



JÖNKÖPING UNIVERSITY
School of Engineering

Industrial DESIGN

**IN-BETWEEN: PRODUCT DEVELOPMENT
STUDY THROUGH INDUSTRIAL AND
EXPERIMENTAL APPROACHES**

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MASTERTHESIS 2021
Master in Product Development with a specialization
INDUSTRIAL DESIGN



JÖNKÖPING UNIVERSITY

School of Engineering

IN-BETWEEN: PRODUKTUTVECKLINGSSTUDIE GENOM INDUSTRIELLA OCH EXPERIMENTELLA METODER

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This degree project is performed at the School of Engineering in Jönköping in the subject field Industrial Design. The project is a result of the master program Industrial Design. The writers are responsible of the result, conclusions and reflections.

Tutor: Magnus Andersson

Extent: 30 points (D-level)

Date: 25/05/2021

Filing number:

Abstract

Experimental design is a practice operating at the limit between craftsmanship, art and technology. In collaboration with the studio breadedEscalope (Vienna, Austria) this project oscillates between research and production to study the link between industrial and experimental approach to design.

Hitherto initiated from an impulse or a problem requiring solution, the action of designing suggest a product or a service to fulfill needs. In industrial design, the creative process follows contextually anchored steps to frame, define, develop and deliver. For the sake of a pragmatic answer, the delivery is centred around the user and its needs, often leading to an opaque finished product.

Home's basic, the coat rack was selected to support this study as a concrete product base for trend and consumer behavior analysis. From shared ornamental and functional object placed in the entrance of houses, the coat rack previously "hatstand", is today an unnoticed domestic object. The final product was hand manufactured with recycled and raw component, allowing transparency on the production process and used material. Stacking up coats on the produced rack create a private space for the user to sit in, questioning the relationship between user and product (ownership, trust, value). Based on architectural concept and design theory, the product aims to bridge creative and technical disciplines to suggest a functional yet questionable product as dialogue starter.

How sustainable are the objects that surround us every day? What is the story of the product? With those question in head the experimental design thinking studio breadedEscalope based in Vienna (Austria), offers an alternative approach to design. Always starting projects with the production process as a story of formations, offering unique and playful outcome to the act of designing.

Keywords

- Industrial design
- Experimental design
- Circular design
- breadedEscalope
- Production process
- Transitional space
- Coat rack

Sammanfattning

Experimentell design är en praxis som fungerar på gränsen mellan hantverk, konst och teknik. I samarbete med studio breadeEscalope (Wien, Österrike) pendlar detta projekt mellan forskning och produktion för att studera sambandet mellan industriell och experimentell strategi för design.

Hittills initierad från en impuls eller ett problem som kräver lösning, föreslår åtgärden att designa en produkt eller en tjänst för att uppfylla behoven. Inom industriell design följer den kreativa processen kontextuellt förankrade steg för att rama in, definiera, utveckla och leverera. För ett pragmatiskt svar är leveransen centrerad kring användaren och dess behov, vilket ofta leder till en ogenomskinlig färdig produkt.

Hemmets grund, klädhänget valdes för att stödja denna studie som en konkret produktbas för trend- och konsumentbeteendeanalys. Från delat prydnads- och funktionellt föremål placerat i ingången till hus är klädhänget tidigare "hatstand", idag ett obemärkt inhemskt föremål.

Slutprodukten tillverkades för hand med återvunnen och rå komponent, vilket gav insyn i produktionsprocessen och använt material. Att stapla upp rockar på det producerade racket skapar ett privat utrymme för användaren att sitta i och ifrågasätter förhållandet mellan användare och produkt (ägande, förtroende, värde). Baserat på arkitektoniska koncept och designteori syftar produkten till att överbrygga kreativa och tekniska discipliner för att föreslå en funktionell men tvivelaktig produkt som dialogstartare.

Hur hållbara är de objekt som omger oss varje dag? Vad är historien om produkten? Med dessa frågor i huvudet erbjuder den experimentella designtänkande studion breadedEscalope baserad i Wien (Österrike), ett alternativt tillvägagångssätt för design. Alltid starta projekt med produktionsprocessen som en berättelse om formationer, erbjuder unikt och lekfullt resultat till handlingen att designa.

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1 Introduction

The following report recount a thesis project done for the MsC in Product Development specialized in Industrial Design at the Engineering School of Jönköping University.

Accordingly, this thesis took place in Jönköping but was realized during spring 2021 (January to May) in remote-collaboration with the Austrian studio of Experimental Design Thinking breadedEscalope based in Vienna.

I.I Background

In 1950, Edgar Kauffman Jr (1910-1989) associate curator of the Industrial Design department of New York's Moma, published "*What is Modern Design?*" (published by the Museum of Modern Art, New York) a book where he explains what is *Good Design*. In it, Kauffman Jr said about it: "A complete fusion of form and function revealing simple and practical beauty." [1]

Even if the word "good" is subjective by nature and "modern", time/context relative, in today's industrial design practice, this adage as a strong a leading point.

Aware of design as a tool for narration, the designers of breadedEscalope (created in 2008) choose: materials or object as transformation possibilities, process as a dialogue and tools/technics as locomotive structure. With agile mindsets and mobile knowledge, they are able to question contemporary subjects such as our relationship to objects: How much do we know about them? or our habits in society: What is the link between socio-political changes and our production/consumption system? [2]

For the realization of this thesis, the experimental design process of the Austrian studio was placed in parallel with an orthodox industrial approach, in order to broaden the boundaries of design. Further along during the development of the project, the coat rack was chosen as a product support to materialize the result of the study.

Representative of an environment and human behaviour (the northern globe's hemisphere requires seasonal change in outdoor/indoor clothing), the coat rack is a common item anchored in people's daily life. During the Victorian era (1837–1901), in the entrance of houses, the "hat stand" or "coatrack" became a signifier of the household's wealth, social position and knowledge. Placed in the hallway, hall stands or hatracks were the most important piece of furniture, as homes became larger and social visits became more structured. Since then, houses standard evolved as well as habits and customs. Likewise, coatracks often became invisible in today's most entrance composition. [3]

As this project's "production support", the coatrack, is an opportunity for re-interpretation and reflection on human lifestyle in a permanent momentum, switching between physical and virtual environments.

I.2 Purpose and research question

This thesis will explore the relation between industrial design and experimental design. The collaboration aims to create a product in relation with a formulated problematic using mixed tools. The expected result should help to answer the following research questions:

- Where are the differences between an industrial approach from an experimental approach in design?
- How much of the product identity is the story?
- Are these two approaches compatible? And how much do we value them?

Features considered in the development of the project:

- Problematic formulation
- Story and communication
- Cross domain referencing
- Material and form language

Note: In the beginning of the process the coatrack is not yet identified as the main product of study. The latter along with the supporting problematic “Between spaces, how to enhance the user’s relation to its daily environment?” are suggested at the end of the first phase of study (cf. 4.4.6) accordingly to the listed features of this project (above).

I.3 Delimitations

The resulting product of this study should be a physical prototype. Due to the nature of the collaboration the final delivery isn’t restricted to a form language but by available resources.

The prototype should be able to give an understanding of intentions in terms of purpose and dimensions. This should allow users to experience the product and make interpretation based on the latter or with additional lecture of the report.

Self-initiated and in collaboration with breadedEscalope, the project can lead to additional content. Depending on the context, strongly influenced by the pandemic crisis (COVID-19), a possible visit to the studio in Vienna could be consider.

The time delimitations will follow the school schedule:

- Mid-presentation in week 11, 17th of March
- Report hand in to supervisor and opponent, week 19, 12th of May
- Final presentation week 20, 19th of May
- Final report hand in week 21, Monday 24th of May

I.4 Disposition

This thesis report is structured as it follows:

1. Introduction: Contain brief relative to the project (background, purpose and research questions, delimitations and disposition)
2. Theoretical background: information relative to the domain of study, useful to the understanding the development of the thesis
3. Method: methodologies used according to the approach of the thesis
4. Approach and Implementation: recording and explanation of the process following the methods
5. Result: presentation of the final product
6. Conclusion and discussion: explanation and reflection surrounding the obtained result

The additional content is placed in the supporting parts: Abstract, Sammanfattning, References and Appendices

2 Theoretical Background

To give a static and framed definition of *Design*, is stepping in the research's field. Anchored in English as it follows: "to make or draw plans for something, for example clothes or buildings" [4] the word design from a verb, to a noun, in the common culture has become a discipline.

Nowadays, *Design* covers a vast amount of activities linked to planning and creation such as the verb intended it to be. Following this logic, the person or entity who design is called a designer. The designer "make or draw" elements in order to create, construct, implement and/or optimise a product or a process.



Figure 1 - Choppers found in the Olduvai Gorge (left) knapped flint and 3D printed polymer by Dov Ganchrow, 2014 (right)

In the 1930's the archaeologists Mary and Louis Leakey discovered in the Olduvai Gorge, in Tanzania, the earliest known tool of the human history: the Oldowan tools (Figure 1). Involving an ingenious lay fissile rock (ex. volcanic stone) and a "hammerstone", the Oldowan tools are a memory of the first archaic stone tool manufacturing industry, approximately 2.6 million years older than us. Meaning, that the first genus Homo predating the *Homo habilis*, were a designer. [5]

That said, the object and purpose of this thesis is not to research nor study the origin of *Design*. Nevertheless, it is necessary to cover its goal and clarify the use of the Design tools and other notions in order to anchor the content of this thesis.

2.1 Design and industrial design

The first publicly known use of the term *Design* brings us back to 1849 with Sir Henri Cole (1808-1882) in his *Journal of Design and Manufacture* (created in partnership with Richard Redgrave) to promote the industrial production of goods associating "function", "decoration" and "cleverness". [6]

In the early form of Industrial Design, *Design* is a tool to promote a vision of a durable, modern social structure and the progress in technology of a shifting society. During the Industrial

Revolution, *Design* was at the crossroad of Fine Art, Industry and Science. Industrial Design was supposed to be the apex point of craftsmanship, for an Industry aiming to ease every Man around the world and; according to Prince Albert (1819-1861), to work on the “unification of the human race”. [7] As an example, inspired by the ideas developed by William Morris (1834-1896) concerning *Design*, designers and architects of the Modern Movement in the 20th century tried to visualize an utopic future built upon a total faith in the power of technology and functionalism.

Even if the influence of *Design* and *Designers* change through years, *Design* stays an expression of Human search for progress and self-improvement while shaping a better world.

From Richard “Bucky” Fuller (1895-1983), who published in 1969, *Operating Manuel for Spaceship Earth* [8] to Dieter Rams (1932-) and his ten principles for good design, Industrial Designers capture the essence of their societies (social, political, economic, cultural) in order to “*Create and develop concepts and specifications that optimize the function, value, and appearance of products and systems for the mutual benefit of both user and manufacturer*”. [9]

2.2 Design: “why” and “how”

2.2.1 Design knowledge

Design is a vast field of possibilities where boundaries are often shifted. As Ken Friedman (Department of Knowledge Management, Norwegian School of Management) mentions it in his article concerning design knowledge [10], design it is a domain globally as old as the first human beings (cf. 2.1); therefore, a discipline on which we have been able to put on a name quite recently (cf. 2.1). Due to these two factors, the notion of legitimacy in the perimeter affected by design discovery and further on in the knowledge generated, can be questioned inside and outside the profession.

In 1969, Richard Fuller [11] tried to give a form to the process of designing. He brought to light the evidence of two phases in the process: search/research and prototyping/practice. [10] He then evaluated the scope of design knowledge in four domains subdivided in main subjects:

- Domain 1: Skills for Learning and Leading
- Domain 2: The Human World
- Domain 3: The Artifact
- Domain 4: The Environment

Friedman suggest a partition of design through six fields complementary to Fuller’s vision: natural sciences, humanities and liberal arts, social and behavioural sciences, human professions and services, creative and applied arts, and technology and engineering.

As a discipline, design generates knowledge rooted in between materiality and immateriality. The design fields allow the designer to question his surrounding and its perspectives and through research and practice “change existing situations into preferred ones” [12]. In the process of change, the motion from action to past experiences lead to knowledge. Everything that have been experienced is considered as explicit knowledge. On the other hand, knowledge which involve assumptions, shared experience, and personal development can be considered as tacit knowledge, and because of that nature is hard to be fully stated.

In his report Friedman summarize the act of designing as it follows: “*In one regard, design is a field of thinking and pure research. In another, it is a field of practice and applied research. When applications are used to solve specific problems in a specific setting, it is a field of clinical research.*” [10]

2.2.2 Design thinking

Design Thinking is a process often used by designer to approach subjects. Suggested as a creative/innovative way to solve problem, it relies on the use of several steps of reflexion for the designer go through while focusing on the end goal rather than the problematic itself. As an iterative process, design thinking allows the designer to come back on each step of the process to take the project back from a “blank state to a new, innovative solution”. [13]

In 1969, Herbert A. Simon Nobel Prize laureate for economics work contributed to the spread of the Design Thinking in the 1970’s, push on the importance of rapid prototyping and testing. [14]

As defined on IDEO’s web site [13], an influential design consulting firm formed in 1991 and famous for promoting design thinking, the identify process followed by designer relies on:

- Question framing: using the customer needs and profile for a matching problematic
- Inspiration gathering: broaden the source of inspiration to enhance creativity
- Ideas generation: push boundaries to suggest innovative solution
- Tangible idea reformulation: prototyping to solution to assure their viability
- Testing: test the prototype to go further on
- Sharing: expose the solution for feed-back (possibility of iteration)

The core idea of the design thinking is that designers adopt shifting position by constantly questioning ideas and process to bring a valuable proposition to the customer needs.

2.2.3 Design focus: Human and/or User

Human-centred design (HCD) is an empathetic design approach [15] willing to adopt a Human perspective throughout the design project. “Adopting a Human perspective” is encouraged, not in the same perspective as a Captcha [16] (based on the Turing theory to certify access to a content); but as a focus point in the design process. Allowing the problematic, the development and the answer to fit a Human context, environment and need. The nature of this design approach is built around interaction and involvement of the people and community.

In *What Designers Know*, Bryan Lawson calls out a discussion with the architect Ian Ritchie about the early stage of the design process, agreeing on the value of the client in the nature of the future solution. In order to begin the design process, the designer shall get away from the preconceptions and collect “knowledge about human goals, strategies and desired behaviour”. [17]

In this sense Don Norman, points out Communication as an important aspect of the project from the beginning to the end, in success as in failure. [18]

Nowadays, Human centred design can be misrecognized as User Design or User Experience. Maybe because of the semantic similarity and close relationship between Human and User. Under

the word Experience is covered a set of key word which will depict or qualify the interaction of the User with the product.

As Don Norman mention it, HCD is a philosophy, a mindset which will guide the designer in the design process. User Design, User Experience are domains of study included in the scope of the product design. [18]

A link could be created through the honourable objective of the Human Centred Design and *The lumières* from the 17th century in France who had as goal to enlighten every Men through the study of cultural, social, scientific, philosophy and ethic knowledge [19].

Not everybody agrees on HCD though. Don Norman himself on his website wrote an article about the harmful potential of HCD. Not as a physical threat to the user, but as limiting frame to the design potential. Due to its general angle and focus, this philosophy wouldn't make a full use of technological assistance, would be anchored in context and further on un-adapted for mixed study community (general needs overpassing individual needs). [20]

2.3 Perception

When looking at the definition of perception in a dictionary one can find two suggested definition. One concern the belief of the perceiver and the other his sight. [21]

Perception is in other words, the result of the interpretations based on sight or belief of tangible or intangible matter (Figure 2). Base on this suggested definition, designing a product is confronting the designer intended perception to the public perception i.e trying to align sensorial experiences and beliefs.



Figure 2 - Duck or Rabbit? Fliegende Blätter,
Munich 1892

In *Design for product understanding* [22], the Swedish industrial designer and honorary doctor of Industrial design (Chalmers University of Technology) Rune Monö introduce the product perception through those words “When a group of people look at an object, none of them sees exactly the same things as anyone else” [22, p. 16]. He later introduces the notion meta-product relaying of semiotic (study of signs) and semantic (the study of signs message, their meaning) to

explain the phenomenon. The meta product is the perceived version of a physical product based on interpretation and ideas “behind” the physical product. [22, p. 20]

2.3.1 Gestalt

Möno describes the act of designing as a combination of gestalts. “Gestalt” in German or “Unified whole” comes from the German psychologists Max Wertheimer, Kurt Koffka and Wolfgang Kohler, who identified a set of principles/laws to describe human perception of objects.

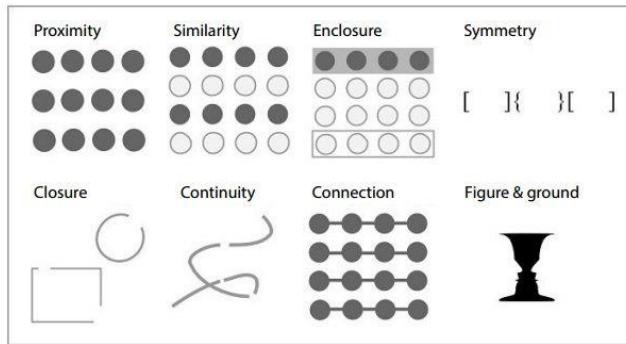


Figure 3 - Gestalt laws

Gestalts study works on principles based on what the eyes can see and so on, how the mind interprets it: proximity, similarity, enclosure, symmetry, closure, continuity, connection, figure & ground (Figure 3). Those are semiotic elements: physical properties of signs which carry message readable by the perceiver.

2.3.2 Emotion

On the other hand, the semantics of product, trigger by socio-cultural aspects, can give implicit instructions: Warning! Or even trigger emotions to the perceiver.

Emotion design is an important and difficult aspect of the development of a product. Since 1999, the International Design & Emotion Society promoted the development and finding in Emotion Design. The experience of the product by the user goes by its perception and doesn't start in the usage of the product but even before. In *The Dream Society*, Jensen Rolf [23] signalled the commercialization of human emotion and pointed out the shift in consumption toward the experiences and emotions conveyed by the product. [24]

Emotion is the central point in User Experience (cf. 2.2.3). When correctly studied, emotion can ensure a proper connection between the customer and its product to give the feeling of a “good product” compared to another one of the same ranges (ex. Coffee pot experience, Overbeeke and Hekkert introduction speech, 1st International Conference on Design and Emotion, 1999).

2.4 Design process

2.4.1 Double diamond

The Double Diamond is a model composed of four phases useful to the design process. As the name suggest it, the model alternate between divergent and convergent phase (Figure 4).

