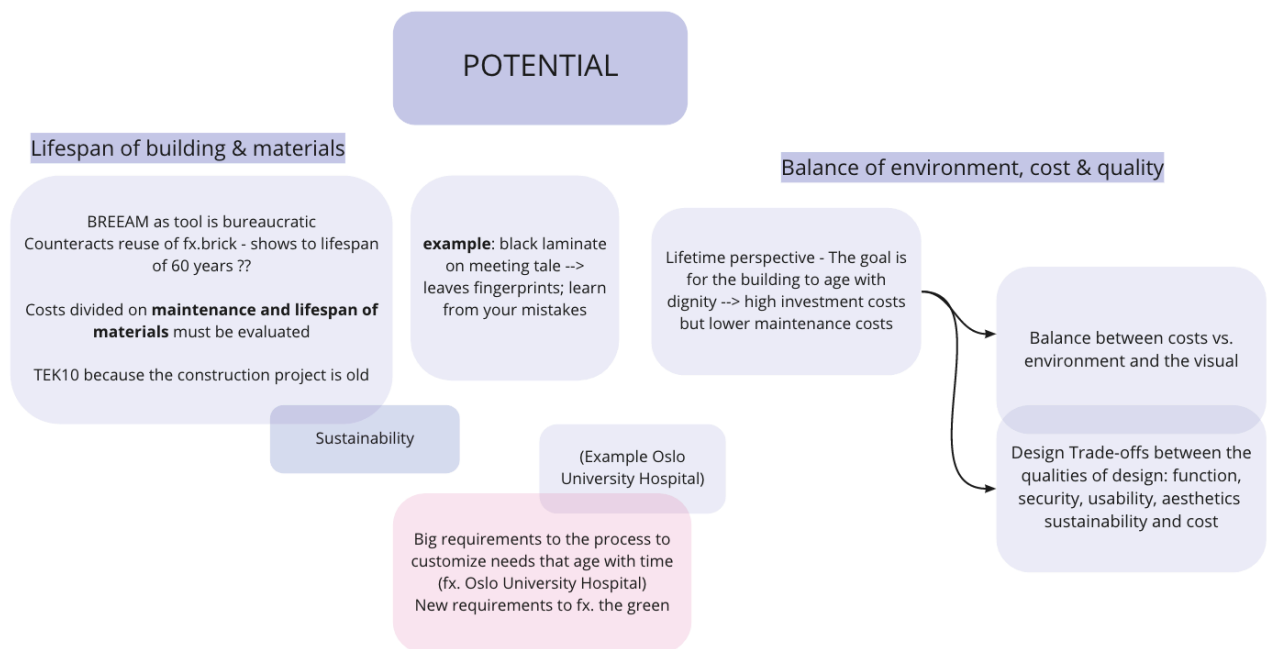
Figure 63: P-points from GIGA-map

Lifespan of building & materials

It is stated in the GIGA-map how BREEAM as a tool is bureaucratic and might counteract reuse of materials. Brick is mentioned as an example, where the tool BREEAM shows to a lifespan of 60 years. It is addressed how costs divided on maintenance and lifespan of materials has to be evaluated throughout the process. A discussion of balance presents a potential to address the current evaluations and possible improvements and adjustments for the future.

The building project follows the technical requirements to buildings within the regulation TEK10. Since 2017 TEK17 has been the standard requirements of building projects, but since the project of the Life Science Building started before the updated regulation, it follows TEK10. Another effect of the complex building project is the incorporation of Oslo University Hospital, presenting how needs within the building ages with the time of its project, and must be customized accordingly. This is also a point addressed in relation to complex building projects which involves great resources and extends over a long period of time. The point presents the potential to learn and address an issue in order for possible improvements and adjustments to be made in the future.

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Balance of environment, quality and cost

Discussion of balance represents a potential in how the different elements weigh up to each other. The elements discussed within balance in the GIGA-map was environment, quality and cost. All three are important aspects to consider, but which has to be balanced with the other two as resources are not endless. Each of the elements represents a goal, where sustainability is one, staying within the cost limitation is one, and quality one, which represents both the visual and the durability of a material composition. The balance of the elements must be anchored in the lifespan perspective, in order to distribute the resources to the different elements. A goal for the building is for it to age with dignity, where the investment costs are high, and the maintenance costs are low, aiming to the material quality.

Another example from the map gives an example of an experience where black laminate was chosen as material for meeting tables. Use of the laminate table led to visible fingerprints and an experience to learn from.

I-points

Points of intervention are found by searching for leverage points, where slight changes can have a significant impact (Sevaldson, 2012). The focus for the I-points are to find and address resolutions to the P-points and to create new relations (Sevaldson, 2012). The I-points are presented in Figure 64.
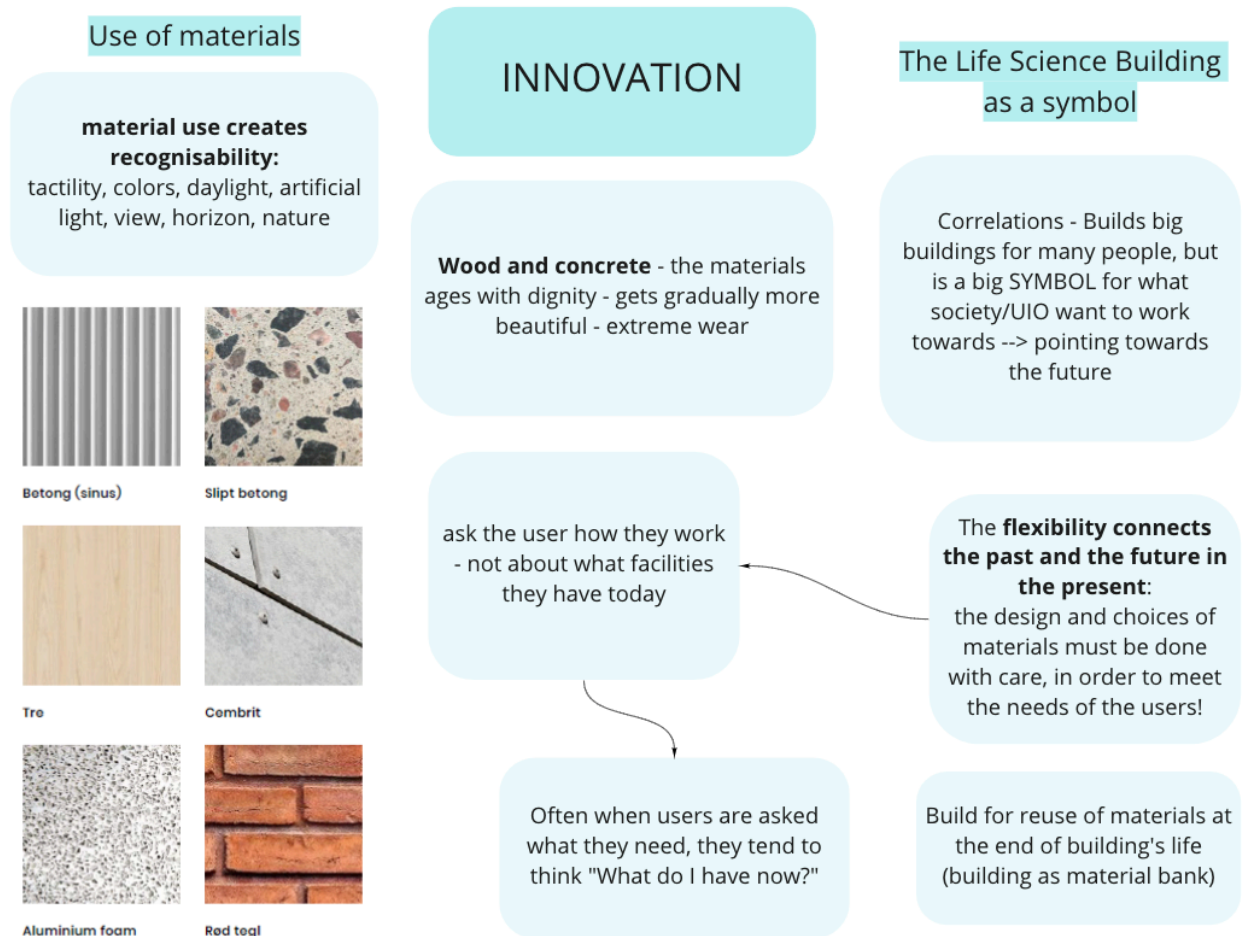
Figure 64: I-points from GIGA-map

Material use

The use of material creates recognizability, through elements such as tactility, colors, daylight, artificial light, view, horizon, and nature. Revisiting the material palette also addressed in the Zoom map, presenting the materials concrete, wood, cembrit, aluminum foam and red brick. Wood and concrete are examples from the palette of materials which age with dignity, where extreme wear leads to a gradual process of becoming more beautiful.

A possible resolution to the P-point about lifespan of a building and its materials is to build for materials to be reused at the end of the building's life. This can represent an innovation where the living building itself can act as a material bank.

The Life Science Building as a symbol

The Life Science Building is a big building that is being built for many people. This complex project is presented as a symbol for what both the society and the University of Oslo want to work towards in the future. This correlation of the building and the future revisits how the building can be looked at as an ecosystem and address currents in society.

Flexibility connects the past and the future within the present, where choices within design and materials must be done with care, in order to meet the needs of the users. A solution addressed in the map is to focus on how the user works, as opposed to the specific facilities they have today. The choices made concerning materials and design must anchor in a balance between experiences from the past and use for the future.

Summary

In the Zoom section, the Life Science Building was explored as an ecosystem, requirements within complex building projects were explored and addressed, where different sources for materials and sustainability were looked into and included in the Zoom-map. For the Potentials section, problematics concerning the lifespan of the building and materials were addressed, in addition to exploring how the elements environment, quality and cost are considered and balanced. For the innovation part of the analysis, the use of materials was explored considering lifespan of the building and materials, in addition to addressing how the Life Science Building acts as a symbol of society.

The themes addressed within these three sections of the analysis will be brought further into a merged analysis, in Chapter 0

5.4 Merged findings and analysis

After conducting a content analysis of the collaborative booklets, a thematic analysis on the observations of public spaces, and a ZIP analysis of the GIGA-mapping workshop, I merged the three analyses in a kind of meta-analysis. A meta-analysis will help to define an understanding of the dialogue between people and materials in public spaces, looking closer at how materials are experienced and manifested in public buildings.

Table 3 shows an overview of the themes and areas which were explored through the previous analysis, and which will be further analyzed in the meta-analysis.

Table 3: Themes from analyses

method	GIGA-MAPPING			OBSERVATIONS				BOOKLETS	
main themes/ points	zoom	potential	observation	building materials	presented information	exhibitions and installations	visitor participation	care for planet	systemic changes
sub-themes	materials & sustainability	balance of environment, quality and cost	use/age of materials	history	physical space	exhibitions	participatory exhibitions	repair and maintenance	
	LSB as an ecosystem	lifespan of building materials	LSB as a symbol	form & texture	digital guidance	artworks	experience	local community	
	complexity in building projects			nature	analog guidance	material effects	inclusion of participants	production	
				space & inclusion	currents	collaboration			

5.4.1 Meta-analytical framework

As the area of sustainability has led my motivation for exploration, I will now bring sustainability back as a theme in a deductive analysis, as described in Chapter 4.7.1. My main focus within the area of sustainability was materials. Materials as a theme was consistently explored with the different data gathering methods, by exploring how materials can be experienced and manifested in public spaces.