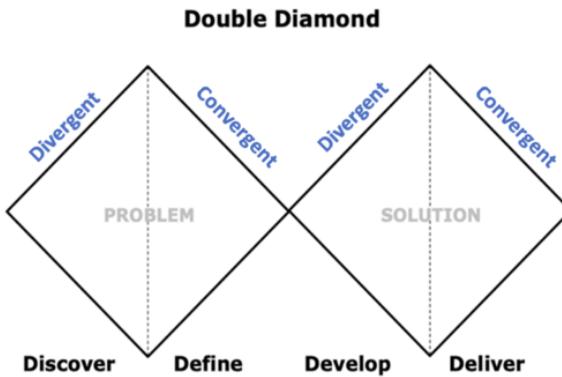


Figure 4- Visualization of the Double Diamond model (DTU Project lab's figure based on the British Design Council, 2005)

As an iterative process, the problem and the solution can be refined independently and give a new turn to the project.

- **Discover:** Design research for investigation and exploration
- **Define:** Delimit a problem interpretation based the result of Discover
- **Develop:** Suggest various solution or iteration to a problematic
- **Deliver:** Final testing for feedback collection and improved outcome

2.4.2 D.school: Design Thinking Bootleg

The Design Thinking (cf.2.2.2) Bootleg is a free compilation of tools developed at the d.school (Institute of Design) of Stanford University. Created as a booklet of methods, d.school's Design Thinking Bootleg advocate for an active practice of the design thinking. [25]

1. Show don't tell
2. Focus on human values
3. Craft clarity
4. Embrace experimentation
5. Be mindful of process
6. Bias toward action
7. Radical collaboration

Framed around seven key mindsets, the goal is to teach individuals the tools to creative thinking and to approach subject/problems from a human centred point of view.

To create perspective, the methods mix presented in the document can be applied to the design process through five modes (Figure 5).

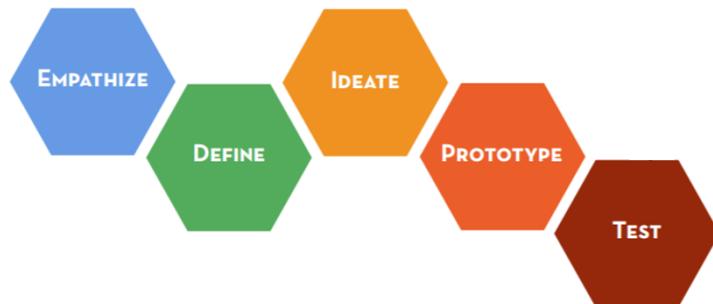


Figure 5 - Design Thinking diagram (Design Thinking Bootleg)

Empathize: In order to uncover needs and bring innovative solutions, the first step of designer should be to adopt an *emphasizing* posture. Each individual is made of beliefs which can give us biased point of view while approaching a project. To *empathize* is to observe, engage and immerse with the user through a “fresh set of eyes”, allowing the designer to understand behaviours and discover emotions that guide them.

Define: As a result of the previous observation-oriented mode, the designer compels the findings to extract a problem statement. Aware of his point of view as a critical filter, the designer aims for a clear problematic which would fuels the other steps of the process and their actors.

Ideate: Empowered by a pertinent problematic the *ideation* mode consists on the exploration of concepts and their outcomes. Compared to the previous mode focus on a target to be define, here the objective is to reach out in wide spaces. In a few words, the motto should be: Out of the box thinking. To bring clarity to the next step, it is then important to evaluate ideas to plan the next mode. Attention is to be put on the distinction of each phases: *ideation*-evaluation, to avoid framing ideas.

Prototype: The goal of the *prototype* is to create a dialogue through tangible material in order to progress. It should be a quick and easy way to learn and fail while collecting a lot of data from it. Due to its function, the *prototype* doesn't need to be high level detailed, but should aim for a clear understanding of the selected idea.

Test: To *test*, is to evaluate the limit of a prototype. Test can validate previously emitted hypothesis/choices (made through the ideation mode) and at the same time discard a prototype. The *test* mode is here to push forward ideas and prototype to reach a potential end and at cut irrelevant or dysfunctional iteration.

Even if structured as a combination of chronological steps, the cycle presented bring possibilities of iterations and loops (due to the diversity of the methodology) in a refining approach of the design process.

2.5 Experimental design thinking - breadedEscalope

In the Cambridge dictionary, when searching for the definition of the noun “experiment” we can read: “A test done in order to learn something or to discover if something works or is true”. For the verb experiment, we can read what follows: “To test or to try a new way of doing something”. [26]

Experimental design thinking is by association the practice of design through new actions, path or process. Design is no more in the result but in the mind’s reflection leading to a chosen process for expression (cf. 2.2.2). Away from the usual focus on the end product, which is nowadays, the final delivery to the customer, experimental design chose to focus as much on the process leading to a dialogue with the customer.

2.5.1 “Misfit Revisited” - THONET

In 2012, the design studio Breaded Escalope hosted a 3-days workshop/exhibition in collaboration with the company THONET titled “Misfit Revisited”: Intended as a public experiment, the workshop allowed participant to design their own furniture by using, revising, recycling rejected parts and semi-finished products from THONET’s production. [27]



Figure 6 - Collection of chairs from the Misfit Revisited workshop hosted by Thonet and breadedEscalope 2012

Emerging from the wish to question the design process and the consumer choices, the studio started a pilot project called “Collective Furniture” with the aim of using the current impulse of the worldwide web. Like previously showed with the Misfit Revisited, Collective Furniture is an innovative model demonstrating the potential of the “prosumer”, challenging the development of goods. [28]

2.5.2 Collective furniture - Collective Desk

In 2014, in collaboration with the Austrian company Neuen Wiener Werkstätte, the studio started the Collective Desk. breadedEscalope suggested a participatory development process with a public selected off the internet (project call created through a platform website) in order to develop a piece of furniture. In the continuity of the participatory process, the furniture was intended to be transmit on an Open Source basis or with the possibility to order it from NWW production.

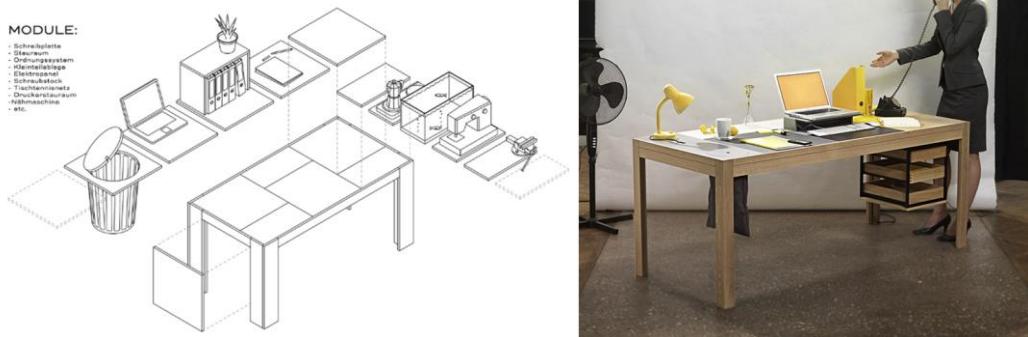


Figure 7 - Collective desk modular scheme (left) office work configuration example (right)

The Collective Desk, in the Collective Furniture line of product, explored the boundaries between “consumer” and “prosumer”, to offer a modular surface willing to fit public needs and potentials. Instead of switching space to transit between activities, the user in an “active” position, switch the modules of the Collective Desk. Around the 160x82 cm frame provided by NWW and initial prefabricated modules (of 52x52 or 26x52 cm²) developed by the public and produced by NWW, the user organise/arrange this available surface to his needs (Figure 7).

2.6 Open Source

Originally created relatively to software engineering, an Open source software has a “code that is designed to be publicly accessible—anyone can see, modify, and distribute the code as they see fit” without money transaction involved. [29]

In 1998, Netscape (Netscape Communication Corporation, independent American computer services company defuncted in 2003) during a strategical session decided to release the source code of Netscape Communicator 5.0 for free, to emulate the development process with the participation of the community. Their belief was based on the idea that by involving potential user and developers the product could be improved and further on, “advocate for the superiority of an open development process” [30].

In the Foreword of Eric S. Raymond’s book, *The Cathedral and the Bazaar*, Bob Young, Chairman and CEO of Red Hat Inc. [31] makes the link between the progress made in computers hardware industry vs computer software industry. He observes that due to the freedom enable in computer hardware for both suppliers and consumers, this industry generated “the fastest innovation in

product and consumer value the world has ever seen”. On the other hand, the software measure changes in decades¹.

From small specialized communities, Open Source as a label as emulated progress in all of the layer of our societies from the way we work to the way we live. A good example is the operating system Android for mobile phone created by Android Inc in 2003 and launched in 2008 by Google [32]. Present on most of today’s mobile phone, the system is based on an open source software named Linux created in 1991 by Linus Torvalds. [33]. According to a survey from a data analysis from IDC Corporate, in 2020, Android smartphone share represented 84.8% of worldwide smartphone shipment [34].

2.6.1 **Open Source to design**

Applied to design, the Open Source concept would rely on the collaborative participation of creators, engineers and consumers (Figure 8) to bring a product or a line of product where all information involved in its creation would be available on internet (i.e. CAD files, public accessible production, CNC file); bringing possibilities for re-creation, modification, diffusion and evolution to product and projects. [35]



Figure 8 - Stool from the Edie Set designed by David & Joni Steiner for Open Desk (opendesk.cc)

The Open Design movement seems to aim at collaborative and transverse job in order to reach cross-platform innovation [36]. In the manner of the Open Source movement, several entities formed by expert promote Open Design as tool for machine design applications or open-source hardware design [37].

2.7 **Sustainability**

In Design’s history, the notion of sustainability has been approached through several angles: product, service and technic. Linked to the three domains of sustainability: environment, economical and society, each approach emphasized on a set of criteria in order to bring a valid

¹ Ibid.

answer to the environmental challenge. From raw green washing and ecodesign, in the past years, paths have been suggested to reach a pertinent balance on each domain of the sustainable panel.

In a transition, the importance of a societal answer mandatory to match technological innovation [38] and ensure that each partial approach needs can be consolidated with clear needs definition. Initially focused on the product and its environmental impact, Design for Sustainability has evolved to a more Human centered question where a bilateral can be implemented in the research for solution, bringing long term benefit for the society, the economy and the environment. It has proven that each stakeholder involved in a sustainable approach have an intricate role in the development and the expansion of sustainable knowledge and results (behaviors, consumption, evolution). [39]

2.7.1 Circular Design

In circular economy, design is at the center of the shift in consumers' mindset. The idea is to create a model where the design gravitates around loops and not a linear pattern. Approach such as reuse, sharing, remanufacturing and refurbishment would extend the life cycle of products and reduce environmental impacts, while promoting a sustainable way to consume goods (Figure 9).

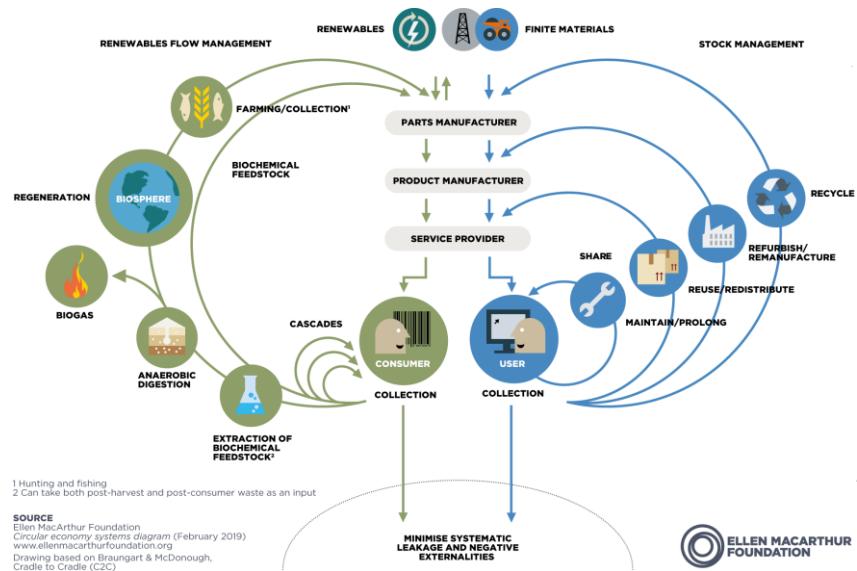


Figure 9 - Circular Design diagram (Ellen MacArthur Foundation)

Being aware of the environmental challenges that our societies are facing is not enough. Awareness without action, put the economy in a “hit or miss” situation due to the consequences of our previous economic model. To balance the effort, governments and associations are promoting circular economy, by advising or funding (ex. European Commission’s European Circular Economy Stakeholder Platform) sustainable projects. [40]

3 Method

The chosen methodologies during this project are taken from the instructions received during the two-year program of Industrial Design in the School of Engineering of Jönköping University. Divided into five section, they will provide quantitate, qualitative data all along the project.

3.1 Collaboration

3.1.1 Meetings and communication

Meetings are basic communication tools aiming to connect participant on a date and place in order to exchange on a defined subject.

In the context of the pandemic, scheduled meetings on regular basis and informal virtual communications can be useful to stimulate activity and implication for each collaborators of the project.

3.1.2 Gantt Schedule

In order to organize and simplify time management, the Gantt chart illustrates activities, critical tasks and resources in a “horizontal bars” calendar. The final goal of the Gantt Schedule is to offer a visual feedback on projects progression to allows quick update and modifications. When optimised, by creating dependency relations for each tasks and attributing resources, it is possible to predict an early end of the project or to its last possible end date. On a simple use, a Gantt chart can be used as a planning (**Error! Reference source not found.**).

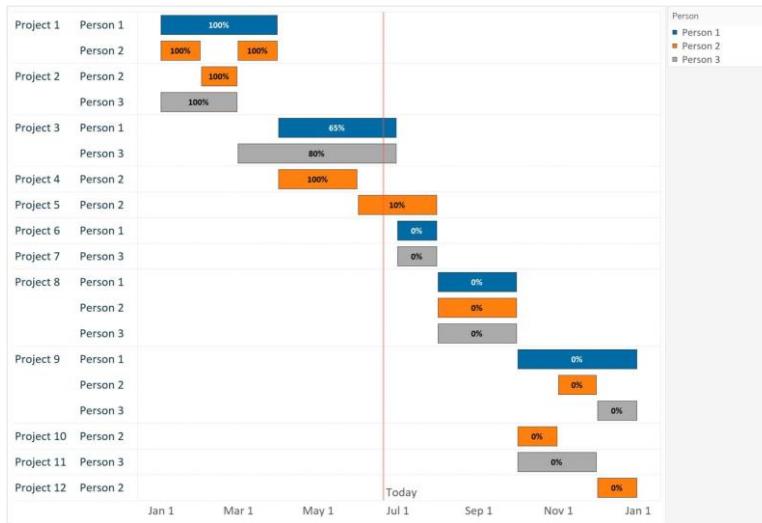


Figure 10 - Gantt Schedule example

In between the checklist and the calendar, the Gantt Schedule is a great tool in project management both for team communication and time management. [41]

3.1.3 Brainstorm

Brainstorming are timed session, involving one or multiple participants, aiming for the prolific generation of ideas, questions, subjects, or any targeted content.

In order to have a successful session, an empty support should be available to help collect the information rapidly generated. Thanks to a trustful atmosphere during the exercise, the lack of judgment allows the brain to amp up its generative part and turn down the evaluative part. [25, p. 41]

3.1.4 Peers review and story share-and-capture

Feedbacks and reviews from peers are essential to adopt new point of view or even collect valuable knowledge, regulations or innovations concerning the domain of study and the project. [25, pp. 23-24]

In order to fully benefit from reviews and feed-back both parties should be open to a dialogue and be attentive to the shared information without personal judgement, allowing clear result on the project.

3.2 Market research

3.2.1 5W+H

Who, What, Where, When, Why and How. This set of questions is used to define the context of use of a product or service to fit the user, their activities, tools and environments. Centred around the users this methodology can help for problem definition or to assure a good user experience. [42]

3.2.2 Markets/Competitors product analysis

In order to position a product or a service it is necessary to identify the market and existing competitors. Market analysis is required to define the approach to the users. In complement, the study of competitors (their product, reachability, numbers) can help identify characteristics such as product/service strengths and weakness.

Further on, with better knowledge of a market it is then possible to do segmentation to adjust the offer and open market niches. [43, p. 49]

3.2.3 Exploratory research: group talk and survey

Group talk can be formal and unformal. Formal in the beginning, they are conducted as debate around defined subjects with the goal of creating as much aperture to widen a subject, tending to become unformal. The created connections suggest new exploratory road to answer a problem and stimulate creativity. Because of this loose setup this type of dialogue are very useful in the beginning of the design process.

Surveys are rigid questionnaire attempting to collect information in a quantitative and formal way (post mail, internet, phone ...). Questions are organized in sections and allows multiple type of data collection from “multiple choice check list” to “open answer”. Clarity, length (time to fulfil), and flow are the three pillars of a good survey. [43, p. 69]

3.2.4 Secondary research: empathic interview

The interview is a good way to empathize with particulars or general users. It help engage communication and confront point of view in order to maximize the intended results.

Interview can be scheduled and very formalized, some time with the benefit of clarity. Some other time they can be spontaneous short “intercept” which are often informal but can help collect natural answer and create a trustful engagement between the interviewee and interviewer. [25, p. 3]

3.2.5 TAIDA

TAIDA is a methodology focusing on contextual scenario. Organise a five steps framework, the TAIDA model sense the environment to identify alternative future development for project.

- Tracking: trace changes, opportunities and signs of threats in an ever-changing environment.
- Analysing: analyse consequences of change to generate scenarios.
- Imaging: identify possibilities and generate desired visions.
- Deciding: consider information to build up strategy and realize choices.
- Acting: define goals and steps to follow up with actions. [44]

3.3 Comparison

3.3.1 Cultural

Culture is at the base of the designer knowledge and can, at the same time, create a boundary. Inspired by cultural comparison, the designer is able to empathize with population or community in order to answer problem or suggest innovative approach. Sometimes, the designer needs to jump cultural dogma to initiate a dynamic momentum. Some other time, the designer needs to use cultural knowledge to evaluate concepts and adapt the delivery.

3.3.2 Domains

Compare notions from different domains helps to bring perspective on elements like methodology, technic or semantic. It helps to adopt an agile posture and add cross-knowledge to the project. Shifting with the point of view, domain-based comparisons can help the designer find new ways to answer a problem. For example, in a team, the designer consults experts to learn from their process, enabling a study through new angles. This can be helpful in the early stage of a project or for problem solving.

3.4 Ideation

3.4.1 Statement

In the process of creating, formulate a statement is a way to anchor a context and insure an outcome. It is a way to explain the reason for a creative approach and it will support the final delivery by being a reference point in the design process.



Figure 11 - Jonas Bohlin's concrete armchair as "spatial installation", produced at Källemo AB Värnamo, Sweden ,1981

The design statement acts as a tacit mutual agreement between the user and the designer, where each agree on appreciation and tolerance of ideas.

3.4.2 Feedback Capture Matrix

Feedback capture matrices allow quick organized and visual representation of feedback [25, p. 65]. The matrix itself is made of two axes creating four quadrant:

- Upper left quadrant: Things one finds notable represented with a **plus sign**
- Upper right quadrant: Constructive criticism or wishes represented with a **triangle**
- Lower left quadrant: Question raised represented with a **question mark**
- Lower right quadrant: Spurred new ideas with a **light bulb**

3.4.3 Mind mapping

Popularized by British psychologist Tony Buzan (1942-2019), mind mapping is the visual organised representation of ideas. From the initial core-idea, placed in the centre of the area, ramification of branches representing new ideas are added. And from those ideas, spring new ideas and so on ...

A mind map is useful during problem solving or creative activities like brainstorm. The neuron-shape of the mind map ease the study of concepts and how ideas are interrelated. [45]

3.4.4 Mood board

Mood boards are support for the expression of: emotion, atmosphere, idea, material (Figure 12). Made out of word or visual material (image, video, ...) the mood board centralize inspirational content useful to the understanding or generation of concept. [43, p. 78]

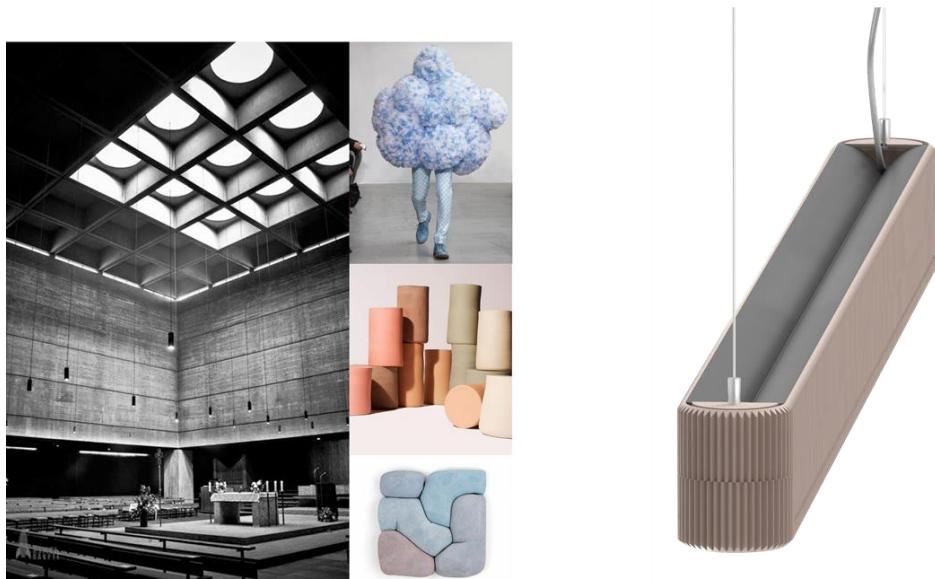


Figure 12 Moodboard (left) resulting product: Kedr luminaire designed by Aymeric Marie-Rose (right)

3.4.5 Sketching

Sketches are freehand rapid drawing. Not only used by designer, sketches are a way to communicate. Throughs sketches idea, message, problem, detail or any data can be laid on a paper to record or to develop.

All along the project, sketching is useful to communicate, especially in remote communication, to ideate or even evaluate. [43, p. 34]

3.4.6 Mock-ups and prototype

Mock-ups are quick and efficient of concepts. Mock-ups can be used to answer unclear communication, answer question and even unlock a “stuck” design process.

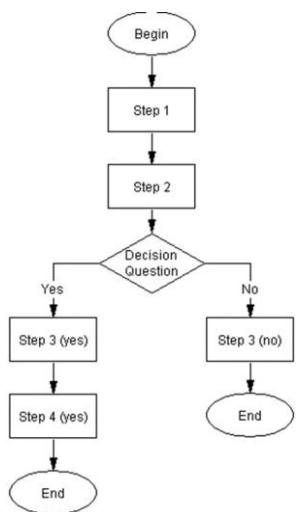


Figure 13 - Mock ups for the off Grid Lamp from Austrian designer Klemens Schilinger

Generally, prototypes are tools used to test aspect of concepts for internal use or even as a support for data collection. Focus on a special aspect of the concept dimensions, material, functionality, the mock-up needs to be made in a way which allows it to maximize the ratio feedback/building time (Figure 13). [25, p. 57]

3.5 Engineering design

3.5.1 Step diagram



A step diagram is a visual description of a process. It allows the study of the actions, choices realized from the beginning to the achievement of the procedure. In the diagram:

- the **beginning and the end** (achievement) are oval,
- **steps** are square,
- **decision** leading to alternative path are diamond.

Step diagrams or process diagrams are used to explain, clarify or optimise procedures (Figure 14).

Figure 14 - Step Diagram sample

3.5.2 CAD – Computer Aided Design

CAD, Computer Aided Design is a technic used to produce two- or three-dimensional technical drawings. Through a CAD software like SketchUp (Freeware) or AutoCAD (Trialware) the user can create forms and convert them for display (rendering), test (3D printed prototyping) or review (detailed drawing). Each software comes with pros and cons, letting the freedom of choice to the user for optimised workflow (Figure 15).



Figure 15 - CAD model (left) rendered model (right)

3.5.3 Physical model

Physical models are useful both for test (user group feedback) and final delivery. Like the mock, a physical model can take advantage of scale and functionality (functional model). Generally more finished and detailed than a mock-up a physical model can be judge on aesthetical criteria due to its proximity with the final delivery.

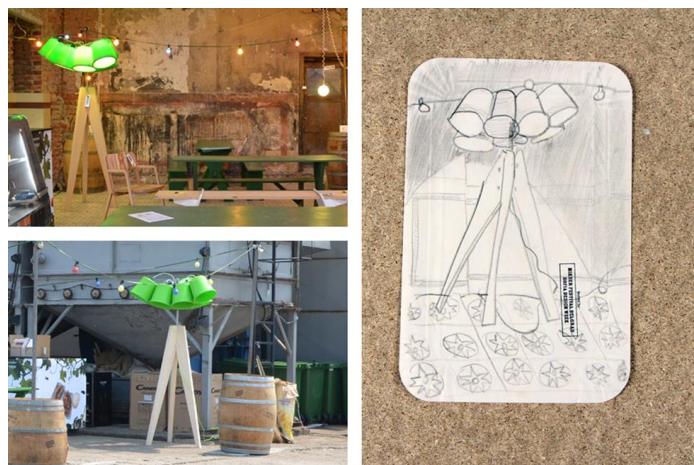


Figure 16 - breadedEscalope's light emitting fake plastic tree, Vienna Design Week Embassy 2011 (left: model right: sketch)

3.5.4 **Eisenhower Matrix**

The Eisenhower matrix is a prioritization tool that helps prioritize tasks on their urgency and importance. Named after the former US president Dwight D Eisenhower (1953-1961), help match actions to priority level. The matrix is divided in four quadrants by x (Urgent) and y (Important) axis (Figure 17)

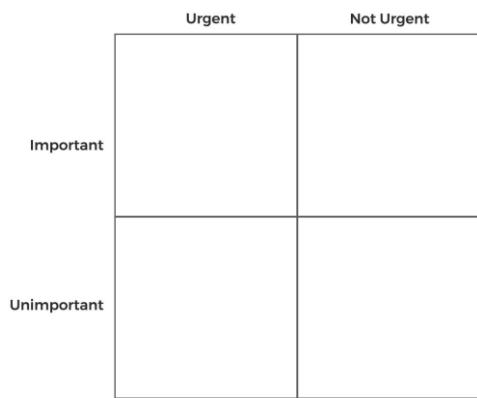


Figure 17 - Eisenhower matrix template

Upper left quadrant: Urgent and Important, the task needs to be done as soon as possible,

Upper right quadrant: Not Urgent but Important, the task needs to be scheduled and followed,

Lower left quadrant: Not Important but Urgent, the task needs to be delegated or simplified (next time better planning required),

Lower right quadrant: Not Important and Not Urgent, considerate supressing the task

4 Approach and Implementation

4.1 Open Brief

Early in the setup of the master thesis, the meaning of the final examination (for the graduating student designer) has been addressed during talks with Martin Schnabl from breadedEscalope. Apart from the standard aspect of the scholar assessment (technical and knowledge validation through framed work) which every student has to go through, the thesis is for a student the last “hand-held” work in autonomy. “Hand-held” for the meaning of possible re-evaluation and possibly last field project where direct economic benefit is not the main success criterium.

The conversation highlighted the deep impact on the designer’s career as:

- an ambitious individual stepping in the professional circle,
- a creative defining her/his line of sight,
- a scholar with perspective on the acquired skills and competences.

As an alternative to a “standard” thesis, this project started from scratch. Each steps of the creative process have been discussed while acting and then implemented with review. Through the problematic formulation, the approach to the product has allowed to answer research questions with materials taken from mixed domains (engineering tools, design knowledge and process).

This approach is an opportunity to put the student in a “free” position allowing him to choose a path of study in collaboration with the design studio (referred previously). The choice of this approach was motivated by the previous experience of the three founder designers of breadedEscalope: Sascha Mikel, Martin Schnabl and Michael Moser (Tatschl).

The design studio is organized around self-initiated projects; therefore, Martin Schnabl has been the main reference during this thesis.

4.2 Collaborative organization

As a result from introduction talks (between December 2020 and January 2021) with Martin, the Collective Desk project was selected as a reference to explain one of the studio collaborative work and approach. Based on this, tools and frame were identified for remote collaboration throughout the thesis project.

To kick-start the first phase of work, we scheduled weekly meetings starting on the beginning of January and chose to work through a virtual whiteboard platform: Conceptboard². The platform was used as a support for the Collective Desk presentation and would be later on, used as a canvas to keep updated information, free references and products. Limited to 600 items (a character is 1 item) for a free account, the content was regularly saved as .pdf format to counter-balance this constraint. We finally abandoned the platform after this introduction phase because of this (low efficiency process).

² <https://conceptboard.com/>

4.3 Gantt Schedule

A Gantt Schedule was made to communicate deadlines, follow up with work progression and transition through phases (Figure 18). It was a useful tool to estimate time and communication constraints such as overlapping scholar work in the beginning of the thesis work (IKEA project, and other).

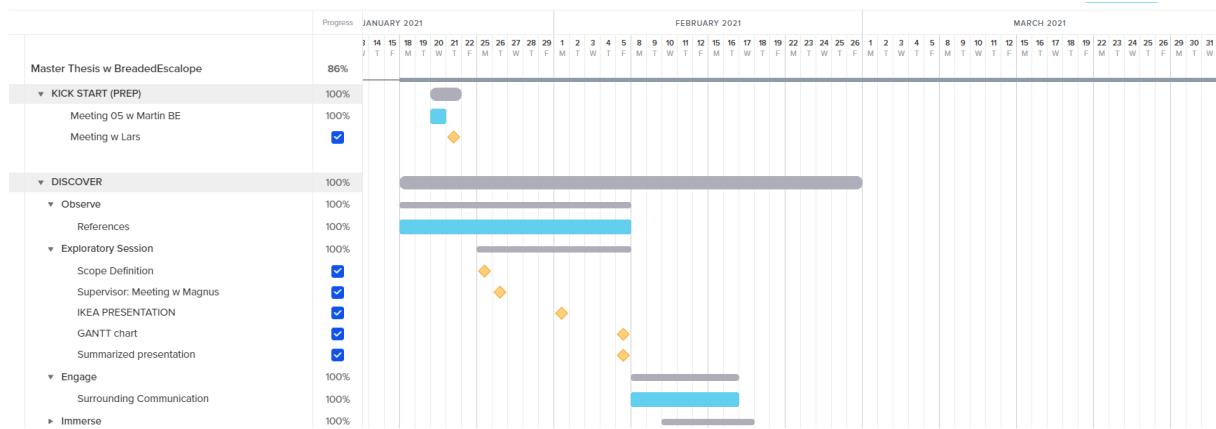


Figure 18 - Sample of the thesis Gantt Chart (platform: Teamgantt.com)

From a macro perspective the Double Diamond process would suit starting with an initial Discovery phase leading to a problematic formulation. Then followed up with Define and Develop periods in order to Deliver.

From a micro perspective, the Design Thinking methodology will be implemented through macro phases (Appendix 1- GANTT Schedule).

Due to the large initial scope of the study, using the two similar methodology helps structure an overall timeline to implement with more precise tools (market or user-centred tools).

4.4 Discover

The discovery phase was a **theoretical** phase rich in knowledge and dialogue. Based on a personal wish, the aim of the phase was to generate a **problematic** mixing domains, civil engineering, architecture and design.

The first step was to understand the motivation behind the Collective Desk and taking inspiration from it. It would then allow the gathering of additional references and then an exploratory session of domains.

4.4.1 Collective desk

The Collective Desk was started in 2014 in collaboration with Neuen Wiener Werkstätte, with leading questions such as: How sustainable are the objects that surround us every day? Where and under what conditions are they made? Where do the resources come from? How many working hours are in it?

Interface between the public and the producer, the studio worked on current production methods and consumer paradigms. Mock up and prototypes were done during workshops, leading on a period of test and feedback from the studio and key member of the community (Figure 19). The next step was to transmit the prototypes to NWW, to develop, compare and optimise them with the resources available from producer point of view.



Figure 19 - Collective desk's workshop and prototyping session, 2014

The final product was a table answering the question of the public needs with lack of space: “How to work at home?”. Way before the pandemic crisis, the need for agile or/and sustainable furniture were formulated for both private and professional space [46]. More than only a surface, the desk evolves to offer possibilities (i.e. storage) by making use of the space above and below the counter.

4.4.2 TAIDA

The goal of this TAIDA analysis is to find out current change in relation with the values and ideas developed in the reference project.

4.4.2.1 Tracking

Aware of environmental crisis and the need for mindset shift, consumers are bounding with new ways to consume and put more attention on their position between tangible and intangible worlds.

Circular design

The core idea is the step out from a linear model where goods are produced from extracted resource, sold for consumption and then thrown-away at the end (sometimes before) of the line. [47]

For example, companies like 57st. propose to consumer to collect back their furniture against a voucher on their next purchase on their shop. “Circulated pieces” as they call them on their website are restored to their original condition to: “To create a system in which furniture is never discarded nor destroyed, but rather circulated from home to home” [48].

Another interesting initiative is from the OS_Studio, a creative studio who behind its Open Structures platform, promote creative circular material flow and re-use/repair through an open and accessible database of parts, for event or project. On the long run the goal is to establish a balance between openness, fairness and economic viability, for both contributors and community. [49]

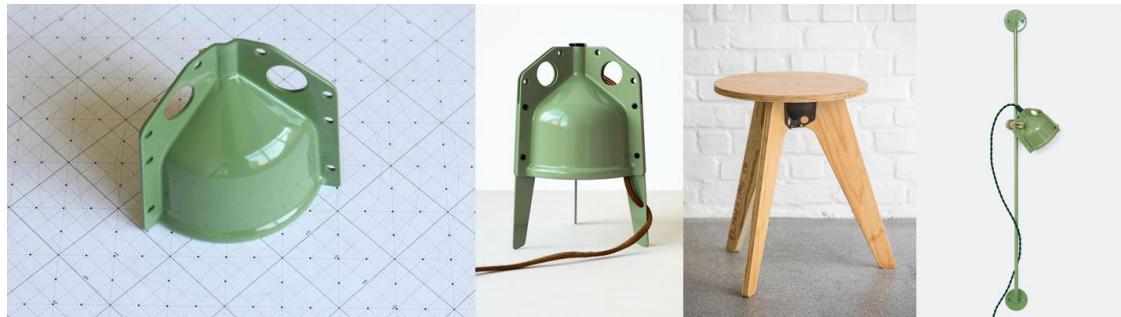


Figure 20 - Connector by OS Studio(left), used for 3 products (right)

Self-care

In 2021, a little bit more than one year after the spread of the COVID-19, vaccination programmes are implemented all around the world to protect population, relieve healthcare service for stability and a first step toward a post-pandemic life. However, in 2020, in the middle of the crisis, voice rose-up to ring a bell concerning the non-direct effect of the pandemic and the potential side effect threatening population and lock-down plan: mental health. [50] [51]

During this pandemic, a lot people all around the world connected back with notions which was on the try-out or long-forgotten: quarantine, routine and self-care. As an example, in South Asia (Asean), nine million people die due to lifestyle related diseases each year. Add up to pandemic restrictions, the result is an important rise of e-commerce for selfcare medicines. [52]

Aside from self-medication and to balance with the stress of challenging time, people find ways to act upon their direct environment and mindset. Literature and internet offer a plethora of solutions to foster restorative indoor environment [53] or to practice mindfulness to cope with COVID-19 and reduce stress and anxiety [54]. The behaviour induced by the pandemic, echoes strongly to Louise Byg Kongsholm, trend forecaster, author, own and director of the Scandinavian trend institute Pej Gruppen. In her talk, at the Stockholm Furniture and Light Faire 2020, she identified 8 global megatrends, which some, in early 2020 strongly corroborate the healthcare assessment to come during the pandemic: 1) Transformation economy, 2) Luxury, 3) Sleep renaissance, 4) Mental health, 5) Combating infobesity, 6) Seeking, silence, 7) Radical transparency, 8) Sensory immersion. [55]

4.4.2.2 *Analysing*

In challenging environment and context, people tend to seek solution through changes. Aware of alternative, consumers switch their consumption habits and behaviours to adapt to their new

lifestyle. More than ever, products are tacit agreements between producer and consumer for result and impact in a global context.

- **Modularity**

Global warming and environmental awareness pushed people to question their choices: transportation (public transport vs individual car), food habits (organic, local production), healthcare (holistic medicine, self-medication) ... As a result, notion like product's "life cycle" (the study of a product from resource extraction to end of life) or even resiliency (the ability to return to original state and shape quickly) are no more specialised and becomes common knowledge for population. As a result, solutions are explored through adaptability and agility. Setups able to quickly adapt to situation and belief further away from the single use, single function and finally, rigid propositions.

- **Trust**

The question of trust is a forever subject in the Human scope. From relationships to self-perception, it is a strong and important driver for decision. Government, communities, companies, and so on, designers are both trust seeker and generator.

More than ever, designers are stakeholders in a global context, to adopt human centred position. Which means, being a force for proposal while being aware of their consequences. Customer don't only put their trust in products but agree to the beliefs surrounding them. In order, to build up healthy relationship companies work together with designer to adopt transparent position, from the meaning to the production and delivery.

- **Accessibility**

Alternative to individual possession are explored several sectors. The product is transformed into a service, allowing it to challenge individual use and ownership to become a shared possession. Question the access to goods and service.