Chapter 2.1.1 presented the environmental, the economic and social as three pillars of sustainability (Hansmann et al., 2012; Purvis et al., 2019). These three are also knows as the

three spheres of sustainability, which are often presented as a Venn diagram (Kandachar, 2014; O'Connor, 2006; Purvis et al., 2019). The diagram shows how the three spheres overlap each other, and that they share the central point of sustainability. The spheres achieve sustainability where the choices made are environmentally and economically *viable*, economically and socially *equitable*, and socially and environmentally *bearable* (Mensah, 2019). O'Connor (2006) states how there is a coevolution of social, environmental and economic systems, where none of the three exist independent from each other. He discusses the three spheres and suggests a political sphere as a fourth one, to help unite the other three. The political sphere regards governance and system regulation, where it aims to regulate the economic and social sphere within their relation to the environmental sphere.

Therefore, to include a fourth sphere of sustainability, Figure 65 (Kandachar, 2014; Mensah, 2019; O'Connor, 2006) shows a Venn diagram made to present the '3 + 1 framework', which is applied as the theory for the deductive analysis (Braun & Clarke, 2006). The political sphere is applied as the '+1' in the '3 + 1 framework', with the aim to strengthen the connection between the spheres. The spheres can be applied to the context of materials in public spaces, which is further explored in the meta-analysis.

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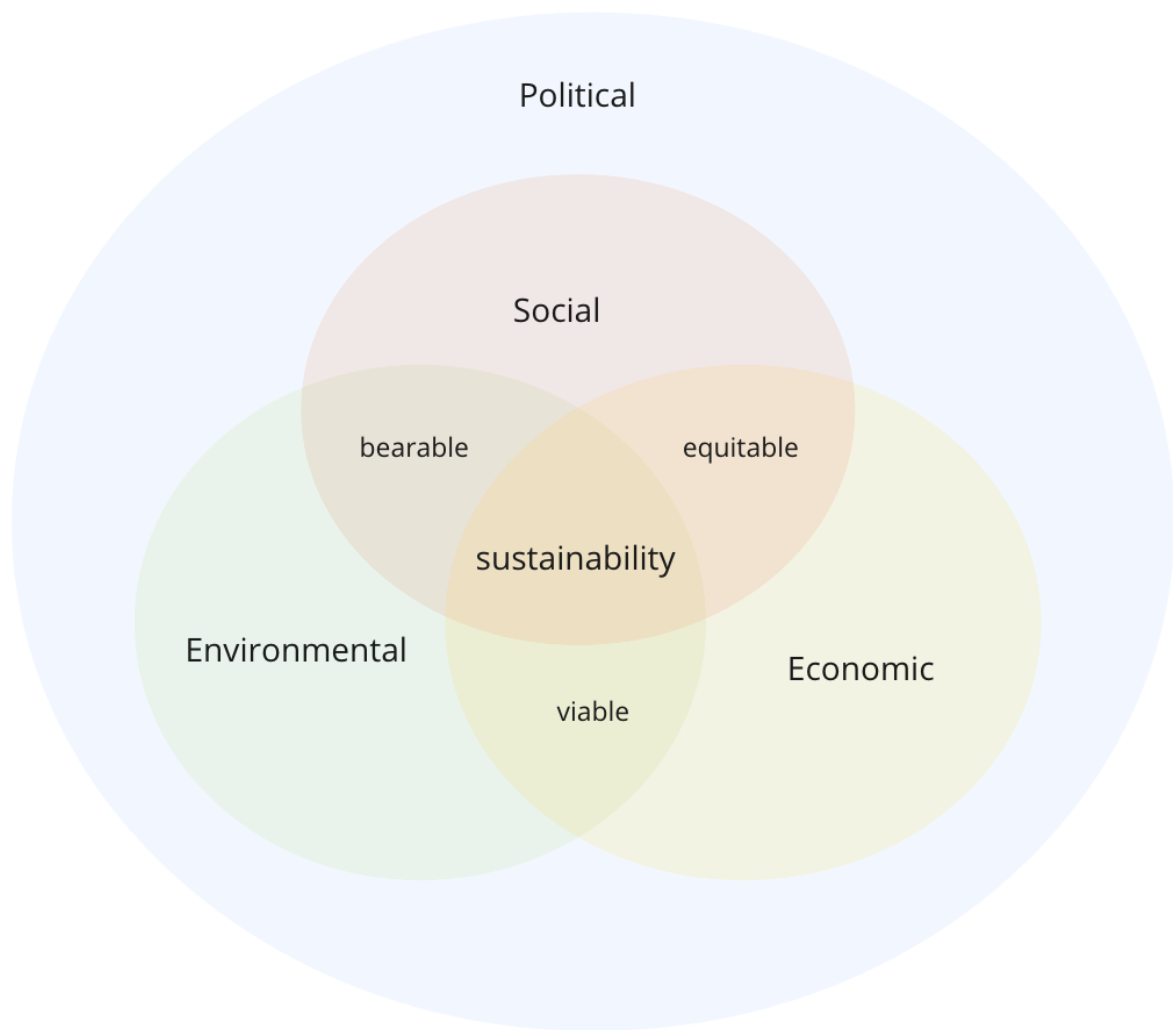
Figure 65: '3 + 1 framework' presenting spheres of sustainability (Kandachar, 2014; Mensah, 2019; O'Connor, 2006)

Including the political sphere in the framework for analysis helps to strengthen the connection between the social, environmental and economic sphere. Another possibility would be to explore the overlap of the spheres more in-depth through the analysis. The meta-analysis focus on sorting things out, which is done deductively within the '3 + 1 framework'. As every sorting has its consequences (Bowker & Star, 1999), a decision was made to focus on the economic, social, environmental and political sphere of sustainability individually in the analysis.

5.4.2 The Meta-analysis

The meta-analysis shows a categorization of the themes from the three methods observation, booklets and GIGA-mapping, according to the spheres of sustainability. The themes shown in Table 3 are categorized according to the provided '3 + 1 framework'. When the themes were sorted into the spheres, a key theme was then found to represent the main topic within each sphere. Key themes from the meta-analysis are shown in Figure 66 in the color blue, while the other colors of the themes each represent the methods they emerged from (where the color is the same as presented in Table 3).

The four key themes identified in the meta-analysis through the framework are *locality* within the social sphere, *distribution of resources* within the economic sphere, *care* within the environmental sphere and *building as a system* within the political sphere. These four themes define as key themes, and will each be described below.

Public spaces as systems
Manifesting materials

Experiencing materials

economic sphere

- Lifespan of building materials
- Complexity in building projects
- Distribution of resources: environment - quality - cost
- distribution of resources
  - production
  - systematic changes

political sphere

- space & inclusion
- form & texture
- building materials
- LSB as a symbol
- building as a system
  - LSB as an ecosystem
  - presented information
    - digital guidance
    - analog guidance
    - physical space

social sphere

- collaboration
- local community
- exhibitions artworks
- material effects
- exhibitions & installations
- participatory exhibitions
- visitor participation
- inclusion of participants
- locality
- experiences
- currents
- presented information

environmental sphere

- care
- Materials & Sustainability
  - care for planet
    - repair & maintenance
  - building materials
    - history
    - nature
- Use/age of materials

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Figure 66: Key themes from merged thematic analysis, relating to spheres of sustainability

Locality

As seen on Figure 66, the key theme of 'locality' relates to the social sphere of sustainability. 'Locality' incorporates the community of which a public space offers to its visitors.

Local community is explored in the booklets, where the recipients discuss locality of materials, and how knowledge and objects can be shared within communities. Participation in action for change, taking back traditional and indigenous methods, and parks as a context of community is also discussed within local community as a theme.

The observations done in the public spaces had participation and collaboration as central points. Exhibitions and installations were presented with participatory elements, inviting the visitor to partake in its subject. Workshops and exhibitions presented current themes, where visitors were included as spokespeople through contributions. Presented information was addressed, where the buildings related its content to current events, such as consumption and the climate crisis.

Distribution of resources

As shown in Figure 66, the key theme 'distribution of resources' relates to the economic sphere of sustainability. This theme explores the balance and prioritization of resources applied to a building project. The theme mostly concerns the focus of manifesting materials, of how choices are made and considered throughout the process.

Incorporated themes from the GIGA-map are 'complexity in building projects', 'lifespan of building materials', and 'balance of environment, quality and cost'. Balancing the elements environment, quality, and cost raises the dilemma of how the resources should be distributed in a building project, for instance The Life Science Building. In weighing these elements, the lifespan of the materials and the building is considered. Such elements and considerations within the building project address an ongoing complexity which should be recognized.

Themes included from the booklets are 'production' and 'systematic changes', where the subtheme 'production' emerged from the intersection of the themes 'care for the planet' and 'systematic change'. Both these sub- and main themes aim at a management level, where

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choices and laws are made and regulated. The context of one building project may not allow for change of hierarchy, but should thereby not exclude to address hierarchical issues when finding a balance between the resources.

Care

The key theme 'care' relates to the environmental sphere of sustainability, as seen in Figure 66. As opposed to the other key themes, the theme 'care' derives from themes from all three methods of GIGA-mapping, observations and booklets, shown through the colors represented in Figure 66. Taking care of the planet as a theme is explored both through materials and through the act of repair and maintenance.

The GIGA-map concerned materials and environmental sustainability, identified as a Z-point in Chapter 5.3.2. The use and age of materials is addressed as an I-point, presenting suggestions of how an aim can be for materials to age with dignity or to be reused through buildings as material banks.

The analysis of the booklets identified the theme 'care for planet', with the subtheme 'repair and maintenance'. Repair and maintenance referred to both taking care of smaller objects like utensils and artifacts and to more complex buildings and infrastructures.

From the observations, environmental sustainability is addressed through building materials, by discussing history and nature. Materials can communicate history of a building, through composition of materials and connection between old and new. This is identified in the analysis of the observations (Chapter 5.1.2) by for instance the composition of new glass ceilings and old brick walls. Nature is incorporated as a theme within building materials through presenting transparency to its natural surroundings. This is incorporated in bringing nature inside, like at the Deichman public library in Bjørvika, or through blending inside and outside by use of natural materials. This theme regards how a building can communicate knowledge through the materials which reflects surrounding nature and history. Gaining knowledge can further help to take action for care.

Building as a system

The key theme 'building as a system' relates to the political sphere of sustainability, as seen in Figure 66. This theme explores relations within a building between materials and visitors.

The GIGA-map addresses how The Life Science Building can be viewed as both a symbol and an ecosystem (see GIGA-map in Figure 60). A symbol and an ecosystem are two perspectives to look at a building, with its materials and visitors both incorporated. An ecosystem represents the building as a system consisting of many layers where materials and people interact and are dependent on each other. Abuilding as a symbol incorporates the values and current themes which are present, considering both the building process and the future building. A quote from the GIGA-mapping workshop is "*Flexibility connects the past and the future within the present"*, which relates both The Life Science Building as a symbol and as an ecosystem.