Before, level and quality of consumed goods where directly link to financial representation. With the raise of alternative like leasing (car, fashion, light, ...) or circular system (transfer, refurbishment, ...), the boundaries of the ownership are blurred and constantly on a shift.

4.4.2.3 *Imaging*

Today, the challenge is to create objects that last. Last because of good function, because of adequate material quality, because of thoughtful engineering, basically last because of "good design". Nonetheless, it seems reductive to qualify it as a modern problem, ignoring the subjective nature of "good", the broad spectrum of what is Design and paradoxically trend's phenomena.



Figure 21 – Espace sonore from Matali Crasset, Table equipped with a gramophone cone)

In an interview for the French radio station France Culture following the release of “*The drawing Center – Les trognes*” published by Les presses du réel in 2020, the designer Matali Crasset gave her vision about the creation of object: “The object should be revealing **potential**, that is to say not to lock up in a function [...]. To reveal more potential for action, for evolution and for potential **emancipation** [of the customer].” [56]

To reveal potential is to dive in the core of creativity, which is the association of meaning, domain, subject, ... resulting in original and unusual possibilities. A way to proceed as follows is to seek for new meaning. In his book “Design-Driven Innovation” published in 2009, Roberto Verganti identifies several ways to reach radical innovation. However, all of them gravitate around the search for new meaning. The identification of potential comes with additional signification and consequently, new meaning for people. [57]

4.4.2.4 Deciding

To work on the idea of meaning and identify new potential it is interesting to associate ideas from the previous part:

- Object dynamic,
- Dialogue,
- Possession,
- Perception,
- Habits,

4.4.2.4.1 Acting

To start up the research for potential we will draw inspiration from other domains, to adopt an original point of view and then proceed to additional experiments.

4.4.3 Engage – Group talk

Inspired by the collaborative approach implemented for the Collective desk, communication was engaged while realising the TAIDA research.

To communicate around the project and raise idea and from a diversified group, the studio breadedEscalope had first pre-engage the community through the project “Misfits revisited”, where workshops were used to immerse people in the prosumer mindset and keep contact with them through a mailing list. Then the opened the website for Collective furniture to call out for crowd participation. The website was the main platform for event communication, organisation and ideation.

Because of limited resources, the platform Discord³, a virtual chatroom (written, voice, video chat), was used to gather 13 peers with engineering background (civil engineering and mechatronic) to debate around notion like: Object, space and use. It rose opportunities to talk about the open brief, allow them to suggest ideas and share anecdote and personal experience.

Thanks to the mixed background, while talking about: object dynamic, human dynamic and habits, most of the perspectives gravitated around the act of using a product or a service in a spatial context. The discussion lead to creative output questioning the relationship between the type of product use in a specific type of space, almost balancing between experience design and space design.

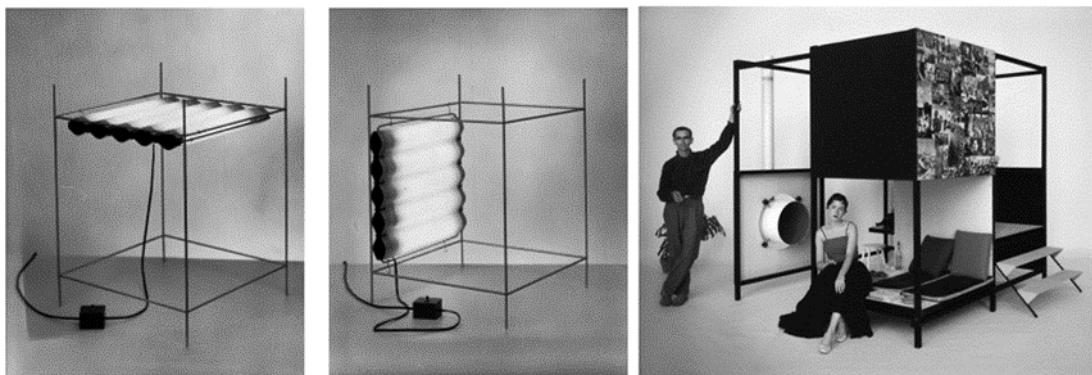


Figure 22 – Ken Isaacs, lamp design, 1953 + Ken and Jo Isaacs in the Cranbrook living structure, photographed for LIFE

³ <https://discord.com/>

4.4.4 Domain Comparison: Transitional space

In science, scale is generally defined by a size comparison between a subject and a reference. The ratio between the measurements is an indicator of scale. In architecture, it covers three different concepts: “human” scale which refers to human size, “contextual” or “outer” scale which is in the context of the building and “inner” scale, which concerns the building and its own components. [58]

In design, we use a mix of both knowledge to frame our study or project. In human centred design the reference is the human. Service are built upon the capacity and people's need. As for a building, a product will have a main function and overall dimensions according to its purpose and intended experience.

In architecture, transitional spaces are described as junctions. They are the merging point between two defined spaces. At a city scale, it would be the outskirt of the city used for several activities from industrial to habitation. At a building scale it could be a corridor, joining main spaces. Because of the unspecific function of transitional spaces, they are considered as “Spatial opportunity”. The “Grand Paris” project is a great example of how by remoulding the city outskirt and increasing connection it is possible to breath in new dynamics to the city with socio-economic impact. [59] [60]



Figure 23 - Visual communication campaign for the Grand Paris Project (VINCENT ISORE/IP3/MAXPPP)

As a designer, it is also possible to use it as a prism of study: What do transitional space would represent from our perspective? Transition could be identified in the consumer habits, in daily life. Observe how change can be implemented in the human behaviour, to nudge better habits or raise awareness about subject. Recently efforts have been focused on the impact of people life style on the environment, and on how from a general effort and small contribution it was possible to affect it.

4.4.5 Ideation 01

In the continuity of the TAIDA analysis and group talk a small group brainstorm (Figure 24) has been done to emulate ideas. The chosen theme was: “What object do we find outside and not inside and vice-versa?”



Figure 24 - Brainstorm board

An interesting conclusion to this activity was that a lot of the founded objects were the same regarding their function or scale (i.e a sofa can be translated as an “indoor bench”). Some other, were anchored in an indoor or outdoor environment, such as the “umbrella”. The “coat rack” caught the attention because of its very limited function and how restricted its usage seemed to be. Barely seen out of the indoor context, the coatrack is often invisible, yet useful. Additionally, it is easy to find optimised alternative like wall hangers or closet.

Rich from inputs, a work of ideation was started and recorded through a table. The ideation was centred around the idea of influencing a public through an object switching the norm of use.

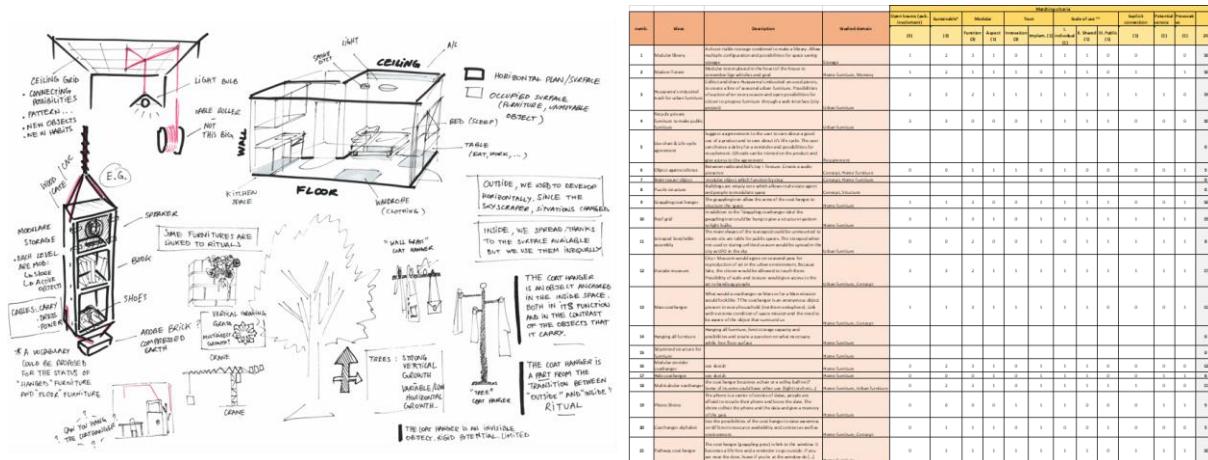


Figure 25 - Sketch from Ideation 01 and ideation table with grading system (in yellow)

This way, twenty one conceptual ideas were generated, occasionally implemented with quick free hand sketches (Figure 25 ; c.f Appendix 2 – Ideation Planche 01 and Appendix 3 – Evaluation table).

To proceed to the analysis of those ideas, a rating table was created to rate the relevancy of the concept to the previous highlighted notion from the Collective Desk and the TAIDA analysis:

Table 1 - Concept evaluation table (grading system)

Open Source	3	
Sustainable	3	
Modular	Function	3
	Aspect	3
Trust	Innovation	3
	Implementation	1
Scale of use	Private individual	1
	Private shared	1
	Public	1
Explicit Connection		1
Convertible into service		1
Provocative		1
	TOTAL	20

4.4.6 Object and problematic

Conclusion from discovery phase:

- As the TAIDA analysis suggested, modularity, trust and accessibility seemed to echo the subjects of circular design and self-care. Consumer becomes active in their research of new product matching their belief, while searching a better balance in their active daily life.
- Group talks suggested a link between space and object usage questioning the notion of experience and object design
- Crossing domain reference showed that in order to affect structures the notion of scale was necessary, ensure an adapted impact on a space momentum (transitional space)
- Ideation 01 helped conceptualize information and highlighted potential object for study (brainstorm)

After considering the result of the different steps through the discovery phase to decision were made according to the featured subject of this thesis (cf. 1.2):

Formulated problematic: *"Between spaces, how to enhance the user's relation to its daily environment?"*

Chosen product for study: Coatrack, for its potential both on user habits as a space marker and cultural element (strongly used in continental environment dependant on season change)

4.4.7 Evaluation 01

The first concept evaluation consisted of a feedback session from the design studio, matching with the Mid-Presentation taking place on week 11. Both evaluations where realized remotely, with screensharing tools (Microsoft Teams⁴ and Google Meet⁵)

Martin (breadedEscalope):

- Research phase supported by strong references,
- The formulated problematic is broad,
- A choice needs to be made on which concept to pursue with,
- Create a story behind the concept.

⁴ <https://www.microsoft.com/en-us/microsoft-teams/download-app>

⁵ <https://meet.google.com/>

Mid-Presentation Supervision:

- Interesting concept formulation,
- A market should be identified and studied,

4.5 Define

Based on the feedback from Evaluation 01 (cf. previous part, 4.4.7), the define phase was a creative part where the chosen concept was looked through.

It started with the implementation of a market research to clarify the concept and help push it further. Followed with ideation iteration to explore the area of the coatrack and help building a narrative.

4.5.1 Base concept selection

The following concept (Figure 26) is finally chosen to continue the study as a base and work on the definition of the coatrack and its signification.

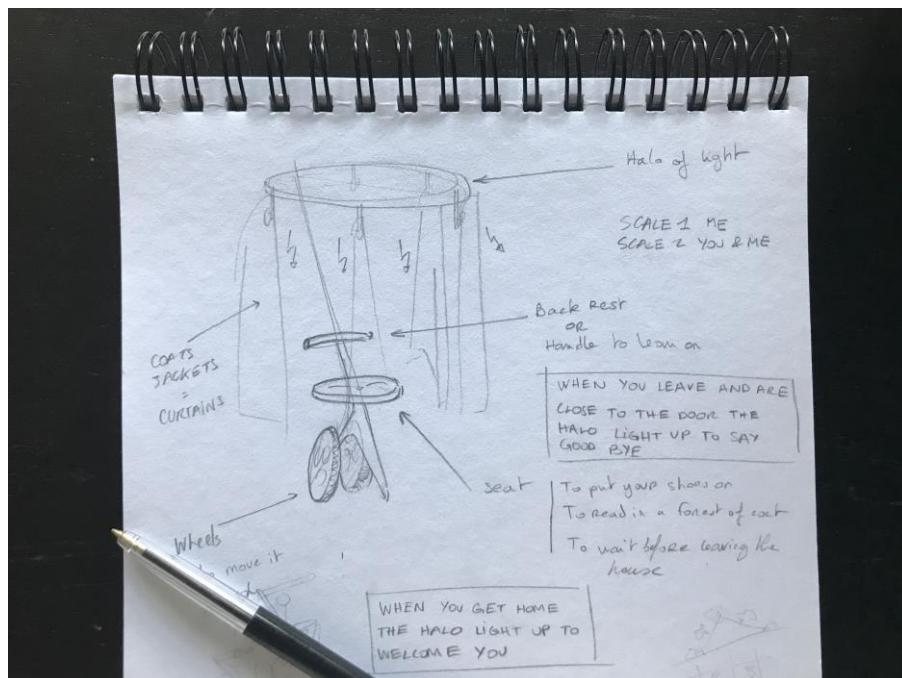


Figure 26 - Quick sketch coatrack concept, choice of the Discovery phase

The concept 01 was described as it follow during the mid-presentation:

- The choice is to explore the potential of the coatrack, as a meaningful object and as an anchor in the home transition,
- To mark and affect the momentum with which everybody lives. Potentially enhance people habits, and make the transition in space a trigger for intension and sensation,
- Interaction with the coatrack could engage short light therapy, for relaxing or other use,
- Mobile in the entrance, the object is not fixed and from passive become an active furniture for open usage.

4.5.2 Market research

4.5.2.1 Survey

A survey (Figure 27) was realized to collect data from users. Influenced by the concept, the survey was divided in 3 parts and 35 questions:

Individual information: age, gender, profession and family related questions.

Household layout: type of habitation, interior layout and entrance logistic (shoes, jacket, accessory storage) related question.

Health and habits: working habits and self-evaluated stress level (daily life, work meditation) related questions.

The screenshot shows a Google Form interface. At the top, there is a small video thumbnail of a person sitting at a table. Below it, the title of the section is 'Leaving and entering back home (house habits)'. A red asterisk indicates it is mandatory ('*Obligatoire'). The next section is titled 'Household organization' in a pink header. A question asks 'In which type of housing do you live in? *'. There are three radio button options: 'Apartment', 'House', and 'Autre:'. A text input field is provided for the 'Autre:' option.

Figure 27 - Survey question sample (Google Form)

The survey was created to take more or less 5 minutes to be done (tested and time recorded by peers). Two version of the survey were created. The thesis taking place in Sweden and due to the international nature of the program, one version was made in English. Another version was translated in French to be shared in a short amount of time to most people. The survey was then transmitted via the tool Google Forms and stayed open during 2 weeks (Appendix 4 – Survey questions).

In total 89 answers got sent back: 34 from Sweden and abroad (Spain, Denmark, Austria, Hungry, Germany and India) + 55 from France. The collected data were then mixed and treated with an Excel sheet. Pivot Tables were updated to generate Pivot Chart around the emerging pattern. This pattern helped to create market personas.

Below a list of the conclusion made from the survey result:

Survey methodology and result:

- Quantitative questions were effectives but when put on a wide scale (1 to 10) the freedom of the answer led again to broad distribution,

- Most of the participants are aged between 18-35 years old (89%)
 - Half of the 18-35 y.o is working, the other half studying,
- In general, the attention put on the jackets is very low compared to the shoes: “You can keep your jacket on but get your shoes off before getting inside”
- Most of the population have a defined entrance where functional furniture is present. Depending on the flow, multiple type of the same furniture are present (closet, wall hanger, coatrack),
- Average household store 3-5 jackets in the entrance 5+ depending on the household (single and share habitation),
- Even if the entrance is an important part of the house, it can be improved.
- The office or work-related content are brought back in the house, the feeling is shared by both active and student.
- The stress level results vary on a broad scale, making it hard to exploit the data.
- Most of the population know about meditation or mindfulness, the majority would like to practice more.

Hypothetic profile created on from survey:

- Single active from 18-35: Household vary, the furniture needs to save time, functional aspect, open to alternative solution for well being
- Couple of active 18-35: Household composition is increasing, search for aesthetically pleasing furniture, safe to use and need to improve the entrance with functional aspect.
- Couple active 35-55: Stable household, a minimum of functionality is required, safe to use and open to alternative solution for wellbeing.

4.5.2.2 Competitors and story influence

The coatrack is a home furniture which can be found in a lot of furniture supplier, hardware store and sometimes grocery stores. As a base element of homes and offices it is possible to find multiple type of coatracks or even ways to store and hang coats.

Through the competitor analysis, three products and two concepts have been identified. For the products, their production, their price and descriptions helped to understand the targeted market. The concepts, were used as influence based on the domain comparison, to consider the potential of special experiment on mindsets.

Products

The main compared products were:

- Ikea NIKKEBY and PINNIG collections (599 to 799 SEK)
- Pallucco ALBERO (15 000 SEK)
- Seray Ozdemir CORRIDOR SOCIETY (Graduation project)

While comparing the product one evident difference was the price range. Even though, each product used similar material, lacquered metal tubing and sometime wooden part for the seat the attributed value highly differs. One hypothesis is the targeted market and so on the selling company. Ikea's goal is to mass produce product while intern quality requirement. Because of their Brand identity and market (the everyday people), the gain will be made by selling the maximum of product according to their production.

Pallucco is an Italian company (created in 1980) working in the field of “design culture and experimentation of art, architecture and design”. As it is possible to read on their website, the focus is put on creating advanced and iconic piece of furniture. [61]

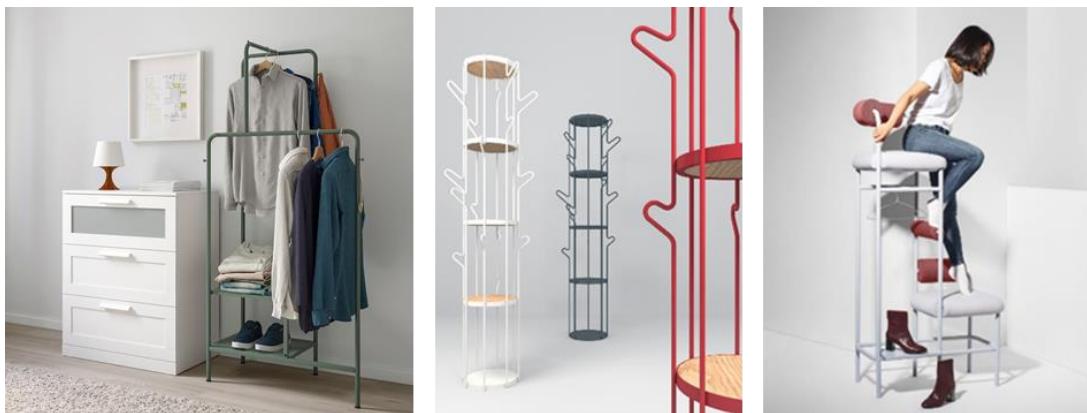


Figure 28 - (left) IKEA's NIKKEBY coatrack; (centre) Pallucco's ALBERO coatrack; (right) Seray Ozdemir's CORRIDOR SOCIETY coatrack

The description of the product will follow the intended story of the product. One one hand, Pallucco put the attention on the collaboration with the Italian designers and with the poetic approach to the product. The product is almost alive in the description and put here at your service. On the other hand, Ikea make a strong statement on the good-looking, yet useful coatrack. The product doesn't exist outside of its purpose and gain value because of its technicality (Figure 29).