The observations explore 'building materials' and 'presented information' as themes, where both the materials and the information of a building can contribute to define a symbol or a system of a building. A voice for the building is created by presenting its materials and information.

The four key themes will be further discussed in relation to the according sphere in Chapter 6.

6 Discussion

In this chapter I will discuss the main findings of my analyses and how they answer to my research question: "*How can we understand the dialogue between people and materials in public buildings?*". My findings will then be discussed through presenting the key themes found in the meta-analysis: *locality*, *distribution of resources*, *care* and *building as a system*. As the three spheres of sustainability were applied as a meta-analytical framework, I will discuss the key themes in relation to these. Discussing these relations will be used in answering the sub-questions "*How are materials experienced in public spaces?*" and "*How are materials manifested in public spaces?*".

I will first in Chapter 6.1 discuss the four key themes explored through the spheres of sustainability. Followingly, I will explore the sub-questions in Chapter 6.2, where dialogue with a building is discussed through the different methods and stakeholders included. Chapter 6.3 will provide some reflections.

6.1 Spheres of sustainability

Wilkes (2011, p. 5) states how materials have the *"potential to alter society for better or for worse"*. Through the meta-analysis, I found how materials in public spaces can be related to the economic, the environmental, the social and the political sphere of sustainability.

6.1.1 Locality as social sustainability

The key theme 'locality' relates to the social sphere of sustainability. The theme emerged from exploring materials through the observations and the booklets, which both aimed towards the visitor role of a building. As Wilkes (2011) states, material choices can have social consequences, where the use and choices of materials can determine whether or not it will lead to a sustainable society. This is emphasized in one quote from the collaborative booklets expressing a dream for the future: *"things are made by locals with local materials for the local context"*.

As a visitor of a building, you participate in the community which the building creates and represents. This can for instance be experienced through participatory exhibitions and

installations in public buildings. Partaking in local community is also made possible through the act of sharing and loaning. Everything from sharing supplies, materials and knowledge contributes to creating and maintaining a community. A community aims to create an inclusive space for all, and a contrast to the hierarchal structure of governance power. For a community to remain local, it is especially important for tangible materials and other resources to exist and circulate sustainably. One example is how materials can be sourced through local reuse or recycling. Providing an independent availability of resources within a local context will help to strengthen communal power.

Renger et al. (2015) state how "*Architecture is unique in each location, so net-positive outcomes will require site-specific analysis of the climate and ecology and the social and economic needs of the urban area*" (p.22). The theme locality emphasizes the benefits for the dialogue between people and materials to exist locally. A local dialogue leads communication to be present and more direct. Experiencing materials in a local context can help to engage in local manifestation of materials. Local manifestation points to how materials are chosen and used in the local context of the applicable building. The locality of community and the locality of materials enhances the relation and communication between the people and the building.

6.1.2 Distribution of resources as economic sustainability

The key theme 'distribution of resources' relates to the economic sphere of sustainability. The theme addresses how resources are distributed within building projects, both before and after the building is built. Materials are relevant to discuss in relation to economics, as it historically was referred to as a resource (Dean, 2017). Sustainable development rose as a critique of economic development, as economic development evolved from exploiting natural resources from a colonial context (Purvis et al., 2019). The approach of sustainable development recognized how the wealthy oppressed social justice, by questioning the vision of unlimited economic growth.

The theme 'production' emerged in the analysis of the booklet-study, and is included in the key theme for 'distribution of resources'. The participants envisioned a future with sustainable requirements within the building and construction area, no renovation solely for cosmetic reasons, and a transition from over-production and large-scale production to a

tradition for investing in quality. These all point to the unnecessary contribution of massive waste, through both private and public construction and consumption. Distribution of resources is relevant in both smaller and more complex projects and settings. These structures can be connected to governance and the political sphere which aims to regulate the economic sphere to the other spheres to ensure sustainability within natural and social systems (O'Connor, 2006).

Through the key informant interview and the GIGA-mapping workshop, the balance and distribution of resources were discussed and addressed. As the Life Science Building is a complex building and project, its elements of environment, quality and costs need to be balanced. Here, the resources within the building project are distributed as the costs must be valued regarding investment compared to lifespan. While the BREEAM tool considers materials within the standard of a 60 year lifespan, the goal for the Life Science Building is to remain great through a longer period of time. The building project is complex as it involves a large amount of resources and extends over a long period of time. At the start of the project, the relevant regulation to follow was TEK10. However, new and current regulations are TEK17, established in 2017. The complexity of the building project makes it a challenge to continuously update on regulations, as it would most likely delay the process further. These remarks of the Life Science Building can reflect some complexities in sustaining the economy within building projects.

Raworth (2017) presents the framework of Doughnut economics with the notion of a regenerative and distributive economy. The economic framework includes social and ecological factors, presenting a basic standard of people's well-being and sets a limit to use and extraction of planetary resources (Raworth, 2017). Connecting these factors shows the importance of balancing available resources, emphasizing to use resources wisely and to avoid extracting beyond the Earth's capacity. A closer connection of the social and environmental factors to the economic sphere could move the focus for the discussion of how resources are distributed to discussing how they are *re*distributed.

6.1.3 Care as environmental sustainability

The key theme 'care' is related to the environmental sphere of sustainability. As shown in the meta-analysis, environmental sustainability was a present theme through all conducted

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methods. Environmental sustainability was emphasized through addressing the importance of taking care of the planet and its resources. Care can be viewed as a framework for political change, providing an understanding of caring *for* and caring *about* (Tronto, 1998). *Caring about* aims to becoming aware of the need to care, while *caring for* relates to taking responsibility to meet an identified need (Tronto, 1998). *Caring about* is important to understand a problem, while *caring for* is to take action for change. The care for and about materials is important to understand and meet the needs within a given context. In the case of the Life Science Building, caring for and about materials is important in both manifesting and experiencing materials. Care in manifesting materials can influence how materials are chosen and considered throughout the process, while care in experiencing materials will reflect how they are being used and maintained.

Environmental sustainability of materials has been discussed through use, age and history. As a building communicate knowledge of its surrounding nature and history through its materials, visitors can be steered into taking action to care for the building. Through knowledge of the specific materials and their history, the relation between the building and its visitor might be strengthened. The composition of materials can contribute to show the connection between old and new, which communicates the history of the building. Knowledge of history might engage for maintenance and repair of buildings and their materials, supporting environmental sustainability.

The GIGA-map addressed how an aim for the materials in the Life Science Building is to age with dignity or to be reused through a building as a material bank. This emphasizes how important the manifestation of materials is in a building process. The choices of materials contribute to how the building is further cared for in the future. Manifesting a building as a material bank in order for reuse of its materials might ensure to sustain the cycle of the applied materials as resources.

In discussing the oxymoron of sustainable development, Birkeland (2012) states the dilemma: *"So far, many green buildings do little more than modify the materials, facades and products that came in with the international style, so that they collectively do 'less harm' than codes permit"* (p. 164). She discusses how sustainability can be achieved in urban spaces through net positivism, aiming at reversing the impacts and to increase the ecological base and public estate beyond the conditions of pre-development. Net positive buildings can also be referred to as energy-positive buildings, as they give back more energy than what is being used. Tools

for life cycle assessment (LCA) do not measure beyond zero, which is what net positivism aims at. Thereby, net positivism can help to design buildings to reverse their carbon imprint (Renger et al., 2015).

Net positivism can provide a more equal dialogue between people and materials than a traditional meeting between these two as dialogists. People are both the designers and visitors of a building, which often means that buildings are designed for people. This leads to an inequal contribution to the dialogue, where net positivism would provide a more equal ground to lead a dialogue. Net positive buildings could contribute to a common aim between people, as both designers and visitors, and materials. The two dialogists would collaborate in the aim of giving back more than what is being used.

6.1.4 Building as a system as political sustainability

The key theme 'building as a system' is related to governance and the political sphere of sustainability. The key theme 'building as a system' shows a result of how the Life Science Building has been explored through thinking with systems. As the political sphere is applied to strengthen the connection of the other three, it also shows how the spheres are nuanced and connected to each other.

As the world is an interconnected system of social, economic and environmental needs (O'Connor, 2006), so can we understand a building. Even though the focus in the meta-analysis was not the overlap of the spheres, the four spheres and key themes are all connected to each other, as shown through the double pointed arrows in Figure 67. The case of the Life Science Building has been discussed both as an ecosystem and as a symbol. The ecosystem perspective points towards what the building holds and who it houses. Through housing visitors and holding materials, the building consists of interconnected relations between the two. The building as a symbol of what is happening in the world is represented through its visual information, participatory exhibitions or other material effects. Through this, a building can engage its visitors to participate and collaborate within the space it provides.
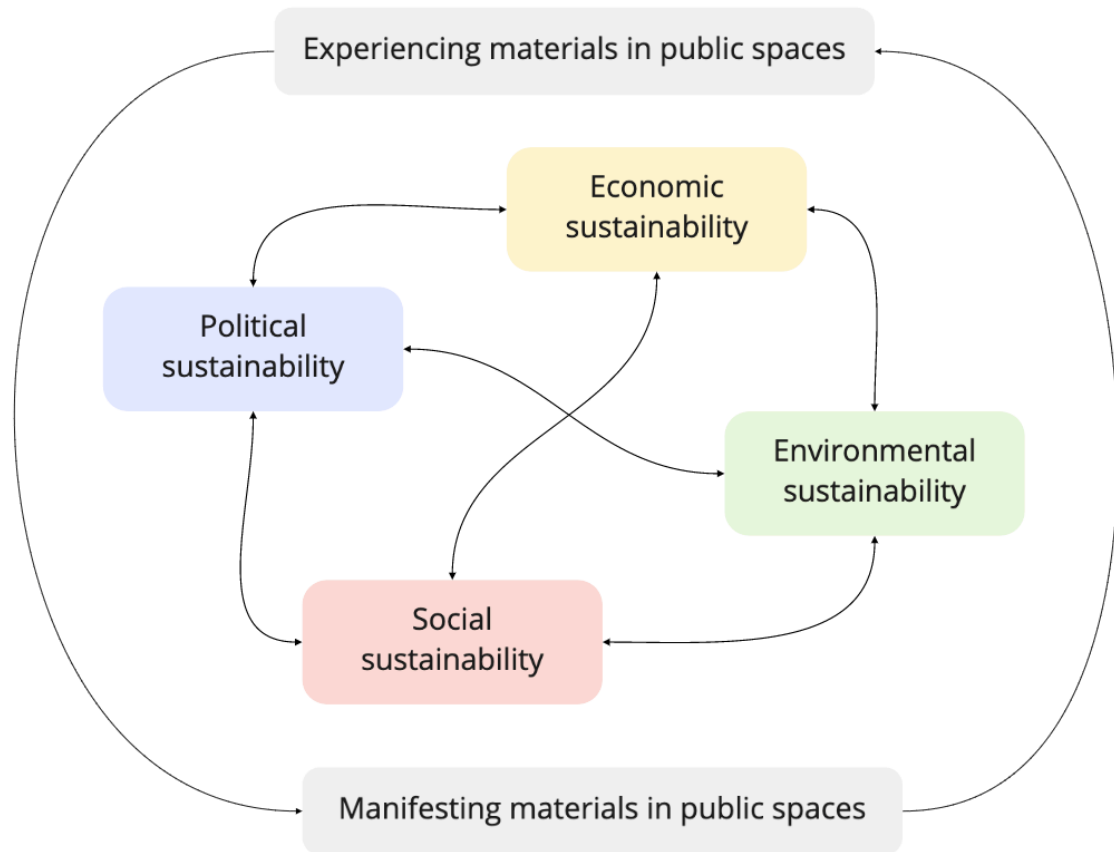
Figure 67: Illustration of spheres in meta-analysis

The spheres, also referred to as pillars (Purvis et al., 2019), of sustainability has been applied to explore sustainability in regard to building processes, such as the work of Khoshnava et al. (2018), Johnsen and Drevland (2016) and Awadh (2017). Khoshnava et al. (2018) explore how criteria for green building materials can be incompatible in regard to the three spheres of sustainability, where they find how the relations of green building materials and sustainability is different within each of the individual spheres. Johnsen and Drevland (2016) explore how the three spheres can relate to construction processes, discussing lean construction and sustainable development. Awadh (2017) explores sustainability in regard to green building rating systems, like BREEAM, and states how certifications for being a green building doesn't necessarily correspond to environmental aims.