The coatrack developed by Seray Ozdemir on its side, aims to suggest alternative interpretation of the furniture. By using the product, the user has the possibility to change his space perception and home layout, heading for higher perspective to connect back with their “domestic selves”. [62]

Designer:
Pio and Tito Toso

Year:
2019

Albero, a project with a linear and essential design. Its slim and minimal silhouette evokes an image of great poetic charge. The graphic design of Albero blends the function of the coat hanger with that of the shelf container, transforming an everyday object into a delicate sculpture.

[Request more information](#)

Figure 29 - Albero's product description on Pallucco website (pallucco.com/collection)

These elements suggest strongly that the brand identity (story, ambition, reputation), and the story being the product (statement, aesthetic, dimension) influence strongly the perception of the product, almost independently of the material or technicality of product. [62]

Concepts

The main compared concepts were:

- Merry-go-round for the Museum Boijmans Van Beuningen by Studio Wieke Somers (design studio)
- Immersive space series -by Office of Things (architecture and design studio)
- Meditation Space by Tadao Ando (Architect) for the UNISCO Paris

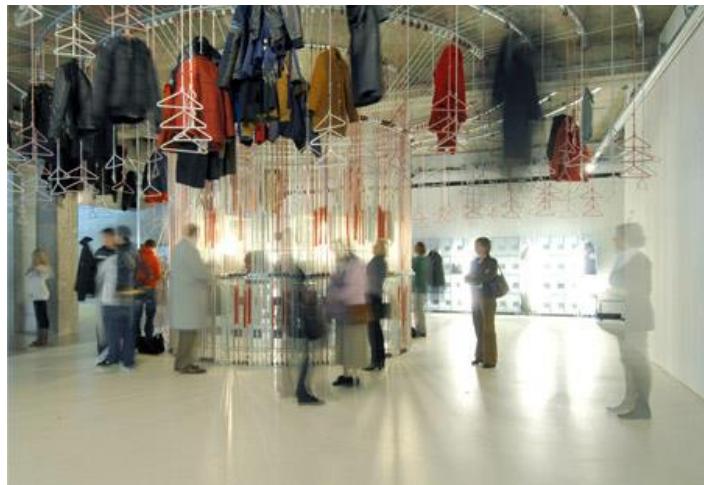


Figure 30 - Merry-go-round by Studio Wieke Somers for BVB Museum in Rotterdam (Netherlands)

These three concepts were chosen because of their space reinterpretation. Compared to the previous section, the story is directly linked to the overall building: museum, offices or cultural entities.

For the Merry go round project, the Dutch studio suggest a playful interaction at the entrance of the museum. Inspired from coal miners, gravity becomes the partner of the coat rack and hanging a coat away from the floor becomes the opportunity to create a “ballet” of clothes with color variation depending on the season. [63]

In this case, the installation and the name itself are obvious “homage” to the mining world and story. A merry-go-round was name given to the cargo wagons loading and unloading coal in the UK during the 60’s.



Figure 31 - Coal wagon and Hanging room in the Mines Museum of Saint Etienne (France)

The two other concepts are well-being oriented. When Tadao Ando offer a sober space for meditation, yet made out of concrete and simply furnished (two chairs), the choice of the position in front of the UNESCO is an echo to the simple concept of peace and inner peace: “Peace must be founded upon dialogue and mutual understanding. Peace must be built upon the intellectual and moral solidarity of humanity.” Affected by the memories of the past (Hiroshima, irradiated granite were used in this project), the Japanese architect invites the visitor to reflect on to adopt a solemn posture and incites a contemplation upon oneself. [64] [65]

As a more pragmatic approach of space, the studio Office of Thing used narrow space to cover them with artificial light and a décor. The goal? Nudge well-being if tech companies offices to help employees to show proof of self-awareness, reduce the stress level and meditate for better focus. The womb created feeling and the gazing effect induced are at first sight against the flow of the “over challenging aspect of big companies. The immersive space series become an entry to “shed the literal and figurative noise of the office and outside world”. [66]

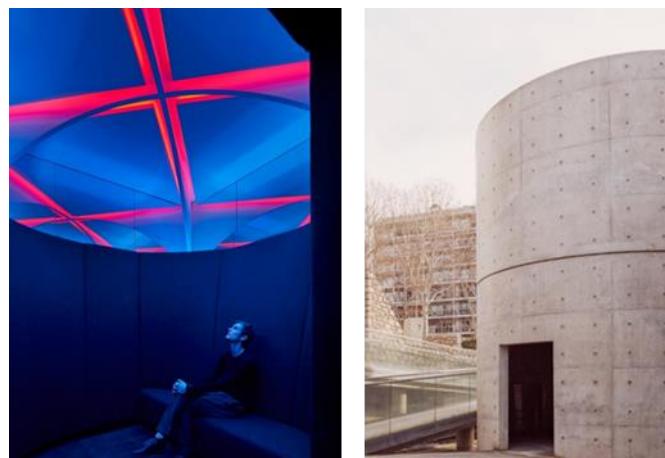


Figure 32 - (left) The chambers by Office of Things; (right) UNESCO: Meditation Space by Tadao Ando

4.5.2.3 5W+H

From the initial idea the 5W+H were answer as it follows:

Who? Everyone (by the persona profiles created previously with the results of the survey).

What? The coatrack is use for interaction with the user.

What do the users do? The motion of taking out a coat hanger starts a light. Light variation, to encourage the public to take leaving home as mindful exercise for relaxation! Depending on the chosen time they dress or undress and follow their routine. Starting or ending the day with a moment of self-awareness.

Where: In the entrance. The entrance is a transitional place able to affect the user momentum while entering or leaving the house.

When: In the process of leaving or entering the house.

How do they perform those tasks? Follow their routine. Interaction with the coat rack, suggest mindfulness process while in the transition space (entrance).

Why? At work and in daily-life, it is necessary to be over-productive, which can be stressful. To mark the separation between home and outside, is to keep the stress out the healthy home.

4.5.3 Ideation 02: Mimic

During the next ideation part, the 5W+H will be challenged and rethought with new inputs from the survey and competitor study. The goal was to suggest a new iteration from the core idea of the 5W+H and try to fit it as an extension of the Collective Desk.

4.5.3.1 Scenario

An overall scenario was defined based on personal experience and peer talks. Looking at the coatrack as mono-functional object is moving aside object potential. Relatively to the survey, three elements are identified as habits influential in the overall process occurring in the entrance:

- Household composition,
- Moment of the day/year,
- Personal/shared habits,

HABITS



Figure 33 - Classification of habits in the entrance

4.5.3.2 Developed sketch and challenging concept

Digital sketches (Figure 34) were done to challenge the initial concept 01 and brainstorm on iteration, with the chosen theme of “How to affect the process of leaving or getting back home”. Some of the ideas were:

- Puzzle wallrack – **concept 02**: Wall mounted rack. With slots, based on weight-counterweight to carry coats. Increasing the capacity create a corridor of coats,
- Bobby Pin – **concept 03**: A bobby pin shaped coat rack. Each hole in the shape would be used for optimized function with the help of wooden plot. Possibility to set the height of the wooden plot adapted for kids and adults. Additional elements could be added, a movable lamp, in the spirit of the concept 01 (c.f. 4.5.1),
- DIY & modular - **concept 04**: Made with easy and affordable material, the coatrack would evolve with the household, both capacity and functionality wise. Like in the concept 01 (c.f. 4.5.1) a circle of light is present but split in half, making it easy to use against a wall or in a bench configuration.

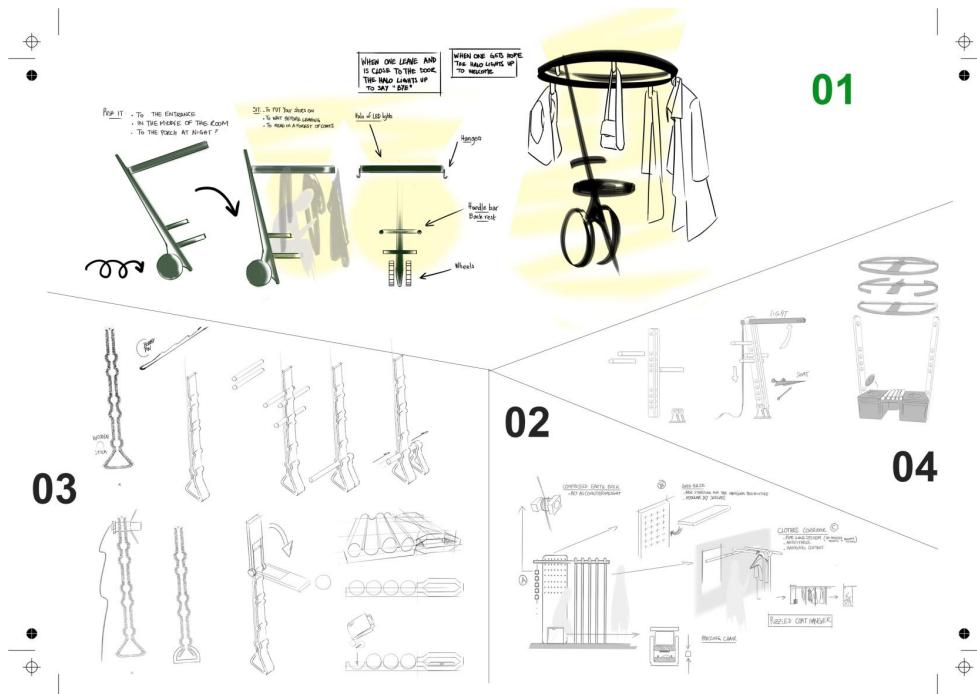


Figure 34 - Concept exploration

The choice was made to pursue with the concept 01 and develop the concept further on through user habits for the functions, mockups for the stability and dimensions.

4.5.4 Evaluation 02

Studio (breadedEscalope): This evaluation was attempted by the three members of the studio located in different location of Austria due to government lockdown regulations.

The talk was an opportunity to present the previous work and collect feedback from the team. A strong emphasis was made on the need to create a story around the product and to start prototyping ideas to help them evolve in the direction of a story. A formulation is required. The iterative sketching is less effective without dimensions or proper focus on a aspect of the coatrack.

- What is the essence of the object?
- Where is the message?
- How could it be made?
- Where is the experimentation of the space?

4.5.5 Project review 02

The define phase of the project helped select a leading concept to follow-up with the next part of the study. Focus on market and concept definition the part allowed to:

- Understand a market,
- Collect date on user habits
- Explore form and materials.

4.6 Develop

Apart from the features listed in the previous part, one of the goal was to fulfill the requirement from the design studio while mixing tools of product development (Industrial Design) with experimentation process (real size mock ups, quick mock up, model). The final design and function chosen for the concept should allow the production of a real size model and “should allow users to experience the product” accordingly to the project delimitation (c.f 1.3 Delimitations)

4.6.1 Step diagram and user talk

Based on the influential concept study from the previous part (c.f 4.5.2.2 Competitors and story influence), a new environment was suggested: the office. Step diagram were created around the process of:

- Entering/Leaving home environment,
- Entering/Leaving office environment,

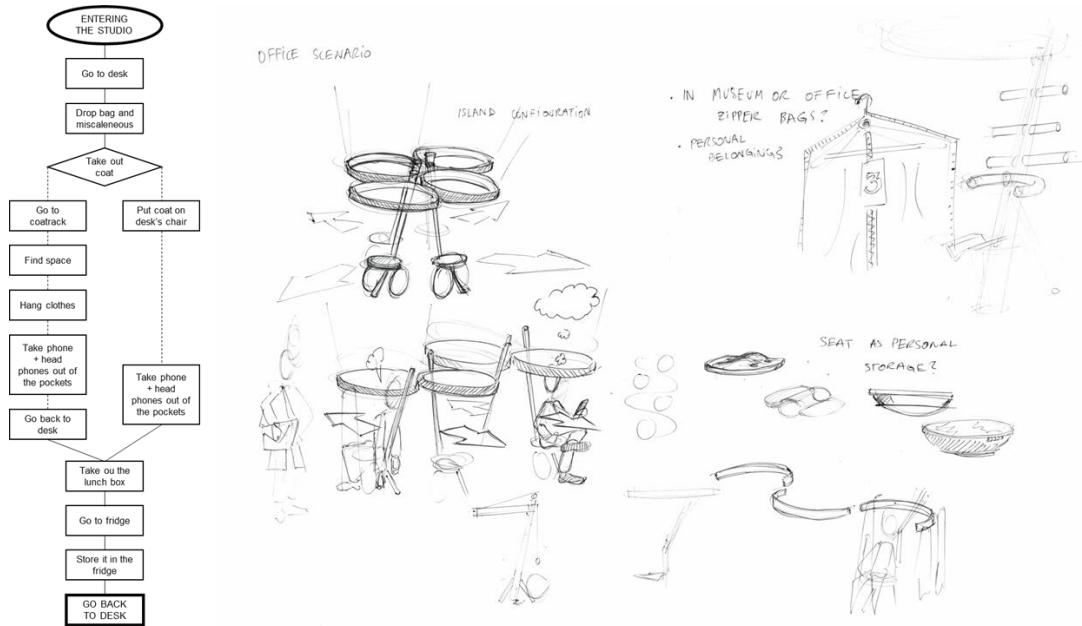


Figure 35 - Step diagram "Leaving the studio" (left) Rough sketching (right)

Step diagram where useful to understand possible scenario. But the nature of the tool, optimization oriented, didn't brought a relevant insight on the concept development.

Rough sketches were made to explore the idea of coat rack formation in a professional environment (**Error! Reference source not found.**).

Group talk realized with students from the school program around the recording () of one of them getting back home to discuss about their habits and why "they do it this way".

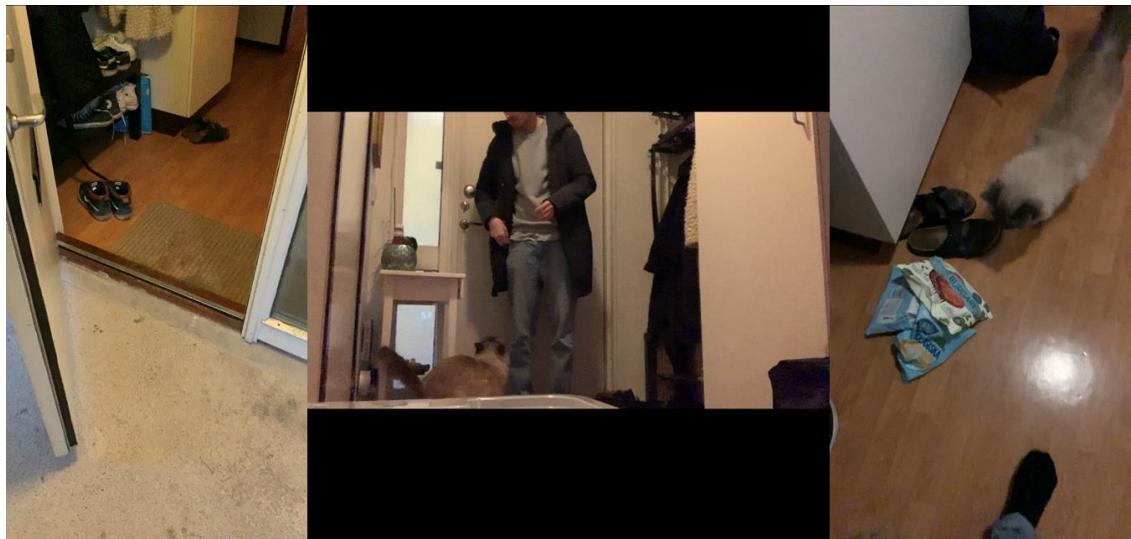


Figure 36 - Sample from the support video recording, "returning home after grocery shopping, floor drop" (left)

The 35 minutes long discussion was recorded and echoed previous hypothesis formulated in Define chapter (c.f. 4.5.3.1 Scenario) concerning the user habits. Two interesting items were discussed:

- While returning home it is interesting to have a “drop off point” to put groceries or bag, avoid temporary floor “drop”,
- Forgetting object is a common problem to put the object next to a mandatory step of the routine can help avoid it.

4.6.2 Real size mock-up + interview

A real size mock was made and 5 students from the program were interviewed about their space perception in the mock up. To quickly setup a mockup corresponding to the sketch of the concept 01, two coat rack, one hula-hoop (90 cm diameter, 10 mm radius), a stool and coat hangers were used (Figure 37). The goal was to recreate the notion of circular restricted space and use ceiling lamp with direct light to collect feedback.



Figure 37 - Concept 01 (left) Real size mock-up (right)

Five students (two men, three women of the same age range) were then proposed to experience the space and environment created by the mock up to give their opinion through 10 minutes interviews (Appendix 6 - Real size mock-up interview (five interviews)). A feed back matrix was then filled with the collected feedback highlighting essential perception of the space for the development of the concept.

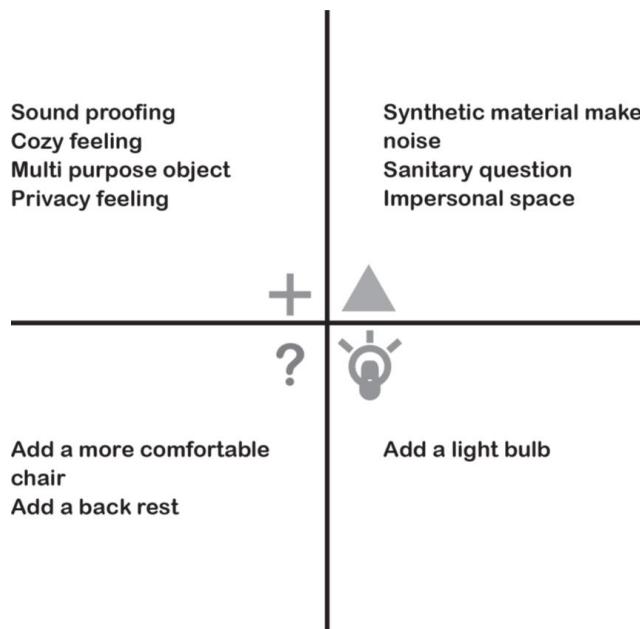


Figure 38 - Feedback matrix from the mock-up user interview

4.6.3 Quick mock up

Early in the discussion surrounding the concept 01, questions regarding the stability were emitted. The coat repartition around a central circle maintained by a titled unique axis made the concept statically challenging (Figure 41). The condition of equilibrium for a structure generally requires it to be balanced, which means to allow the right transmission of torque and other charges affecting the structure. While setting up the real size mock-up installation the light constitution of the hula-hoop (semi rigid hollow light plastic probably made in HDPE) made it bend under the weight of coats and the weak junction between the two coat racks made it fall easily.