The continuous presence of the spheres presents a wholeness which include the interconnected surroundings and relations of the materials. Looking back at the example with the stone presented by Ingold (2007) in Chapter 2.2.2 where the material presenting the stone designs itself, this can also be related to materials within a building. For the materials within the Life Science Building to age with dignity, the materials must have relations to its

surroundings. These surroundings could be other materials, air quality or human patterns and behavior. This shows how materials are in dialogue with and are designed based on their surrounding environment, including the visitors of a building.

6.2 Dialogue with a building

Exploring public spaces through thinking with systems enabled several explorations from different perspectives. While implementing different methods, I have explored buildings through the perspective of two roles: visitors and architects. According to the two sub-research questions, experiencing materials focuses on the stakeholder group of visitors within a building, while manifesting materials has its focus on architects and other authoritative stakeholders. Both these roles engage in a dialogue with materials in a building.

Visitors of public spaces are most often not empowered to engage in decision making in the design and construction of public spaces. The role of visitors is to experience the chosen materials within a building rather than to decide on what materials will exist in a building, which marginalize their role in decision-making in the building system. This relates to the point "*value voices from margins*" presented in Feminist Systems Thinking (Stephens, 2012; Stephens et al., 2010).

As the architects represent the background of a building, the visitors represent the foreground. Architects designs the skeleton of a building and are involved in the process before the building is physically built, while visitors contribute with the content of a building after the building is physical standing. Decisions and structure of a building are created by architects, while the visitor presents a role of someone who will follow (or not follow) the structure and decisions which are manifested into the building. A structure presenting decisions of a building can be anything from placement of the entrance, presentation of common rooms, availability of staircases and elevators, to other signs, codes or symbols.

Materials can bridge the two roles of architects and visitors through engaging visitors to participate and collaborate in different projects. This occurred in the analysis of the observations, within both the themes for 'visitor participation' and 'exhibitions and installations', which in the meta-analysis is categorized within social sustainability.

A dialogical approach

A building can be mapped out as a system by exploring different roles, relations and points of view. Connecting the relations through the different roles is done through dialogue, which is shown through the key themes. As presented by McCarthy and Ciolfi (2008), a dialogical approach presents an experience as a conversation involving several voices where its meaning consequently transitions. As dialogue unfolds in physical space of public buildings, it contributes for individual buildings to connect to its society. Dialogue within buildings can help steer actions towards sustainability, through providing understanding and communication.

Dialogue unfolds through participatory and collaborative experiences, acting as a platform and a portal for materials and people to meet. Dialogue help for materials to remain accessible and transparent, engage in knowledge through different formats, and to solve local problems. Exploring dialogue has led to explore how public buildings can become personally significant. This draws on the importance of how resources are distributed and how they are socially, economically, environmentally and politically sustainable. This will be further discussed in relation to experiencing and manifesting materials.

6.2.1 Experiencing and manifesting materials

A dialogue with a building can unfold through experiencing materials, as explored through the methods for observation and collaborative booklets. The collaborative booklets opened up as a platform for people to explore their relations to public spaces, where the observations led me to engage with public spaces through exploring materials. As a tangible material, the booklets allowed for participants to explore the theme of materials and showed how different materials and buildings can be experienced and perceived. It also showed that answers regarding the present, past, or future were all fruitful and relevant in a dialogue with materials. As the last task presented was to contribute with a material (as seen in Figure 23), it allowed for the participants to express their own definition of what a material can be.

Dialogue can unfold through both experiencing materials and manifesting materials. The stakeholder group of manifesting materials are categorized as architects, presenting the group of creating the structure of a building. Both the GIGA-mapping workshop and the key informant interview involved people who had actively taken part in the process of the Life

Science Building. Involving this group helped to explore the dialogue with materials in The Life Science Building, through insight to the project of material consideration and choices. Through the meta-analysis of the methods, the themes from the GIGA-map mostly related to the spheres of economic and environmental sustainability.

Collaborative and participatory experiences, presented in for instance exhibitions, installations, can strengthen the relation to the building or material. By taking active part in current projects, a visitor of a building is let into a role of manifesting materials. Including different points of view through manifesting 'care' of materials will encourage environmental sustainability. The inclusion as social sustainability will influence the sustainability of the other spheres.

6.2.2 Distributing the spheres of sustainability

When talking about the spheres of sustainability, it is usually referred to the Venn diagram illustrated in Figure 68. Through exploring the different spheres on the basis of analyzing the methods involving the two different roles of a building, has led to the exploration of how the social, economic and environmental spheres are distributed through each role, which is illustrated in Figure 68. As the fourth sphere of political sustainability aims to connect the other three, the social, economic and environmental sphere are explored exclusively within this figure. The spheres are presented on the basis of how present the themes from the methods appeared within the meta-analytical framework.

The role of the architect concerned the economic sphere to a greater extent, where the social sphere was the least addressed in the discussions. The role of the visitor mostly concerned the environmental sphere, where the economic sphere was least concerned. The perceived distribution of the spheres through each role is shown in Figure 68.

The economic sphere of sustainability is highly related to power structures. This is shown through how the economic sphere is distributed through the two roles, where it is the greater extent for architects, while presenting the lesser one for visitors. Presenting a similarity through the roles, the environmental sphere is valued over the social sphere. The sizes of the spheres in the figure represent the presence of the sphere, meaning that environmental sustainability was a more present discussion on the visitor part.

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DISTRIBUTING THE THREE SPHERES OF SUSTAINABILITY

THROUGH THE ROLE OF AN ARCHITECT   THROUGH THE ROLE OF A VISITOR
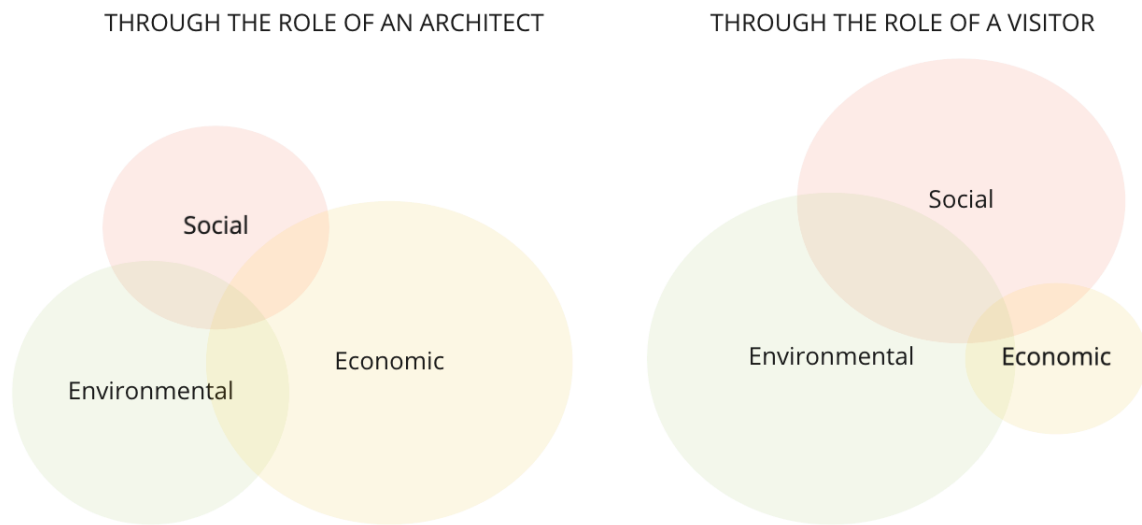
Figure 68: Distributing three spheres of sustainability through roles

Looking at the three spheres exclusively from political as the fourth one, emphasizes its importance and aim. All three spheres concerning social, environmental and economic sustainability must be balanced in order to achieve sustainability (Mensah, 2019). The spheres relating to the different roles in Figure 68 can be discussed. Based on the Venn diagram in Figure 65, the relations between the spheres could also be addressed. From the point of view of an architect, viability is important, while from a visitor point of view bearability is in focus. This is not to say the least covered sphere is not important from each viewpoint, but rather to represent how different spheres take place in dialogue with materials in a building through different roles.

6.2.3 The language of materials

Exploring dialogue with a building brings out the importance of the language we use when we talk about materials. Language is important in order to create a common understanding and consciousness (Bracken & Oughton, 2006). As materials can be experienced in many ways, through several different portals and mediums (Aguirre-Ulloa & Paulsen, 2017), it can be hard to provide one specific definition of it. Wilkes (2011) discussed how communication problems and lack of vocabulary on materials is present in the arts community as the technical knowledge can be insufficient. A fragmentation of knowledge arises where the science and

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arts community are separated from each other. To understand how materials move from laboratory level to a societal one we need a holistic and interdisciplinary approach, combining systematic and scientific studies of sensoaesthetics qualities (Wilkes et al., 2016). In designing sensoaestethical materials, material scientist Miodownik (2007) promote for a collaboration of the areas of art and science. According to materials, some suggested solutions are material libraries (Miodownik, 2007; Wilkes, 2011) to increase access, and materials dictionaries (Wilkes et al., 2016) to relate knowledge to users.

6.3 Reflections

The meta-analysis was conducted to connect the analyses of the data collected in the different methods used in the study, through summarizing their themes through an additional analysis. Within the collaborative booklets, the task of envisioning a future was central. This task built on the exploration of a chosen public space, where the concept and elements explored were further mapped out as a timeline. Through the content analysis of the data gathered from the booklet study, the task for envisioning the future was in focus, and was brought further into the meta-analysis.

Following the methodology of SOD has been both challenging and liberating, where the system is not necessarily defined from the start. In applying GIGA-mapping as a method where all details are valued and welcome (Sevaldson, 2011, 2013), it can be hard to delimit a system through the process. A clear focus should be set as of what is being mapped, without limiting the directions of how for it to be mapped out. The focus for the GIGA-mapping was 'materials in the Life Science Building and other public spaces', where the contributions in the map were more defined through the ZIP-analysis.

Covid-19 has undoubtedly affected the research. Even though it motivated the method of the collaborate booklets, it has also led to disadvantages. The pandemic affected both the interview and the GIGA-mapping workshop as it led to postponements. Conducting the workshop digitally required a more structured communication and participating, where a physical workshop would have a freer format for participation. Observing public spaces in a time of the pandemic and its restrictions might have had an effect on the data, as movement patterns of visitors in the building was not as present.

7   Concluding remarks

The proposed research question: *How can we understand the dialogue between people and materials in public buildings?* with the sub-questions of *how materials are experienced and manifested in public buildings*, have led me to explore materials by including different groups of stakeholders through several methods.

The methods of key informant interview, GIGA-mapping, participatory observation and collaborative booklets have let me explore public spaces through its materials. As materials represent different elements of a building, it has allowed for dialogue to unfold. Dialogue connects the building to its society, by mapping its system of relations. In connecting the relations of materials to the role of a visitor and an architect, the building is explored as a system.

By applying a dialogical approach with materials, I have engaged in a dialogue with a building through involving different groups of stakeholders. Involving the role of architects has let me explore how materials are manifested within a public building and involving the role of visitors has shown how materials are experienced in public building. Facilitating and part-taking in this dialogue has shown how the dialogue between people and materials can be understood through the spheres of sustainability. The composition of these spheres through a public building can be understood differently through the different roles. In order to understand a dialogue between people and materials in a building, the role and context of the dialogists should be addressed.

The two roles of architects and visitors can be bridged by materials, through engaging visitors to participate and collaborate in projects within the building. Participatory and collaborative experiences will help for dialogue to unfold between materials and people. Materials presented as accessible and transparent will engage a dialogue between people and materials in a public building.

7.1 Contributions

This project has explored how to have a dialogue with a building, where the relation and role between materials and people have been explored.

This project contributes to answer how a building can be understood as a system. Involving different methods and stakeholders contributes to the understanding of how materials are experienced and manifested in public spaces.

Applying the spheres of sustainability as a framework for a meta-analysis, has shown how data from different methods and formats can be processed and understood together.

The project has showed how a content analysis can be conducted for the method of collaborative booklets, where the gathered data is presented in various formats. The content analysis of the booklet values the formats of text, sketches and tangible materials, in addition to their composition as a whole.

7.2 Future work

Material library in the Life Science Building

Through the exploration of materials within public spaces across different stakeholders, I understood that a material library for the common areas of the building would be valuable. The GIGA-map states to build for reuse of materials by the end of the building's lifespan, where the building itself would act like a material bank. A more current alternative to a material bank, is for the Life Science Building to consist of a material library. This could help to bridge the gap between the roles of architects and visitors, as well as between the approaches of experiencing and manifesting materials. Making materials more available, both its tangible aspects and its additional knowledge, can facilitate for a dialogue between the two roles and approaches. Such a library could attract to the common areas of the building, which would emphasize the space as available and interdisciplinary. An idea could be to include the materials used within the building, materials involved in its earlier process, and materials which can influence future projects. A focus on sustainability would be valuable, including all spheres, where themes such as reuse, recycle and maintenance could be central topics.

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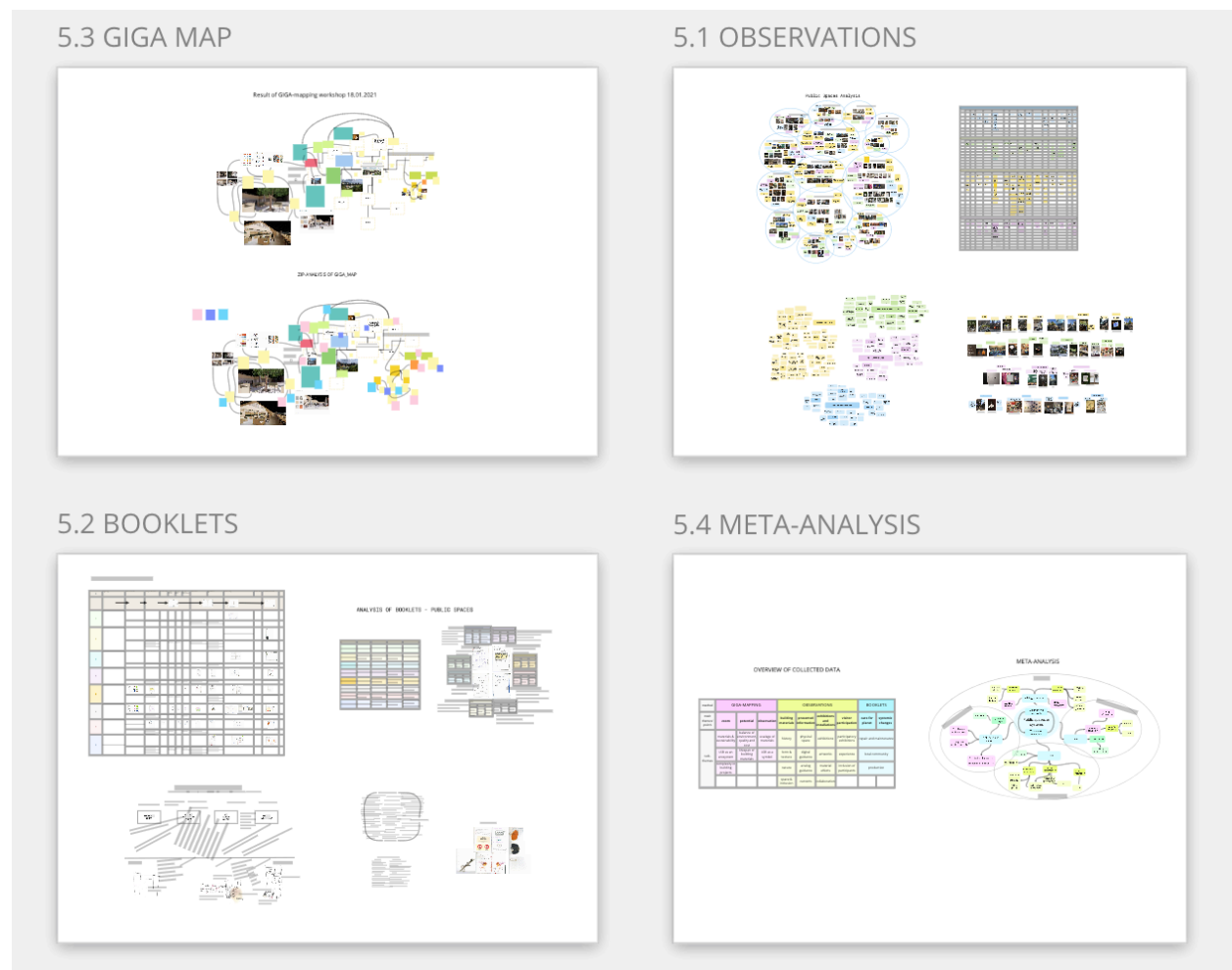
Appendix A: Miro Board

Appendix A provide a link to a Miro board, to access further details and illustrations.

Link to Miro board: https://miro.com/app/board/o9J_lajiAns=/

(Click to view)

Navigation guide

Zoom out to get an overview, zoom in to view details. Figures are numbered according to elsewhere in the thesis.

Appendix B: Field notes from public space observations

This appendix presents field notes and pictures from 15 observations, earlier explained in Chapter 5.1.

Deichman main library in Bjørvika

Visiting the main library in Oslo, Deichman Bjørvika, had its opening only a few months beforehand the visit described in this analysis (October 2020).

Entering the library, you're met with its expression of the contrast between glass and concrete, and between natural and fluorescent lights. Its interior held a variety of forms, colors, and furniture. The dark color on the walls is complimented by the colorful books on the shelf and the activity of visitors.

The visitors present are families with children, teens, students, and elders. The visitors of the building are moving slowly and talking quietly, while allowing the building to speak for itself. Information is found on posters throughout the corridor, on signs explaining the contents of all six floors, on a digital screen informing about the current floor you're on and current events, in addition to an audio voice communicating information from the speaker. The higher you move in the building, the greater overview of Oslo you get through the big windows.

Further is described more thoroughly about three experiences from the building.

The Contemporary Library

The library does not only present materials in the form of books, but also has several art installations places throughout the building. One artwork is a combination of a moving illustration and audio, which several children are interacting with. On the third floor, there is a pathway formed like a snail shell, leading into what I find out is the Contemporary Library. There are places many white books in stacks at the floor, while the shelves fill books with crayon scribbles, titles and colours. There is a poster with information about the project, inviting the visitors to be participants in the Contemporary Library by starting a book or continuing on one already started. From the content of drawings, writings, and titles, the

contemporary library seems mostly to have younger authors as participants. The books address a large selection of topic, amongst others love, friendship, menstruation, magic, the future, young culture, dragons, and secrets.

The Void

Also, on third floor, I find a box of walls in a corner, with a sign which says "The Void" and a door right beside it. I walk inside and close the door behind me. The room, or box, is dark with no windows, where one wall as well as the roof is a mirror. There is a light show in constant movement, coming from a projector above. The movement and colors of the light changes constantly, but in a slow, almost hypnotizing way. I don't know how long I was inside the void, but after walking out I felt strange as being in the real world again. The installation was places in a corner beside desks and chairs that were filled with people reading and studying. A place to be alone, to escape your thoughts, for new impulses and inspiration. A break with the presence of awareness of your surroundings right here and now, nowhere else.

Opening Exhibition of Grønlikaia

As I was about to leave the library, I saw a glimpse of nature hidden behind some bookshelves by the entering area. The exhibition opened up with an area filled with posters explaining what the exhibition was about.

What caught my eyes in the first place was an island of nature in the middle of the exhibition area, contrasting to its surroundings being the great glass windows and concrete floor. The contrast could represent how the project of Grønlikaia wishes to become an area welcoming both the city, its people and nature. The exhibition was called a circular exhibition, as the aim for the project was to involve in movement from the exhibition to be replanted into the landscape of Grønlikaia, being the next phase of the exhibition.

Contemporary library, The Void, Grønlikaia exhibition

The Norwegian National Opera and Ballet

Entering the Opera House triggered the first impressions as empty, open and light. Materials present are glass, wood and tiles, appearing in various forms. Already before entering one of the great glass doors leading into the building, I felt like I was part of it. As the intention of Snøhetta, the architect behind the building, inviting the building to be social rather than sculptural (ref), with its accessible roof and corridor.

The building has almost no straight lines, except from the vertical floor. The lack of straight, vertical lines seems to invite the visitors to explore more within the building. There were few people inside the building, where only some were sitting in the café, and some sitting quietly observing at sheep fur covered benches, like me. Most of the inhabitants of the building seemed to work there. I felt a bit out of place.