Nevertheless, a quick 3D models were CADed and mock-ups were 3D printed in order to check alternative designer for the charge repartition on the structure without affecting the initial shape (Figure 39).

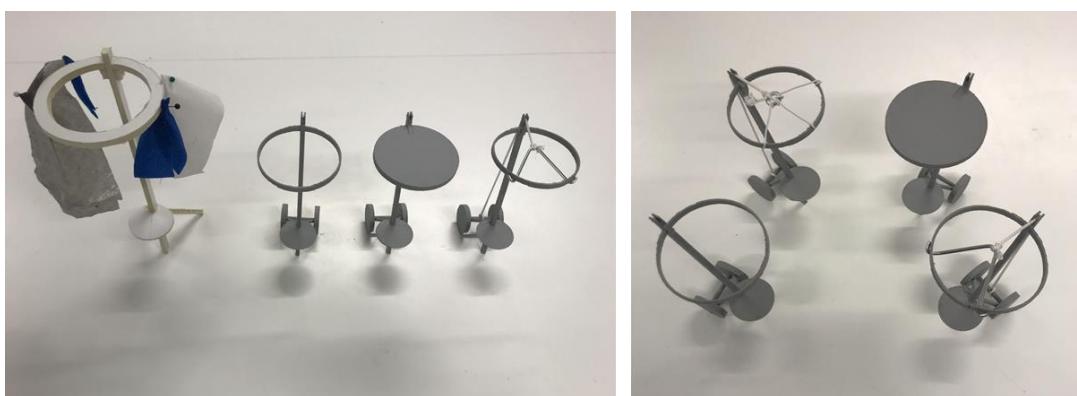


Figure 39 - Paper mock-up and 3D printed mock-ups

The idea was to use a hook system to rigidify the upper ring of a 90 cm diameter (standard aperture of a corridor door) connected to a strap joining the base of the structure. The wheels would have been used as counter weight and base stability. In a few words the idea was to develop the structure of the concept like a crane (Figure 40).

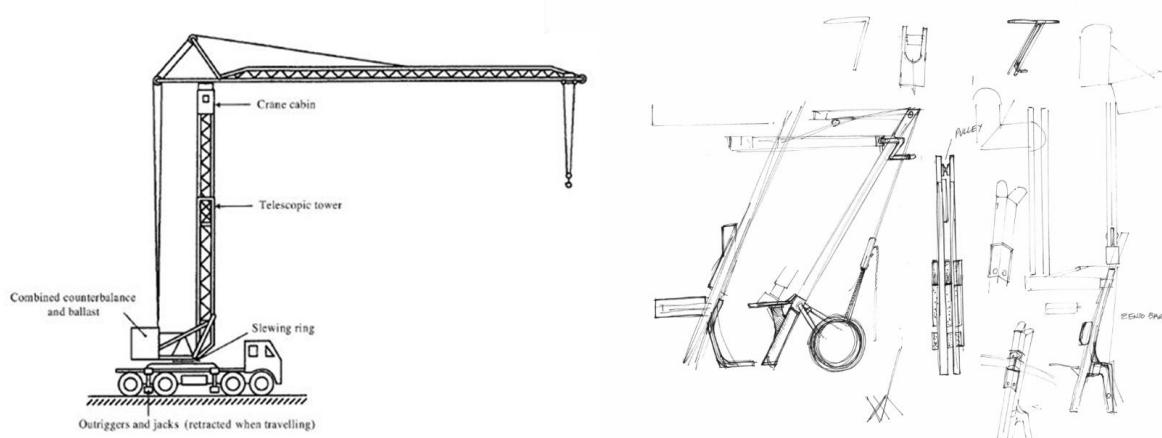


Figure 40 - Truck mounted tower crane (left) side conceptual sketch (right)

More sketches were realized with the 3D model as back layer to develop the structural possibilities (Figure 41)

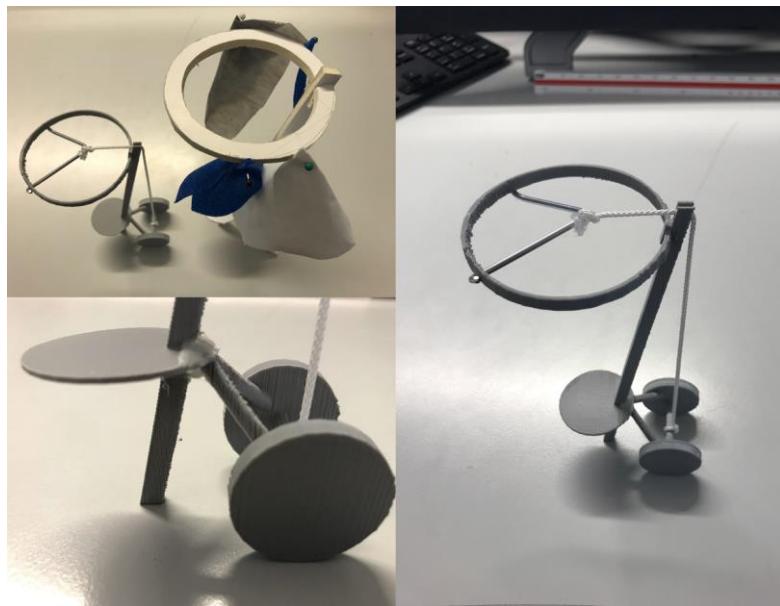


Figure 41 - 3D printed mock-up detail

4.6.4 Moodboards and detail CADing

Moodboards were made to develop the form language of the concept. Because of the challenging dynamic of the shape, aluminum profile was considered. Alluminum solution would allow collaboration with specialized manufacturer select sustainable configuration (life cycle of the product, use recycled aluminum or produce the concept with a maximum of standardized pieces). The concept was divided in four areas:

- The structure: The shape of the main column, rigid but with a fluid and modern design,
- The joinery: Innovative joinery would allow the transmission of charge while ensuring slick design,
- The luminaire: The shape of the luminaire should give a welcoming yet neutral effect, made in metal it would allow indirect light from above and light directed toward the coat and not he user,
- The counterweight: In the initial design the counterweight would be wheels but it could be other element, the mobility of the object isn't a requirement but an add-on
- The sit: Following the feedback from the real size mock-up the seat should be equipped with a back rest and allow a minimum of comfort. A wooden sit would allow simple manufacturing and bring the preceived comfort of "natural material",

The picture platform Pinterest⁶ was used to collect image and organize them.

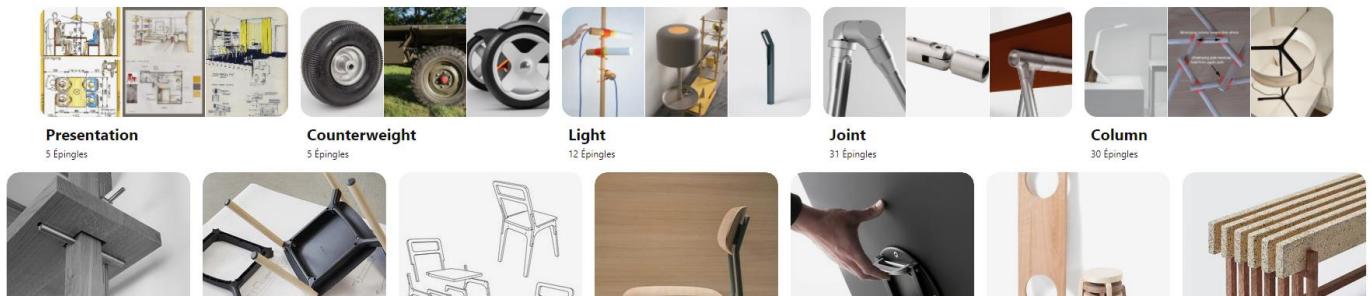


Figure 42 - Moodboard

Based on the moodboard, the final sketch (detail version) would allow the development of a CADed model for a potential 3D printed (down scaled) model as delivery (Figure 43).

⁶ [pinterest.fr](https://www.pinterest.fr)

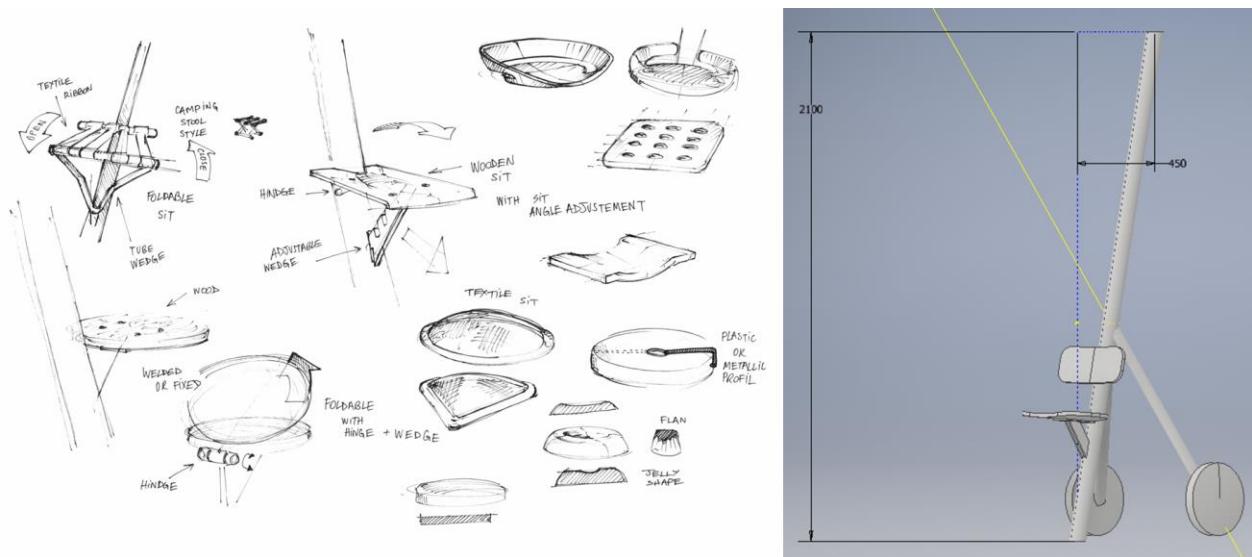


Figure 43 - Seat sketches (left) and CAD iteration (right)

4.6.5 Project review 3

The quick prototyping tool were a good use to identify problem and bring further on the concept. From the design studio breadedEscalope, the industrial design approach (user study, step diagram, fast mock up) was a great use to validate and consolidate a theoretical solution around the concept.

Though major problems were identified during this project review. In the ideation process the ideas were explored but the resulting design choice got over-complexified, disabling possibility for manufacturing. The complexity of the structure, the theoretical choice of material and the feature were no more aligned with the departure point. Without the possibility of creating a real size-functional model from the output of the industrial approach, the process would stay in an “undone” theoretical state, the experience and acquired knowledge would be partial.

In order, correct the situation a new interpretation of the product was proposed: simpler, more flexible on the design language and contextually realizable (resources, technic and tools).

4.7 Deliver

4.7.1 Physical model

Following the warning and advises from the design studio the concept got refurbished and simplified. Reworked on the base of the 5W+H (4.5.2.3) and the different user input, the final would follow a clear statement and be hand manufactured in available material, making it available for simple assembly by one person.

From the previous inspiration founded in the mood board and from the early step of the project a CAD model was done with dimension allowing the exploration of material and production possibility in the workshop in an experimental mindset (Figure 44).

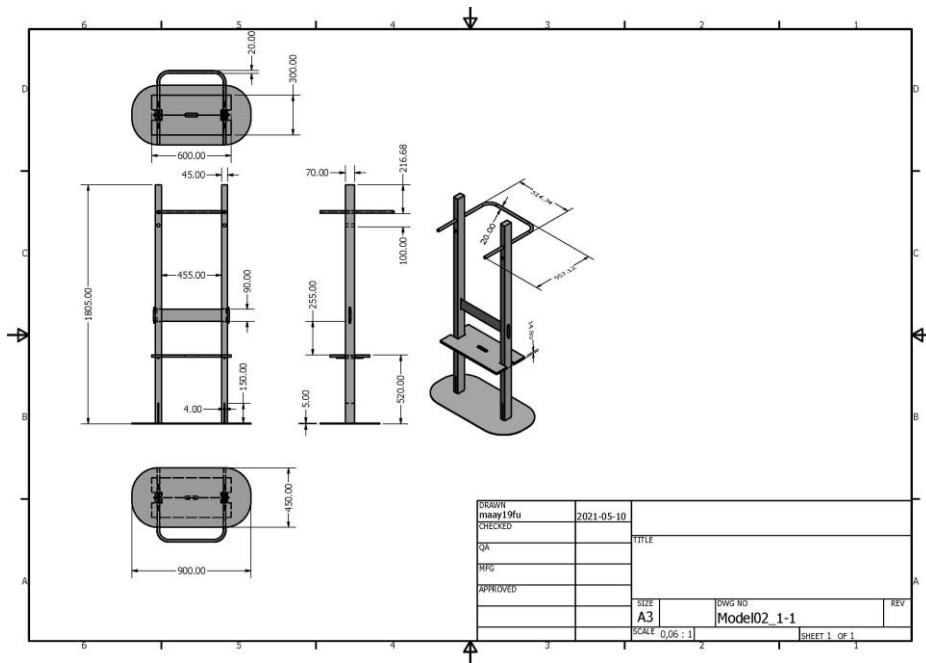


Figure 44 - CAD blueprint

4.7.2 Workshop

Regardful of a sustainable approach, the guideline followed for the production of the model would relay on the recycling of material as much as possible, while enabling simple construction depending on constraints.

For example, in the CAD model, the all structure was thought to be in wood supported by a metal base.

After some field test in the workshop and dimension checking the choice was made to reverse the material.

The structure would me in steel profile, an easily found product. Not only the structure be the rack tube and the base needed to be rigid. Availability and mechanical property of material dictated the selection.

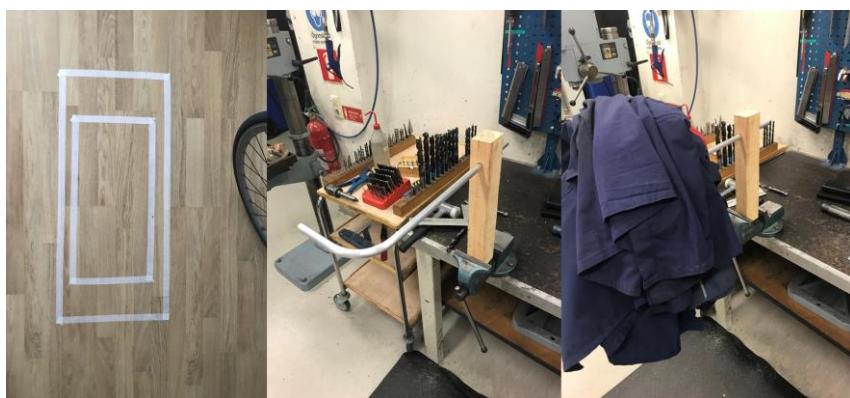


Figure 45 - Floor marking and rigidity simulation with aluminium rod of 18mm diameter

With circular notion in mind and transparency, another choice was made to try valorize the recycled material instead of radically transforming them aesthetically. Working on layers and study material finish, aesthetic and property help make discovery and original aesthetical choice ()�.



Figure 46 - Layer and finish study (recycled workshop table and rusted steel rod)

4.7.3 Crafting knowledge and materials

By choosing to pursue in the workshop, an implicit choice was made due to the limitation of the crafting knowledge. Thanks to the scholar staff, some part requiring specific knowledge (welding) or an hardware store order was manufacture in house. Most of the production process required to cut, drill or sand material. In the process, unknow but accessible skills was learned to produce parts. For example, the textile back rest, realized with a sewing machine, common home appliance.

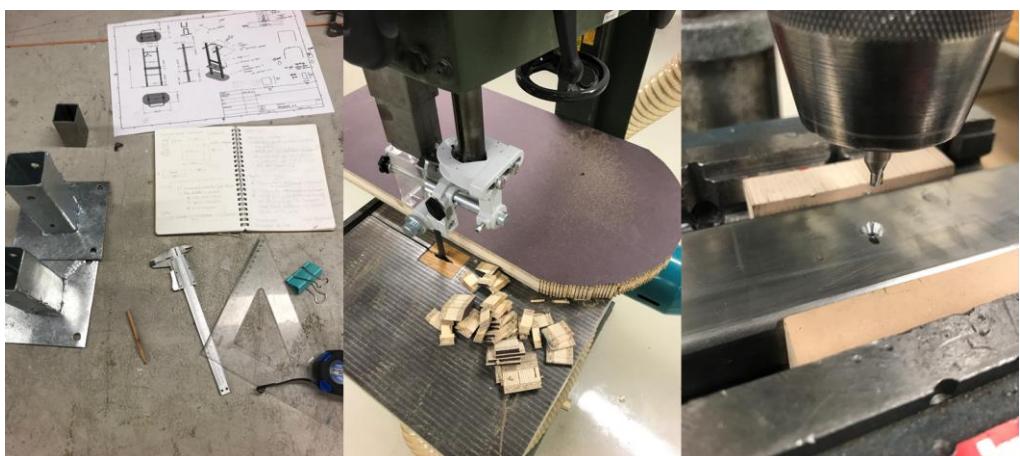


Figure 47 - Production process

In the end to realise the final model was made out of:

- Recycled wood (workshop table),
- Plywood,
- Steel profile,
- Aluminium,
- Textile,
- PLA.



Figure 48 - Ambly and materials

5 Result

The final product is named In-Between. As furniture placed in the centre of the transition indoor and outdoor environment, the coat rack becomes a drop off location with multiple potential. To carry coat, to create space or to storage shoes and miscellaneous the composition of the final product in simple yet functional.



Created on a wish to let the user understand the function and the production of the coat rack, the chosen materials are simple and easy to re-use, re-purpose or recycle.

From an invisible product the coat rack becomes an active furniture trapping space and offering it to the user. The gift of stacking coat on the structure is to receive privacy, sound proofing a place to sit. Slowing down the momentum of modern life style the time to check a map? A message? Or take the time to brief and organise the day.

5.1 Components and aesthetic

Made out of recycled material In-between is the proof that the presumed end of life is actually the beginning. As a popular quote says “One man’s trash is another man’s treasure”.