The usual aim to visiting a theatre is to attend a show. Through the role of an unfamiliar visitor, the building somewhat lacked information. There was not any ongoing show, which otherwise would give information on movement patterns of the audience. As one usually would follow a stream, there were no stream to follow. I reflected on how it would be to visit the Opera house when there is a show going on, where the design is more presented as a landscape to participate in. On the other hand, the value presented by the outside and inside connecting to a landscape can be seen more clearly when there is not an ongoing activity in the building, as it is presented in a cleaner and more open way.

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Library of Humanities and Social Sciences at University of Oslo

The library of humanities and social sciences at University of Oslo is in Georg Sverdrups House at Blindern campus. The library is the biggest one at campus, and is also open for the public. The library seems quite new, even though there are old elements incorporated and presented through the building. The building has a great hall as entrance area, which connects the library to other seminar rooms and a café. The entrance for the library seems both old and new, the door is in glass and cobber, while the sign saying "BIBLIOTEK" (library) is engraved in the marble wall. By the entrance there is also an exhibition, showing stones with runic inscriptions, showcased as "our first books".

Lights are hanging from the great ceiling reminding of gigantic, stationary soap bubbles. A great painting adorns the wall. The clear and visible floors contribute to light and an overview of the building.

Entering into the library, there are even more seating areas by the windows decorated with a rainbow in paper, maybe representing hope. There is an IT-help desk department, an information desk, a pick up shelf, and automats for loaning and delivering books. Different exhibitions are presented in a few glass boxes, resembling to museum exhibitions. One exhibition presents forgotten items from the day March 12th 2020, the first day of lockdown. Another one is representing a microscopic view of what the library holds, where in small glass containers there is a love heart, one with some earplugs, a beer cork, a cigarette butt, and a broken pencil.

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As the library unfolds further in, so is expanded the possibilities of seating areas, group rooms, and inevitable shelves of book, newspapers and magazines. Colorful pennants hang in the ceiling, giving a naïve childish vibe, which might represent the transition into adulthood which is the stereotypical student life. The gigantic and open room of the first floor is organized in dens and nooks for reading and studying. New seating emerges as you explore the library, without feeling too much as a labyrinth.

At the second floor, the space feels less open. Walking up the stairs, you are met by a map of seating areas and a guide on which directions to follow. There is a less broad extent of designed for the visitors, where this floor is more obviously aimed for reading and studying (and preferably with a pre-ordered seating space). The shelves filled with books are taller and the ceiling has moved closer to my head, the space now reminds more of a labyrinth. It seems smaller due to the lack of overview, compared to the first floor. The space is asking me to be quiet, and to move slow but agile. The third floor is like the second, maybe even more quiet, with seating areas by the walls and windows. Fourth and last floor is presented as kind of plateau or a tower. The birds eye view of the third floor allows for a feeling of overview. Additionally, there is an individual tower of fourth the floor, growing directly up from the third floor with an own set of stairs.

Observation at university library: view from the fourth floow, entrance hall, exhibition of library

Medicine and Science Library at University of Oslo

The library for the science and mathematical faculty for the University of Oslo is in Vilhelm Bjerknes House at Blindern campus. The library of science stands in contrast to the library for humanities and social sciences, due to both its content and the difference in years of building

establishment. The library is dark, and in a sense calm as the space is small and quiet. The ceilings are low, there are brick wall. Seating areas are placed comfortably throughout the entrance space. Plants throughout the space make it feel cozy, and unusually calm as an entrance space during lunch hours. An inserted kitchen in the entrance area seems out of place. As it most likely is missing its days of being an open and full student bar on a Friday afternoon and hosting other parties.

The otherwise dark space has big, open windows, opening up for its inhabitant to partake in the campus of which it exists on. Digital screens show information of events. The library is a few floors up, passing bookshelves and seating areas for groups and individuals, before arriving at the science library. As the library presents props as globes of Mars and Europe and a skeleton of an extinct cave bear it confirms the I'm in the right place. There is an open area with computers to study, an information desk, librarians and IT-support. Windows allow a view to the next floor above.

Materials as concrete and old, faded wood dominate the space of the library, similar to the rest of the building.
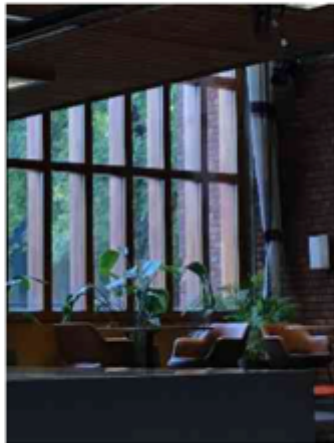
Observation at science library, uio

Astrup Fearnley Museum

The museum of modern art, Astrup Fearnley, is located at Oslo Aker Brygge by the ocean of Oslo fjord. The building has soft edges in faded wood, while a round and soft glass roof

spreads over the building like a blanket. The sun and ocean help the feeling of the building to be open, peaceful and light. The outside area present a good overview of the city, from a normal perspective. Seagulls and boats move slowly in the ocean.

The museum entrance is spacious, where there additionally is a café and a shop to the museum exhibition area.

Antibodies

The current exhibition at the museum is Antibodies by Josh Kline. As I pay student price, I am told to follow the arrows forward and to not go backwards in the exhibition, due to pandemic restrictions. The exhibition explores the technological, economical and biological changes that affect people in the 21. century. One work explores people as waste, presented as waste in the colors and textures of skin, and through body parts made from waste material such as plastic.

Another work from 2016 concerns unemployment of the working class. Cardboard boxes are filled with items belonging in an office, inside a glass formation looking like a virus up close. The accuracy of this work from 4 years ago is frightening.
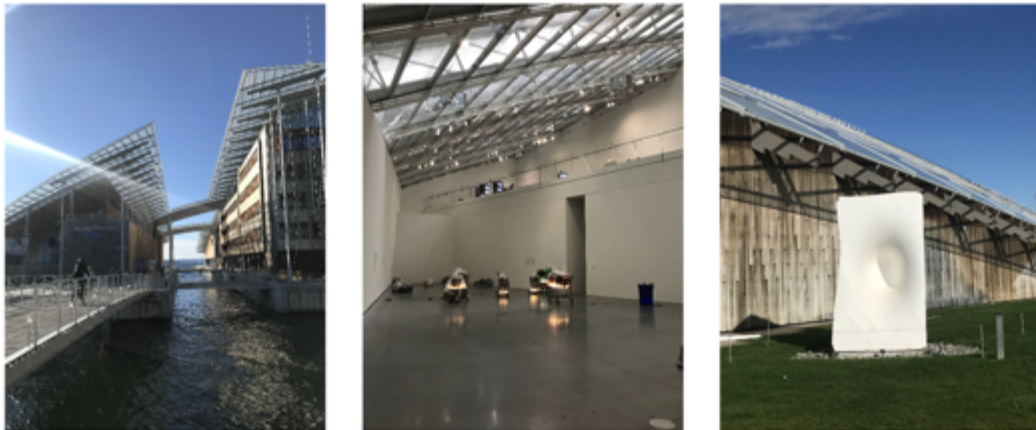
Observation of Astrup Fearnley

Nationaltheateret Train Station

The train station Nationaltheatheret is a central point in Oslo. It connects to both train and T-bane, in addition to being a close network to bus and trams.

The station is dominated with gray concrete but seems open and big. People are passing by and going places. A few people are sitting on a long bench, which is one of the few seating areas provided. A green wall behind the benches act as a colorful contrast to the otherwise gray space. The ceiling opens up, connecting the entrance with glass, while letting the illusion of color and light in from the outside.

The space represents a stop in between, not a destination. It does not invite people to stay for long. A ticket automat and ATMs are available, and digital screen present information on train departures and arrivals. There are three kiosks and one flower shop, which adapts for hungry people, thirsty people and people in love.

Walking down to the train platform, there are black and white photographs throughout the underground, portraying people and nature. The illusion of the material makes the photos act like ghosts, where the eyes follows as I walk on. I exit the station through a different exit than I entered, where infinite escalators are leading me up to the light of the day. The exit hall is dominated by grey concrete, through with different structures. The materials are often presented through the forms of circles, and some colors in passage creates depth and contrast.

Observation at Nationaltheatret train station

Kunstnernes Hus

Kunstrnernes Hus (the artists' house) is a gallery in Oslo, presenting exhibitions throughout the year. There is a café and wooden bar by the entrance of the building, with additional outside area for seating. A DJ deck by the bar is presented but not in use. The entrance hall presents a great set of stairs, leading up to the exhibition, seeming almost royal. By the stairs, there is a ticket desk and a sign leading down to a cinema. The cinema shows movies and documentaries, as well as hosting presentations and events. There are both families with

children, elderly and young adults present. Light is let in by windows, following towards the high ceilings.

A room is presented as "Familieverksted" (family workshop), informing to be a room for children under 15 years old. The current exhibition on is Høstutstillinga, or The Autumn Exhibition, is an annual exhibition where all artists are welcomed to submit works to be considered for the exhibition. The exhibition presents artworks in various forms, presenting both textile, paintings, graphics, sculptures, photographs, video and sound.

Observation at Kunstneres Hus

The National Library

The National Library is in a central and old brick building in Oslo. The autumn shows itself on the outside, by wrapping the building into its leaves of changing colors. The building presents old and new life interchangeably through cycles. The entrance space presents a shop and an info desk. Further is big auditoriums and study areas. Students are studying in the building, and other people having lunch or coffee in the café.

The old books in the library follow the interior of the whole building, through the reading rooms, exhibitions, and the café. The building has dark interior, but the light is present due to windows, lamps and light from opening in the ceilings. The spirit of the library present and welcomes everyone. A stair leads up to the second floor, where the walls are covered in a

great, old and colorful painting. At the second floor, there is a sign for research and scientist reading room.

The building has a few exhibitions on, where one is called "Opplyst" (Enlightened). The exhibition is in a dark room on the first floor. Examples on what is exhibited are the first edition of the Norwegian Constitution, the first Norwegian webpage Oslonett on an old computer, Ibsen's "et dukkehjem", a Karpe Diem record. Some of the props has audio to it, which starts when you lift the headphones off the wall, this captures and ensures attention of the visitors. Another exhibition honors Jens Bjørneboe, through his books and stories, while celebrating his 100 years. Here is presented his books and relevant themes, television shows, clips from newspapers and audio.

Observation at the national library

Arkitektur- og designhøgskolen i Oslo

Entering the school of architecture and design in Oslo (AHO) felt like walking into a workshop, which is not far from the truth. It is hard to tell where the workshop(s) start and end, which I assume it doesn't. Raw materials were dominating the space, such as concrete, wood, bricks and steel.

Entering the building there is a reception, a canteen, and halls leading to classrooms, library and workshops. The space seems open even though it consist of endless hallways.

Branches with leaves in different colors hang from the wall in the canteen, creating a rustic and random expression. There are also living plants throughout the building. Students are walking through the halls and open spaces, using the canteen and the workshops.

The building moves like a horseshoe, creating space for raw nature in the middle. The outside area and entrance act as a workshop itself. There is molded concrete in forms outside, showing a hands-on process, with the value of physical and practical work. Windows open up to the workshops, creating openness, community and inclusion. This allows for sharing knowledge and experiences through craftwork. Looking right at the materials, the process is visible from start to end. Transparency in the present throughout the process, as opposed to materials and results presented elsewhere, such as in exhibitions.