Even if with a raw, the material inspires trust and stability. The flexibility of the plywood both in use and as an asset, allow it to be change or adjusted for any case of use. The wooden base is oiled treated and already mark with imperfection, sign of its previous life.

In some cases raw material is not synonym of strong industrial finish. Maybe it is a wish for honesty? It is a wish to allow the user to understand the material and to appropriate it, eventually customize it.

The textile back rest is simply done and held in place by wood sticks. Color were added on top of the sliced cylinder to create playfulness, notify of the material transformation and give an identity on the type of material:

- Red: wood (back rest holders)
- Blue: Aluminium (seat support and top bent rack rod)
- Yellow: plywood (seat)

5.2 Assembly

Easy to assemble and disassemble the coatrack is trade lightness against stability. The two supporting stell profile are wounded on steel sleeves fixed to the base by four 8,8 hewagon head wood screw each.



The sit it supported by two aluminium rods of 18mm diameter. When installed the sit act as a lock for the bent rack rod and vice-versa. The back seat is amovible and held in place by two handmade sliding wooden stick.

The assembly were directly influence by the available resource and time line of the project like valuable constraints.

5.3 Function and possibility

Abstract in the shape and in the use, In between, in a functional product questioning our relation to space and to possession.

In shared environment, sitting in the middle of the unowned clothes, implicitly create a trust relationship between the user and the owner of the clothe. Clothes are the closest elements to the human body and for some person carry strong meaning (uniform, fashion trends, heritage).



The available space above and below the seat create possibilities and additional story to the coat rack. Add more seats? and in becomes a drop off shelf. Place storage below and it becomes an organised shoe rack. Place additional bent bar? Increase the inside space an make it accessible on a 360 basis.

Yet, all these modifications require one mandatory action: to self-appropriate the object by accepting to drill holes and modify it. Acting upon the object and making it more meaningful because of the ownership through the action, the acquisition and relationship.

Result



6 Conclusion and discussion

This thesis was realized in collaboration with breadedEscalope, an experimental design thinking, studio with the idea of implementing the knowledge acquired during the program of Product Development from the Engineering School of Jönköping. Inspired from the previous experiences of the studio's members, the research question helped to structure and give a context to the collaboration.:

- Where are the differences between an industrial approach from an experimental approach in design?
- How much of the product identity is the story?
- Are these two approaches compatible? And how much do we value them?

6.1 Discussion of method

Starting with design history research helped me understand the relevancy of different design approach. Nevertheless, working in collaboration from remote places was challenging especially based on the core idea of the two studied approaches. Communication tools were used to give more room for exchanges of data, reference, reviews and inspiration. All along the project I tried to frame my work through phases allowing to set deadlines. The first challenge was to be able to make decision or choices and stick to them. The choice of open brief, meaning that the frame of the project was in constant evolution lead to the creation of a “wicked problem” situation. Because of the nature of the formulated problematic which cannot be solved by a definitive solution formulation or submitted to a “stopping rule” the research and ideation period were strongly increased. I chose and object, domains and concept but iteration after iteration, a lot of the idea was interesting but none of them could be considered as the right one. Finally, after the define period I made an arbitrary choice based on gut feeling to pursue with a concept. In the industrial design the choice is more pragmatic because the answer is based on a well-defined problematic, whish a strong emphasise is put on directly in the beginning of a project (hill problem effect). Here, I chose to suggest more than solve, which even if started from a creative approach tends to lean toward an artistic approach.

6.2 Discussion of findings/achieved result

The results founded during the discovery and define phase were valuable from an engineering approach. TAIDA, market analysis and theories allowed me to frame my work in a research approach and enhance creative proposition. The experimentation realized with the real size mock-up leading to interview gave me stability point to lean on while formulating the story and statement of the product. The repercussion of this work was to slowly but surely clarify and ease the communication around the problem and give me opportunity to start reflection in my surrounding in their relation to space, lifestyle and consumption choices. By polishing the story people involved in the project were able to reflect upon it and be a part of the creative process from the ideation to the production.

The production was initiated through a discussion with the design studio, who helped me focus back on the need to step out from theory and virtual conception to focus back on the essence of experimental design: experimentation. Allowing the user to touch, perceive and experiment the final product (especially when spatial notion is involved) is mandatory to create an experience, to tell a story, to conclude the act of creating. Relying on virtual model isn't a negative aspect if not contradictory to the subject and statement.

This discussion lead to the radical simplification of the chosen concept, allowing me to embrace an intense production period in the workshop. For me this choice wasn't easy: making the product deliberately more straight forward and conceptual meant to adopt a different point of view on my usual delivery. But this choice lead me to learn new skills (sewing, wood working, metal working), make quick decision in order to produce a valuable and tangible good.

6.3 Work continuity

In the beginning of the project, the discussion started with Martin Schnabl helped me adopt a different point of view on the thesis, more than an assignment it was the opportunity to experiment, and live a project. Though the project I learned how to switch methods and be agile with the tools in order to deliver. The final result is an alternative functional model to the coat rack, sustainably handmade and simple. Not only on a functional point of view the object allow possibilities but in the dialogue between user and product as well. We can start with pragmatic idea and bring creative approach to life. In this case, drilling new holes in the structure allow to stack more coats or even use it a shelf to stack shoes or objects on the go. Made from a recycled workshop table, plywood and metallic profile this product gave a new life to a previous product in a circular way.

Overall, it was a very challenging experience both on the knowledge, methodology and communication. But a very valuable assignment to conclude two scholar year to study design before entering in a professional practice.

I am grateful to the studio breadedEscalope to have accompany me during this research, to the teaching staff of the Engineering School of Jönköping University, to my peers of the Design program who supported this study with their active participation and to my personal surrounding to fuel this creative process.

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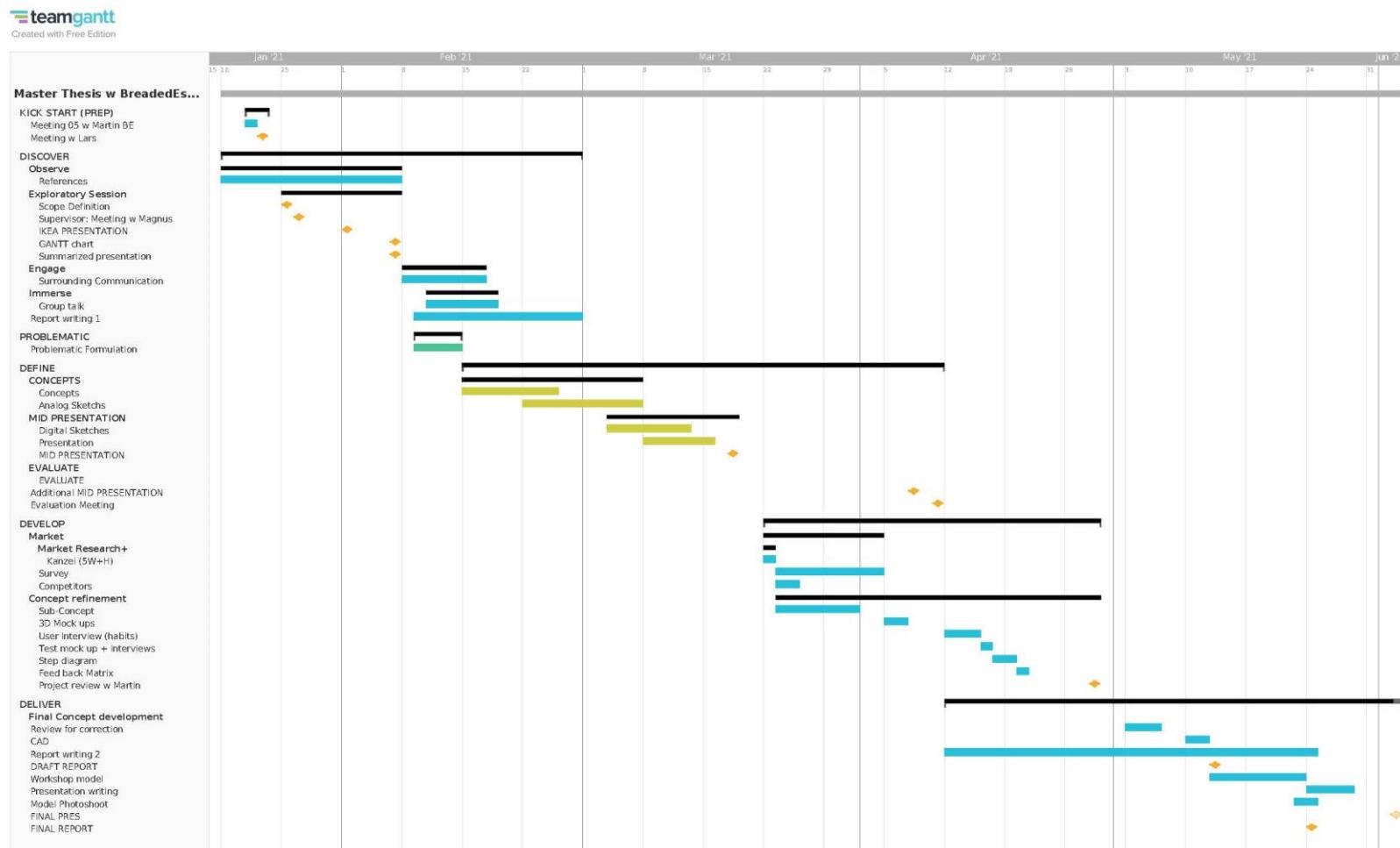
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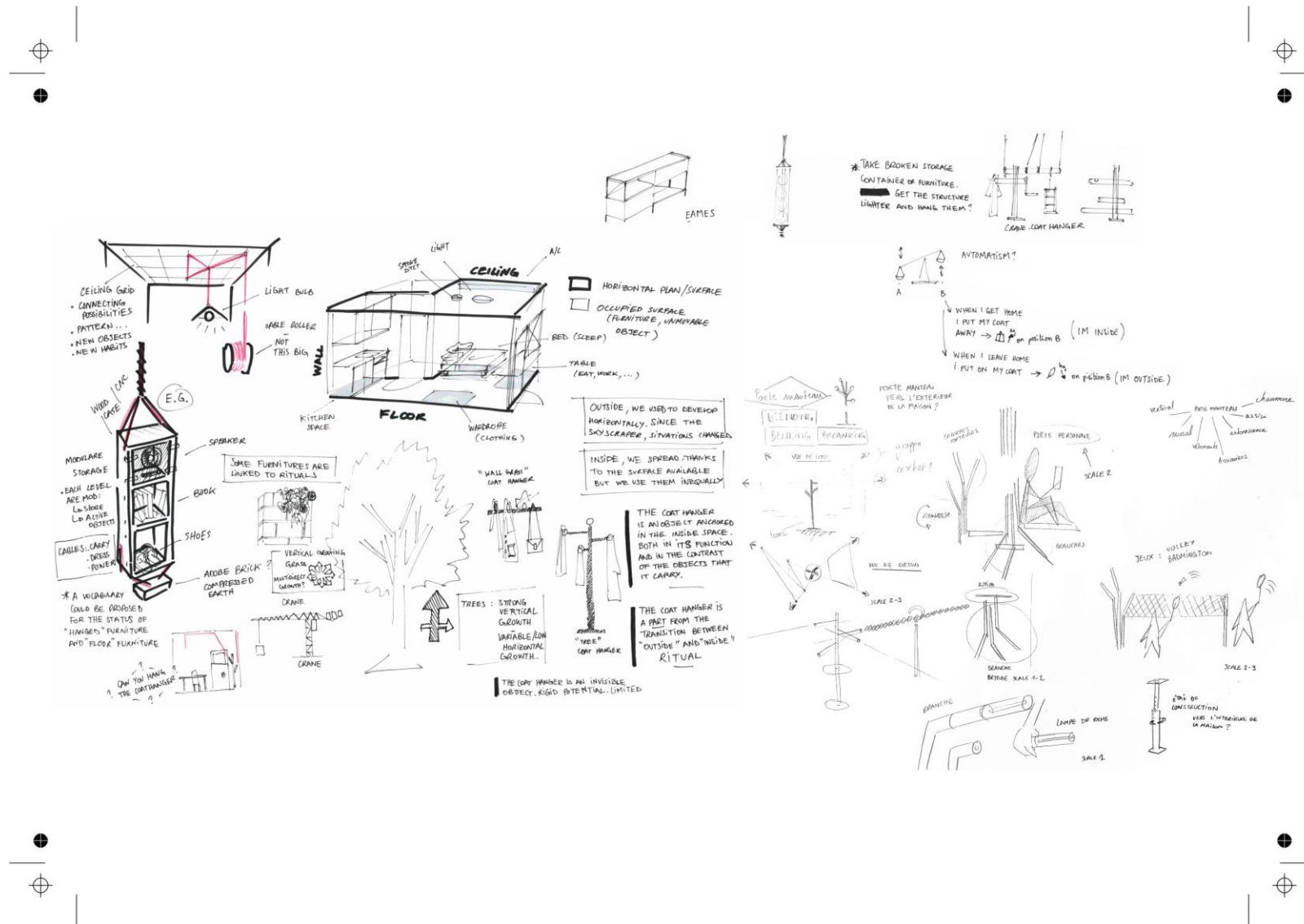
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8 Appendices

8.1 Appendix I- GANTT Schedule



8.2 Appendix 2 – Ideation Planche 01



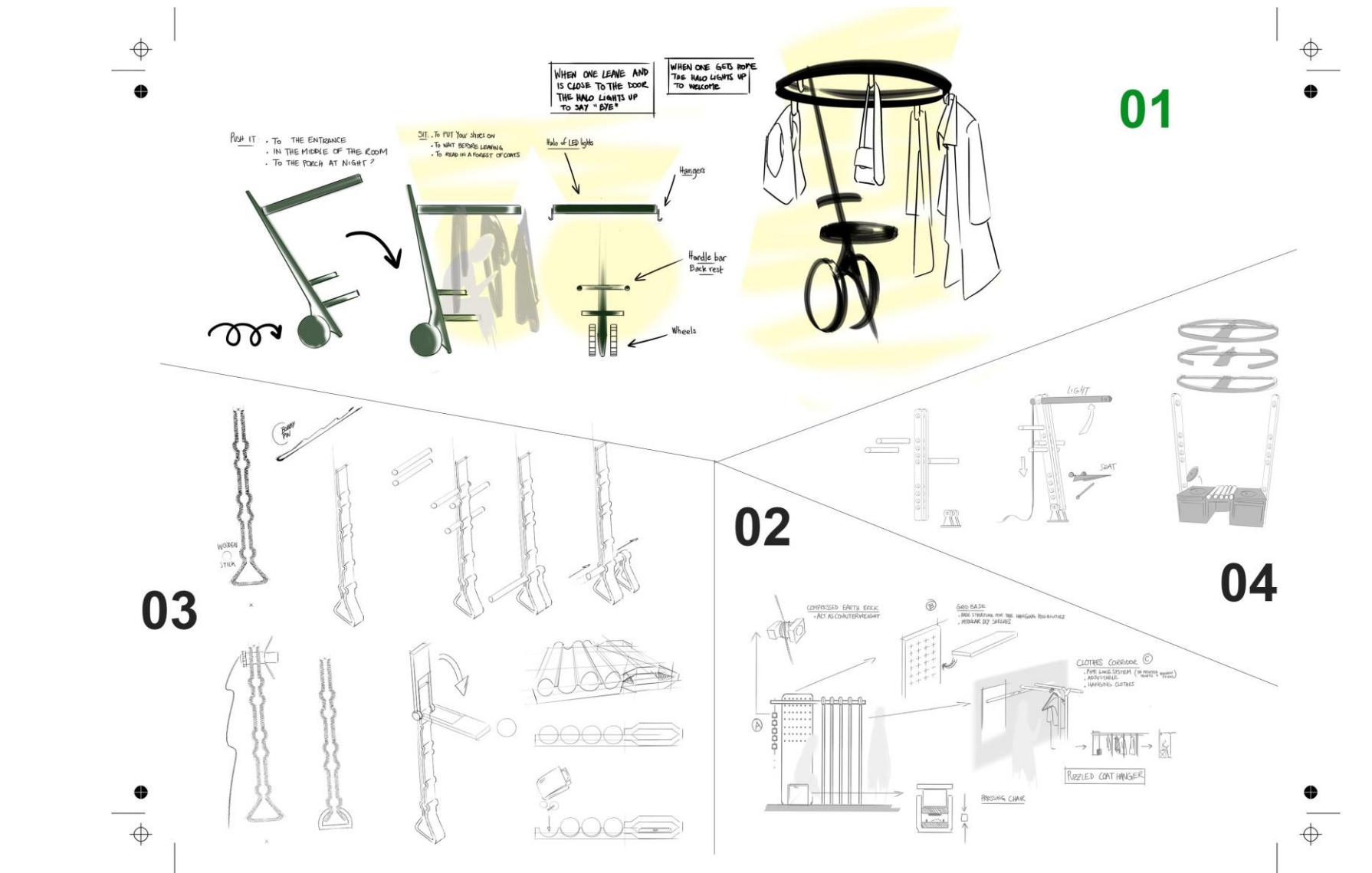
8.3 Appendix 3 – Evaluation table

numb.	Ideas	Description	Studied domain	Matching criteria												
				Open Source [pub. involvement]	Sustainable*	Modular		Trust		Scale of use **			Explicit connection	Potential service	Provocative	
(3)	(3)	Function (3)	Aspect (1)	Innovation (3)	Implem. (1)	I. Individual (1)	II. Shared (1)	III. Public (1)	(1)	(1)	(1)	(1)	(1)	(1)	20	
1	Modular library		Storage	1	2	3	1	0	1	1	1	0	0	0	0	10
2	Modern Totem		Home furniture, Memory	1	2	1	1	1	0	1	1	0	1	1	1	10
3	Husqvarna's industrial trash for urban furniture		Urban furniture	2	3	2	1	1	1	1	1	1	1	1	0	15
4	Recycle private furniture to make public furniture		Urban furniture	3	3	0	0	0	1	1	1	1	0	0	0	10
5	Use chart & Life cycle agreement		Requirement												0	
6	Object against silence		Concept, Home furniture	0	0	1	1	1	0	1	0	0	0	0	1	5
7	Brain teaser object		Concept, Home Furniture												0	
8	Puzzle structure		Concept, Structure												0	
9	Grappling coat hanger		Home furniture	1	1	3	0	0	1	1	1	1	0	0	1	10
10	Roof grid		Home furniture	3	1	3	1	0	1	1	1	1	1	1	1	15
11	tetrapod Seat/table assembly		Urban furniture	0	0	2	0	0	1	0	1	1	1	1	1	8
12	Outside museum		Urban furniture, Concept	3	3	2	1	1	1	1	1	1	1	1	1	17
13	Mars coathanger		Home furniture, Concept	1	1	3	1	1	1	1	1	0	0	0	1	11
14	Hanging all furniture		Home furniture												0	
15	3d printed structure for furniture		Home furniture												0	
16	Modular corridor coathanger		Home furniture	3	2	3	1	0	1	1	1	0	0	0	0	12
17	Halo coathanger		Home furniture	0	0	0	1	0	1	1	1	0	0	1	1	6
18	Multitubular coathanger		Home furniture, Urban furniture	0	2	3	1	0	1	1	1	1	1	0	0	11
19	Phone Shrine		Home furniture	0	0	0	0	1	1	1	0	0	0	1	1	5
20	Coat hanger alphabet		Home furniture, Concept	0	1	1	1	0	1	0	0	1	0	0	0	5
21	Pathway coat hanger		Home furniture	0	1	1	1	1	1	1	1	0	1	1	1	10