A broad set of stairs is leading up to a roof, which is an open space of grass and plants with a seating area with wooden benches. There are four doors on the roof, leading directly in to the second floor of the building, where there is one in each corner. The steel stairs are formed in squares, where grass and moss is naturally breaking through.
The building seems like a place for its inhabitants, who has a current project going on in a workshop.
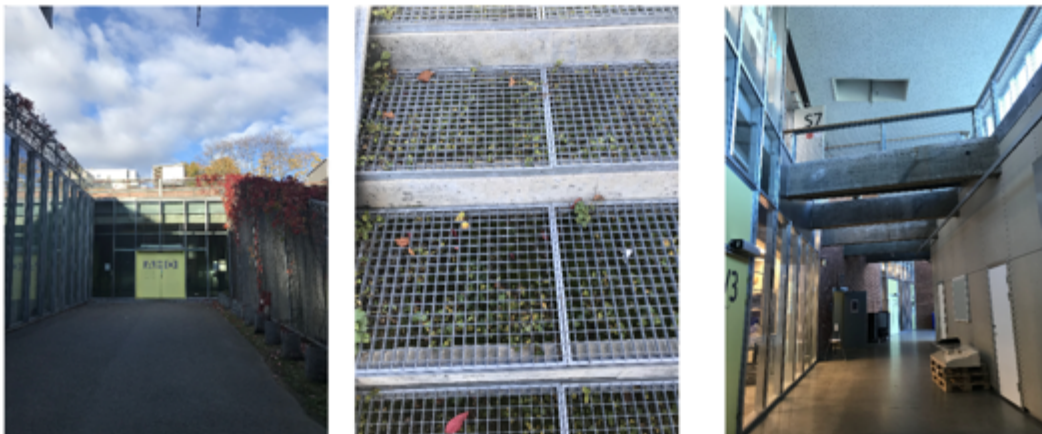
Observations at Arkitektur- og designhøgskolen i Oslo

Kunsthøgskolen i Oslo

Kunsthøgskolen I Oslo (KHiO) has the old building of Seilduksfabrikken (factory of sail cloth/canvas). The building shows clear marks from its earlier times as a factory, where new and old materials meet. The entrance area has a high ceiling and presents an overview of the

building. The glass ceilings marks how the previous separate buildings in brick are now joined.

A sign up the stairs showing the way to the library. There is an art exhibition below the stairs, leading up to the library. The library presents several shelves with books, group rooms, offices and a reception. The library carry clear marks of factory life, where there are materials like steel, brick, and concrete columns and visual pipes in the ceiling.

Raw materials meet modern interior in the library, showing both reuse and maintenance. The library is spacious with several windows in the ceiling. Materials like glass, steel and concrete are presented in different colors and forms. Shelves presenting art- and fashion books leads further into the library. There are a few small exhibitions throughout the library space, where one exhibit old objects framed inside a big glass box.

The interior is modern, but also comes off as random, as all the furniture is in different styles and colors. It makes you think they found certain furniture sets at different corners of the city. Its unexpected combination of styles might represent an expression of art.


Observation at Kunsthøgskolen i Oslo

Klimahuset

Klimahuset is located in the botanical gardens in Oslo and is a part of the University of Oslo. The building is in wood, looking natural through its materials. From the outside you already begin to get an overview of the building from looking in the windows. When inside, the entrance presents a reception, and to the right a room for events, and the left is leading to the exhibition. The event room is circular, and forms a leveled seating area in wood.

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The permanent exhibition in the building concerns climate change, and is split into three section, where the visitors are moved from the theme 'climate change' to 'consequences', and lastly to 'solution'. The exhibitions are confrontational, where your stomach hurts from knowing the information to be facts and not exaggerations. The three themes are talking about the same problem area, but are discussed from different narratives and presented from different perspectives. Consequences present fear, and solutions present hope.

In the middle of these three sections, there are three huge screens, acting as walls to separate the three themes. The screens show a film every 7 minutes. The movie is intense with loud sounds and big pictures. The bench I am sitting on is vibrating of the sound. Forgetting my role of being the audience, I move *into* the rainstorm, *into* the waves of the ocean, *into* the jungle and *into* the swarm of dying bees.
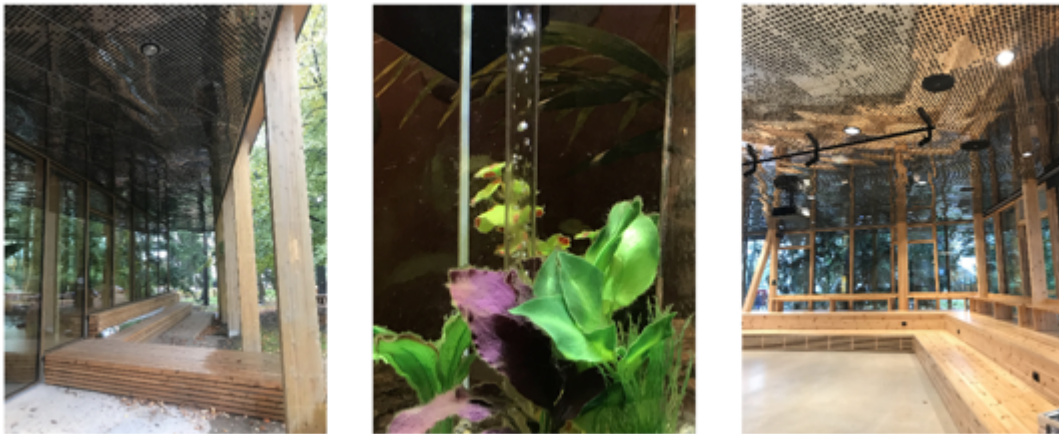
Observation at Klimahuset

Chateau Neuf

Chateau Neuf is the building for the student society at University of Oslo. The building is a cultural house, and has everything from bar (Glassbaren) and café (Bokkafeen), cinema (Cinema Neuf), gallery (Galleri Neuf), radio and premises to rent for student associations.

When walking inside the building, you are met with a spacious entrance hall, with seating areas for events and for students to use. Right by the entrance is Glassbaren, the bar of the building.

The materials of the building are dominated with concrete and brick. I get a feeling of being in a big and old factory. The contrasts of the big, open, factory-like building to the living students' associations, events, contemporary gallery, and the communities accompanies each other well.

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University Library at University of Tromsø

At the campus of The University of Tromsø (UiT), also called The Arctic University of Norway, I observed the university library.

The library is in the main building, where there also is a canteen, and several workspaces for reading and collaborating with peers. The library has two floors, where seating areas are places throughout the walls beside the windows. The yellow shelves act as partition for the open space to become more soft and quiet.

Throughout the building, there are two stands with the sign "free books", one on a shelf in the library by the stairs, and one on the way out by the entrance. The stands are messy, and even though it represents a good cause, it seems like the concept deserves a bit more respect by the inhabitants of the building.

Árdna

Árdna is a place I was inspired to visit after reading the article "Det skal råtne" by Elin Haugdal (Haugdal, 2013) discussing material use in sami architecture. Árdna is a the universitys (UiTs) sami cultural house, where the center for sami studies (SESAM) is responsible. The name Árdna is sami, and translates to *a tressure* or *an object of value*. (https://uit.no/Content/220864/Ardna_folder.pdf).

The building was closed due to the covid19 situation, but fortunately the structure of the building allowed me to peek through windows and still get an overview of the space. The buildings moves with the nature around it, and if you are above it, you might not even see it. From the front, you see its natural materials of wood, and the windows inviting you in to the cultural space. From looking in the windows, you see an indoor "campfire" where the floor opens up, as it would outside in the snow. Arts and crafts are presented on the walls, and the few doors are marked with

The building is placed close to nature, and is of symbolic value for UiT, where its placement in the nature area is not random. The culture landscape starts at the top of Tromsøya, down to the gamut by Joho Niilas, to the Labyrinth, ending up with a view towards Tromsdalen, presenting its sami history. According to this landscape, Árdna then creates a centre for the sami cultural landscape.

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Form, materials and details are chosen with inspiration from sami building tradition.

Observation at Árdna

Nordnorsk Kunstmuseum

Nordnorsk kunstmuseum is the art museum of northern Norway. Here is emphasized art from, for, and by northern Norwegian artist. The museum has a collection exhibition highlighting craft from north and duodji. In addition to art exhibition, the museum also has a design shop dedicated to new established northern Norwegian and sami designers and crafters. Additionally, the museum presents a café and a makerspace called 'Skaperverksted'. This is an atelier for everyone, where "craftivism" is in focus. The makerspace facilitates to bring up current themes such as consumerism, materialism and the climate crisis, through craft and materials.

The art museum had free entrance for kids and students. I walked up the stairs, and was met with a huge woven art piece. The colors of it were light earthy colors, and the structure was raw. Most of the art works were sculptures and objects, rather than paintings. The artworks were of and by northern artist, and I felt at home by the motives of reindeer, snowstorms, cod remains, and other raw crafting methods.

After visiting the museum, I sat down at the maker space, and made a few Christmas cards while exploring the space and crafting equipment. There was a long table, with different equipment in the middle, available sink for washing, and collaborative collages of cut-outs and inspirations hanging on the wall.

Observation at Nordnorsk Kunstmuseum

Appendix C: Collaborative Booklet

This appendix shows the booklet explained in Chapter 5.2.
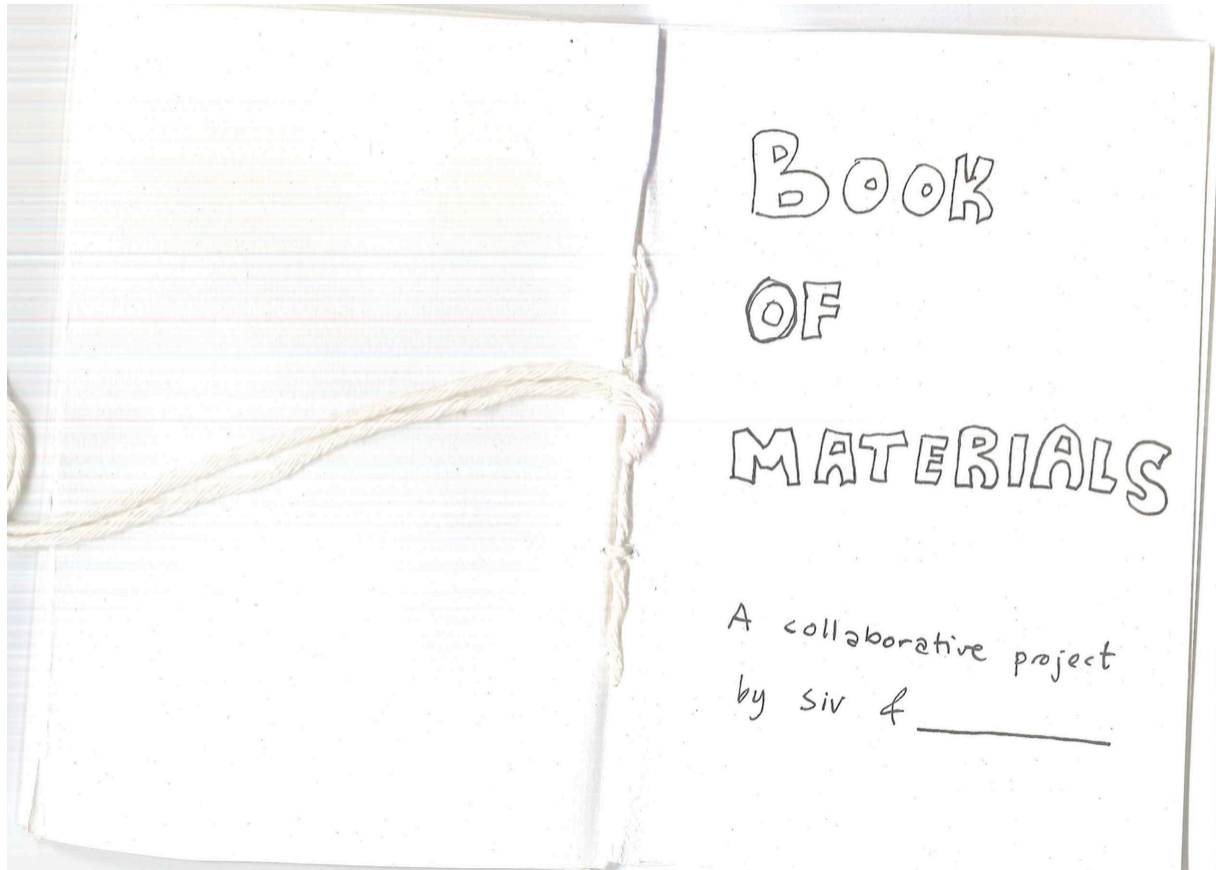
HOW IT WORKS