8.4 Appendix 4 – Survey questions

Theme	Question	Answer				
Household layout	In which type of housing do you live in?	Appartment	House	Other		
	Are you sharing your home (couple, family, collocation)?	Yes	No			
	After opening your door, is your "entrance" an independant room (ex:corridor)?	Yes	No			
	In your home, is taking off coats/hats mandatory before walking further inside?	Yes	No			
	In your home, is taking off shoes mandatory before walking further inside?	Yes	No			
	Do you store coats/jackets in your entrance?	Yes	No			
	How many coats/jackets are stored there (average)?	0	1-2	3-5	5+	
	Do you store shoes in your entrance?	Yes	No			
	How many shoes are stored there (average)?	0	1-2	3-5	5+	
	How are they stored?	Closet	Rack/boxes	Other		
	What other elements are stored in the entrance?	Misc. (key, wallet, headphones)	Hats/helmets	Bag	Umbrella	Other
	Do guests and house tenants share the same storage?	Yes	No			
Health/Habits	Do you consider your entrance bright enough?	Yes	No			
	How is it lighted?	Natural light	Lamp	Ceiling light	Other	
	Do you consider the entrance an important space of your home	Yes	No			
	In your personal life, do you consider yourself organized?	Yes	No			
	Do you use plannifier tools/helps (reminders, mobile apps, ...)?	Yes	No			
	In general, how stressful are your working days? (1=Low;4=High)					
	How stressful are your free days? (1=Low;4=High)					
	Do you have a fixed routine before leaving your housing?	Yes	No			
	Do you have a fixed routine when entering back your housing?	Yes	No			
	Is going back home an important step of your day?	Yes	No			
	After going back home, do you consider your day "done"?	Yes	No			
Individual	At the end of a working day, do you consider yourself disconnected from work?	Absolutely	Almost	Not really	Not at all	No opinion
	Do you practice meditational activities?	Yes	No			
	From your point of view, do you practice enough meditational activities?	Yes	No	Not concerned		
	Have you heard of mindfulness (the practice of purposely bringing one's attention in the present moment without judgement/anticipation)?	Yes	No			
	Have you tried mindfulness in your daily activities?	Yes	No			
	Gender	Male	Female	Other		
	Age	<18	18-35	35-55	55-75	+75
	Number of persons in the household	1	2	3-5	5+	
	Is there children in your household	Yes	No			
	What is your professional status?	Working	Studies	Unemployed	Other	
	Before the pandemic, where you use to remote working?	Yes	No			

8.5 Appendix 5 – Concept Exploration



8.6 Appendix 6 - Real size mock-up interview (five interviews)

Benjamin (man) 00 :08 :19

In this space, how do you feel?

I fell ok.

According to you, how approximatively wide is the circle around you?

I'd say 1 meter wide. But I guess that the position of the coats affect my perception.

Do you feel comfortable here?

It depends on how long I should stay and the activity...

In this space, what would you want to do?

Maybe record vocals or Listen to music. I know that MO, a Danish artist, recorded her first project in her wardrobe.

Why?

Some textiles have a noise cancelling property, and this space feels cozy enough. I would probably put more coats around me and bring a comfortable chair instead of this stool.

Does the fact that the coats, which are surrounding, you aren't yours affect you in any way?

It's ok. But one of these coats is made of a synthetic material which is noisy when moved and the sound is a little bit annoying. Another thing is that for example depending on the type of material and the usage of the coat I'm a little bit worry about the sanitary part ... Some of these coats may carry more germs than other, like when you are in the transport etc ...

Compared to the overall environment of the room, is there a dominant smell in the space?

Yes, it smells laundry and a slight perfume.

How do you perceive the light setup here?

It remembers me the light of a fitting room, a little too bright I'd say. I would prefer a smoother light and a warm tone or eventually hidden light for more comfort.

If I'd leave you here for some minutes, what would you do?

Maybe pass a phone call. I remember that in my previous university, we had phone call booth. I briefly used it once.

Do you have observation regarding the setup?

Yes, a more comfortable chair and a different chair. Add a light bubble centered in the ring maybe? Or a light strip?

Semir (man) 00:09:01

In this space, how do you feel?

The size seems comfortable enough. It could have been more oval maybe?

According to you, how wide is the circle around you? Approximately?

About 1 meter wide

And why oval shape then?

It could be interesting to have a narrower space? To add more proximity on the side or back/front.

Does the fact that the coats, which are surrounding, you aren't yours affect you in any way?

No. Nothing special.

Would you qualify yourself as introvert or extrovert?

A bit of both depending on the context. In known context, extrovert. When unknown, a little more introvert.

Do you feel comfortable in public space?

Yes totally.

What would you do in this type of space?

Take my computer and probably work.

Then, in your house, where would you place an installation like this?

Because of the coat rack, near the entrance door? But otherwise maybe, for an alternative use, like a sound booth, in the living room beside the sofa. I'd probably take out the jacket and put curtain on it.

What about the bedroom then?

Why not but not really. In the bedroom there is already space consuming furniture and there's already privacy, that's where you sleep. In the living room, it could become an interesting piece of furniture.

Do you have any observations about the light?

No the light is ok ...

Maybe sound wise?

Yes, it sounds different, dull. Depending on the position in the studio it would change I think. For example, in the middle of it, it would be totally different.

Do you think that this space would have more dust or than other places in the studio?

No not really ...

What do you think this space could be used for?

A wardrobe

How do you feel in this space?

Kind of comfortable

According to you, how wide is the circle around you? Approximately?

50 cm of radius... Maybe 60 cm?

Would you diminish or widen it to feel more comfortable?

Probably make it wider.

Would it then feel more or less private?

Less private ...

Can you stand up and tell me if it changes your perception of the space?

I don't think so ...

How does it feel to be surrounded by clothes that aren't yours?

I don't enjoy it that much...

Why?

I don't know, it feels impersonal. In some ways, it's uncomfortable. If it was my clothes it would be better.

Blind folded, in the same configuration, would you be able to tell if it is your clothes or not?

Yes. I think I would recognize familiar scent (perfume ...)

Is there any special scent in this space right now?

No it doesn't smell anything special, unless I get closer to the clothes.

What would you use this installation for?

Maybe to dry clothes.

Why?

Because usually that's how you can dry them.

How do you find the light?

It feels nice. I think I like it. Can I sit?

It's funny it feels more comfortable. Maybe I get used to it?

What would you do in this type of space?

I don't know but I would personalize to make it more comfortable!

What would you add, to make it more comfortable?

Change the sit probably. My back starts to hurt now.

Would you adjust the height of the sit?

Why not? But that doesn't feel really necessary.

Would it help you relax?

No not specially.

If you had a book would you feel comfortable to read it?

Yes.

Compared to other spaces of the studio how does it feels?

There is less sounds! It's a little bit warmer too.

I still don't know what is it for but I'm starting to like it.

Julia (woman) 00:13:54

What do you think this space could be used for?

IT could be a museum installation, because of the way it is displayed. It looks exposed.

Do you have 3 words to characterize museum?

Creative, different ... and "alternatif"?

In this space, how do you feel?

I feel overwhelmed, because there are many things around me.

From your point of view, is the seat well placed? And does it matter?

I can't see you.

(a scarf on a coat hanger, deployed like a curtain is between us)

And it feels that some clothes are in the way. If I move them, it will be good.

Why would you put it differently?

Because, I could see around.

Do you feel comfortable?

Yes, I feel comfortable. It feels like I can reach every coat around me. But the scarf is still annoying.

(the scarf is switch with a t-shirt which was in the back)

How does it feel?

It feels better. The other was too big. Here the t-shirt can be move around or turn around. The scarf blocked my view a lot and it felt like a fitting room.

How do you feel in a fitting room?

I mean I feel ok. But if the curtain is too close to me and every time you move you touch it, it's uncomfortable.

How do you think this space is compared to a fitting room? How wide could it be?

It's smaller, probably it is 1 m wide? And a fitting room must be 1,5 wide?

What would you do in this space?

Choose clothes?

Does the fact that the coats, which are surrounding, you aren't yours affect you in any way?
I don't care. If the clothes were dirty, it would be different.

Are the clothes too close to you right now?

No, I'm sited so I think it's ok.

Can you stand up and tell me how do you feel in the space now?

Now I feel more overwhelmed. Down, it wasn't the same size. And here it's more.... There're more things...

And, what do you think about the height of the installation?

It's okay, I'm not that tall and I can catch/rech everything.

And the light?

It's good.

Are the clothes recognizable?

Yes.

And the light on you, how does it feel from your point of view?

It's good. It's enough, and the color is warm. That is also a problem in fitting room, the light is always on you...

Back to the beginning, if it should be in a museum what would you change?

I would add a hat on the side to balance the objects.

Would you close the space above you?

No, no that's ok.

Do you have observation regarding the setup?

Now that I'm standing up, it's a little bit more overwhelming. Adding more clothes would be even more overwhelming. I would probably make it bigger to add more of them.

Miriam (woman) 00:10:35

How do you feel in this space?

It's a bit small bu I'm feeling good.

According to you, how wide is the circle around you? Approximately?

50 cm radius.

If it was smaller how would you feel?

I would not feel ok maybe...

In your opinion what could this be?

A changing room, but it feels too small for it.

Then, how big would you make it?

Double the size.

Does the fact that the coats, which are surrounding, you aren't yours affect you in any way?
Because they are not touching me it's good. Maybe if it was it would be different.

Why?

It would be intrusive.

And if it was your clothes?

It would still be annoying because it would be in my space.

Are you comfortable in this space?

Yes.

What can bother you in a changing room? Do you have example?

When the chair takes too much space.

What make a good changing room?

When there is wall hanger for example. It makes it functional.

Make this space a coat rack. Do you think that it makes its job?

From an outside point of view, yes.

Why?

Because if there would be too much coats it would be annoying to be inside or get in. And it's easier to spot clothes from the outside, walking around it.

What would you add?

If it was possible to align the coats, it would be easy to choose them.

Do you have any observations about the light?

It's a bit yellow-ish but it's okay.

What would you do with this installation?

Put wet clothes on it.

Is the sit comfortable?

Yes, but with a back rest it would be better.

If it was for an individual use, means only used by you would you enjoy it?

Yes, to put only my jacket on, yes.

Can you stand? What are your impressions?

It seems that the clothes are closer! It feels less comfortable.

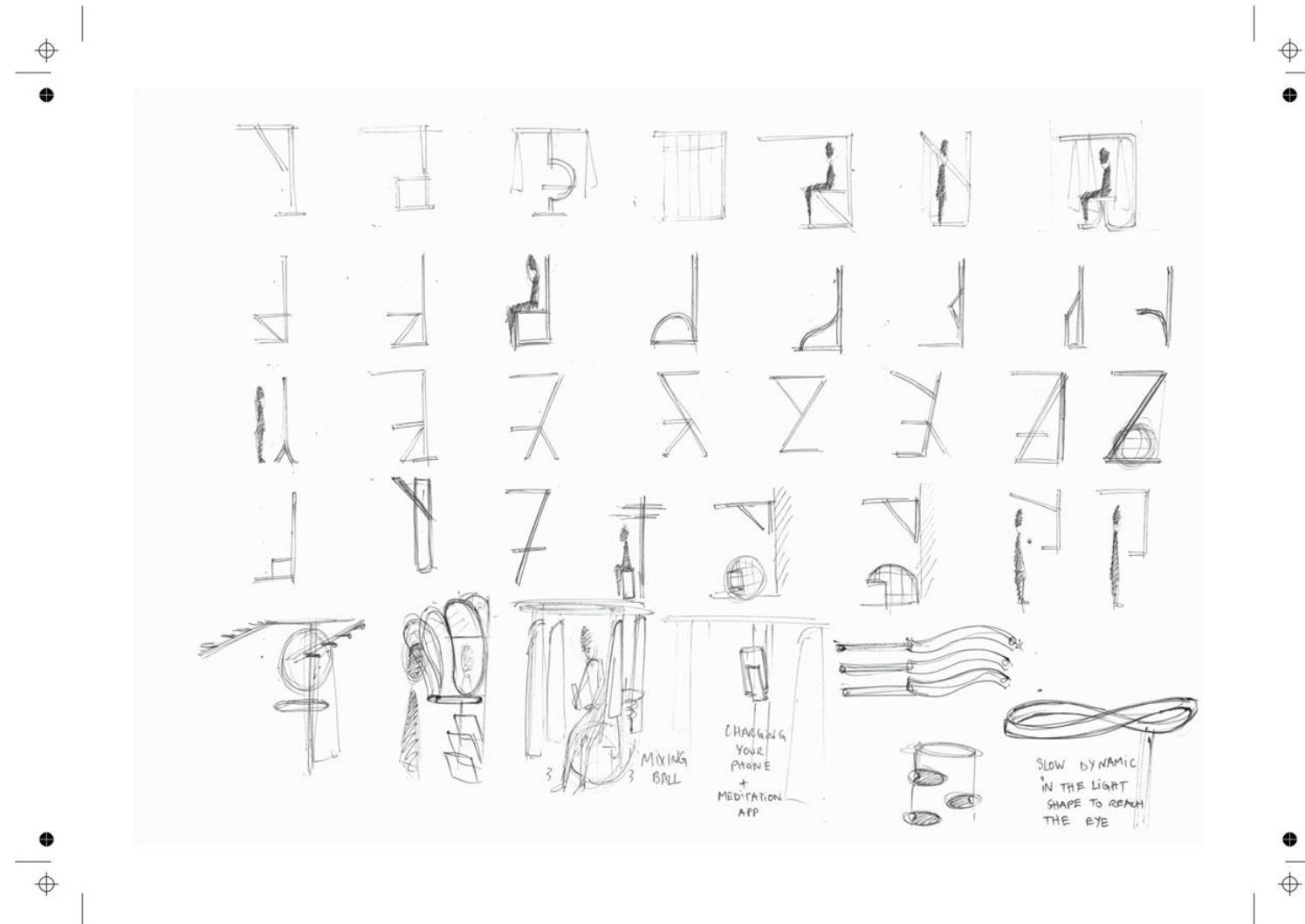
Step away from it, from the outside how does it look?

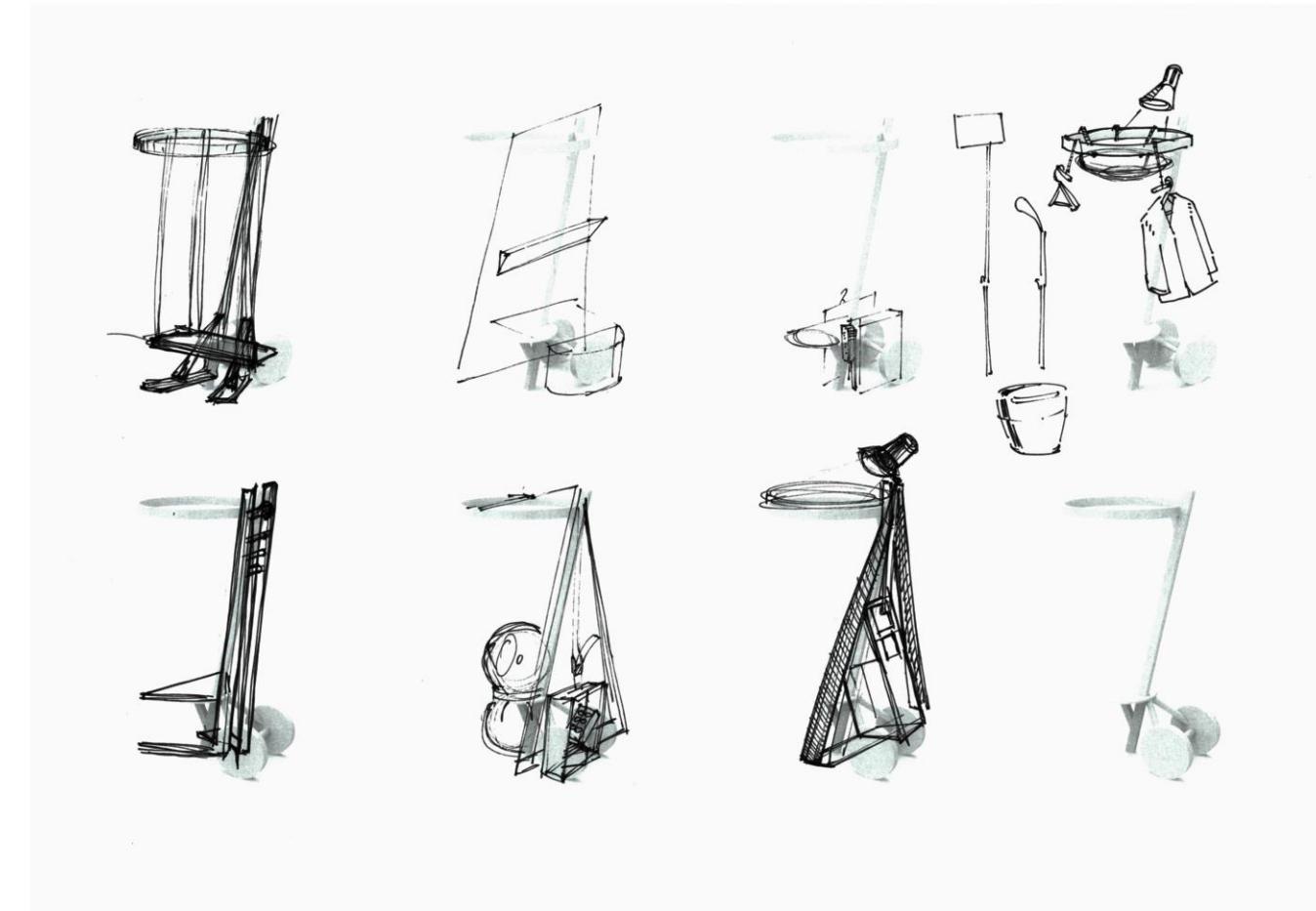
Strangely, it looks bigger!

Back inside?

Now inside feels a little smaller!

8.7 Appendix 7 – Structural sketching (two pages)





8.8 NOTE

Merci, Thank You, Tack