1. I send you this booklet (hope it found you well!)

2. You fill out what you want, and enjoy the process

3. You send me the booklet back (I will cover postage)

4. I analyse the content to include anonymously in my project.

ABOUT SIV

I am a master student at UiO, where I am writing about design and sustainability. Tromsø is my home town, but I am currently living in Oslo. Some things I like to do are knitting, reading and hiking.

ABOUT ME
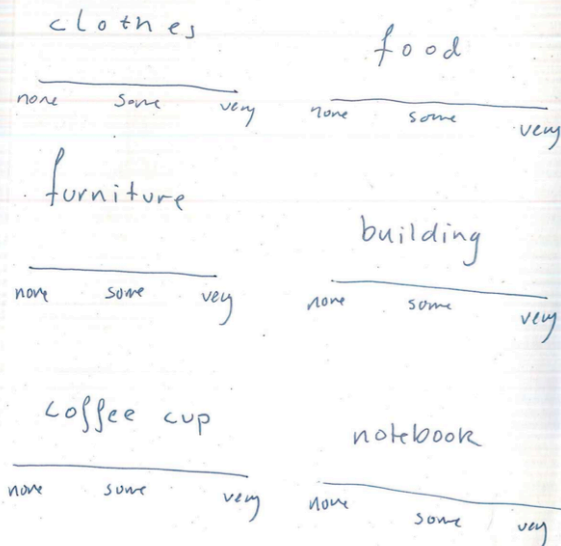
My current city/country of residence is . . . .
My hometown is : . . . .
I am currently . . . . years old.
Some things I enjoy doing are:

. . . .

. . . . . .

MY RELATIONSHIP TO MATERIALS

I think about what things are made of when it comes to...
[mark the line of what resonates]

clothes
none   some   very

food
none   some   very

furniture
none   some   very

building
none   some   very

coffee cup
none   some   very

notebook
none   some   very

MATERIALS ARE E V E R Y W H E R E

trees
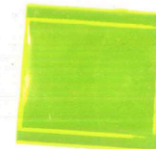
computer

jewlery

food

bus

house

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why should we care about
what things are made of?

why should we get to the
ground, the bottom of things?

the history and future of an
object can tell stories, and
we can explore these stories
by bringing awareness to our
surroundings.

Now, think of a
public building or
space you enjoy
in some way.

.   .   .

Ready?

Describe the public space
you are thinking of
[in words, drawings, keywords...]

Now, choose a 'favourite' room/concept/
furniture/artwork/whatever within
the building, and describe...
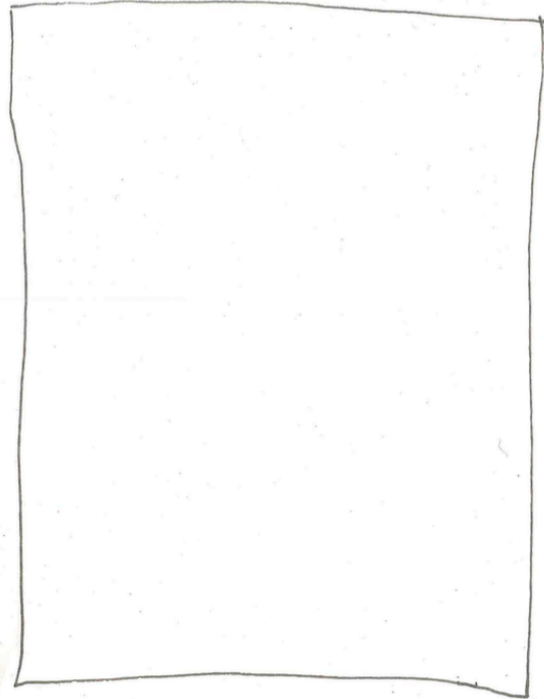
what it is

its qualities

its perks

its room
for improvement

Envision the Future you want
– what does it look like?
[illustrate as prefered]

My biggest Dreams for the Future
(personal, societal, planetary, etc.)

Think of the building/space from earlier.
How can Dreams manifest and be implemented in this space?
[map out the future on the timeline]

[TODAY]

[THE FUTURE]

would you like to contribute
with a material ?

[can be anything laying around,
like a piece of newspaper or
a leaf.]

Thank you for participating!

Appendix D: Consent form

Samtykkeskjema for masterprosjekt om Livsvitenskapsbygget

Jeg er en masterstudent ved Universitetet i Oslo. Med dette skrivet ønsker jeg å informere hva prosjektet mitt har som formål, spørre deg om du vil delta i prosjektet, samt berette hva deltagelse vil innebære for deg.

Formål

Formålet med mitt prosjekt er å undersøke innføring og bruk av design og materialer i Livsvitenskapsbygget. Jeg ønsker derfor å intervjue deg og/eller invitere deg til å delta i en workshop om Livsvitenskapsbygget. Formålet med intervjuet/workshopen er å få innsikt angående teknologibruk og design i det nye Livsvitenskapsbygget, å utforske bruk av ulike materialer eller teknologier, og testing eller utforming av prototyper eller ideer i denne forbindelse.

Deltakelse

Jeg ønsker din deltakelse fordi du kan representere prosjektet for Livsvitenskapsbygget/en fremtidig besøkende av det nye Livsvitenskapsbygget, og kan bidra med verdifull informasjon for min oppgave. Dersom du velger å delta ønsker jeg å gjøre et intervju/din deltakelse i en workshop med deg i min datainnsamling. Intervjuet vil vare i omkring én time, og jeg kommer til å gjøre et opptak av lyd, samt ta enkle notater fra intervjuet. En workshop vil innebære oppgaver eller øvelser som oppfordrer til kreativitet eller deling av perspektiver. Under workshopen vil jeg gjerne gjøre lydopptak og ta bilder. Bildene vil ikke inkludere identifiserbare trekk som for eksempel ansikter, men heller av selve oppgaven (notater, prototyper, tegninger).

Frivillig deltakelse

Det er frivillig å delta i mitt prosjekt. Du kan når som helst avslutte din deltakelse eller trekke tilbake informasjon som er gitt. Du kan når som helst velge å trekke samtykket uten å måtte oppgi grunn. Dersom samtykket trekkes vil eventuelle personopplysninger som er innsamlet om deg slettes og det vil ikke innebære noen negative konsekvenser for deg at du velger å

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trekke ditt samtykke. For å trekke tilbake samtykke eller opplysninger etter at datainnsamlingen er utført, kontakt meg med telefonnummer eller e-post adressen som er oppgitt nederst i dette dokumentet.

Personvern: innsamling, oppbevaring, behandling og bruk av dine opplysninger

Ingen sensitive personopplysninger (jf. Personvernforordningens artikkel 9 og 10) vil bli innsamlet. Personlige opplysninger om deg vil kun benyttes til formålene beskrevet i dette informasjonsskrivet. Jeg behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

Personlige opplysning innsamlet i opptaket vil bli anonymisert i transkriberingen og rapporteringen så fort som mulig, senest en uke etter intervjuet er gjort. Ingen andre enn jeg vil høre lydopptaket, og bare jeg og mine veiledere, Maja van Der Velden og Andrea Gasparini vil vite hvem som har deltatt. Det som oppbevares av anonymisert rapportering fra datainnsamlingen vil følge Universitetet i Oslo sine rutiner for sikker oppbevaring.

Navn og kontaktinformasjon erstattes med pseudonymer og koder. Intervjuet/workshopen vil kun behandles og transkriberes av meg og kan ettersendes deg ved ønske. Dataen som oppbevares, inkludert anonymisert data vil ikke kunne tilbakeføres til deg.

Dersom det er relevant ønsker jeg å inkludere din stillingstittel i beskrivelse av intervjuet. Dersom du ikke ønsker dette eller det medfører betydelig risiko for at du kan bli identifisert kan jeg også anonymisere dette.

Hva skjer med innsamlet data når masterprosjektet avsluttes?

Alle notater, opptak, transkribering og lydopptak fra datainnsamling blir slettes senest 1. Juni 2021. Dette gjelder også anonymiserte og avidentifiserte opplysninger om deg.

Rettigheter

Vi behandler opplysninger om deg basert på ditt samtykke. Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om deg, og å få utlevert en kopi av opplysningene,

- å få rettet personopplysninger om deg,

- å få slettet personopplysninger om deg, og

- å sende klage til Datatilsynet om behandlingen av dine personopplysninger.

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med Siv Årsand (sivaar@ifi.uio.no) eller min veileder Andrea Gasparini på e-post a.a.gasparini@ub.uio.no.

Hvor kan jeg finne ut mer?

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med Siv Årsand (sivaar@ifi.uio.no) eller vår veileder Andrea Gasparini på e-post a.a.gasparini@ub.uio.no.
Personvernombud ved UiO: Roger Markgraf-Bye, personvernombud@uio.no.

Før intervjuet begynner ber jeg deg om å samtykke i deltagelsen ved å undertegne på at du har lest og forstått informasjonen på dette arket, og ønsker å stille opp til lydintervju.

Med vennlig hilsen
Siv Årsand

Tlf.: 97482741, E-mail: sivaar@ifi.uio.no

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om masterprosjektet, og har fått anledning til å stille spørsmål. Jeg samtykker til:

❏ Å delta i intervju med lydopptak

❏ Å delta i workshop med lydopptak

❏ At stillingstittelen min blir nevnt i oppgaven

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet.

_____

Sted og dato

_____

Fullt navn

_____

Signatur