



Design — Archeology Research Kit

Exploring the past
to uncover the present
and work towards the future

Final Master Project Report

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Summary

Design is a future oriented practice, but design can also learn from its past. Through the creation of the Design Archeology Research Kit (D.ARK), I explored how the past can be used to inform design practice and can be used as material for design. In the context of the d.centre|EU, a new initiative from Transforming Practices, I tried to introduce a role for the past in the development of the d.centre|EU.

As the d.centre|EU is a new development in Transforming Practices, I used my design to interview designers about their past projects that were important in the development of Transforming Practices. In the interviews D.ARK was used to try to extract narratives about the past that can inform present and future design practice.

The data gathered through these interview sessions was analyzed and together with insights from theoretical research presented in the form of a manifesto for Design Archeology.

In this report I will discuss my work of the past semester. I will shortly introduce the context and the collaborative way of working and discuss the theoretical background; from there I will go into the design process and present the final design and the results. Finally, I will present the design manifesto and discuss the results and the design process.

Introduction

Transitional Design Histories and Histories as Prototypes

The practice of design is future oriented, designers make propositions that help to imagine, experience and research new futures (Bardzell, Bardzell, Forlizzi, Zimmerman & Antanitis, 2012; Dunne & Raby, 2013; Göransdotter, 2020; Koskinen, Zimmerman, Binder, Redström & Wensveen, 2011; Kyng, 1995; Redström, 2017). But design can also learn from its past and use this knowledge that is embedded in the past to inform and shape current and future practices.

The practice of design history focusses mainly on the products/projects and discusses how these products/projects play an important role in the development of the field of design. Design history looks towards the past from our present perspective but rarely relates itself to this present-day or future design practice, something that is similar in the way the practice of design mainly focusses towards the future and rarely looks back to the past. (Göransdotter, 2020).

In Maria Göransdotter's PHD on transitional design histories (2020) she uses Johan Redström's definition of 'design' as a fluid and continuous spectrum spanning between what 'a design' could be (such as products, or projects) to what 'designing' is understood to be (in terms of practices and internal paradigms) (Redström, 2017) to propose a shift in making design histories from a practice point of view opposed to the traditional product/project point of view. By doing this she connects the practice of design history to the practice of design, where she uses the 'cone of potential futures' (Hancock & Bezold, 1994; Dunne & Raby, 2013) to visualize the perspective of design practice.

By constructing design histories that describe and research past practices, Göransdotter is able to uncover hidden knowledge that is useful for the development of the practice of design. It provides insight on the dynamics that play a role in the design process and how they change over time. These practice-based design histories are introduced as transitional design histories. Göransdotter proposes to construct these histories as prototypes. This means that they should be open, possible to adjust and can change after trying them out, but they are still rigid enough to be able to provide a certain functionality or experience that allows for specific aspects of an idea or proposal to be investigated.

These histories as prototypes allow for multiple perspectives on the past to be explored and integrated in a larger historical narrative. These multiple perspectives on the past allow for new perspectives on the present to arise and uncovers a multitude of possible, plausible and preferable futures. So, through exploring the past through the method of transitional design histories, a multitude of perspectives on the past can be uncovered that help to research and explore the present and uncover a multitude of futures.

To explore this method of transitional design histories and see how it's principles could be used in the context of design practice I used the methods to explore the past of Transforming Practices (Hummels et al. 2019; Hummels et al. 2021; Hummels, 2021; Hummels & Lévy, 2021) in relation to the a new development within Transforming Practices, the d.centre|EU.

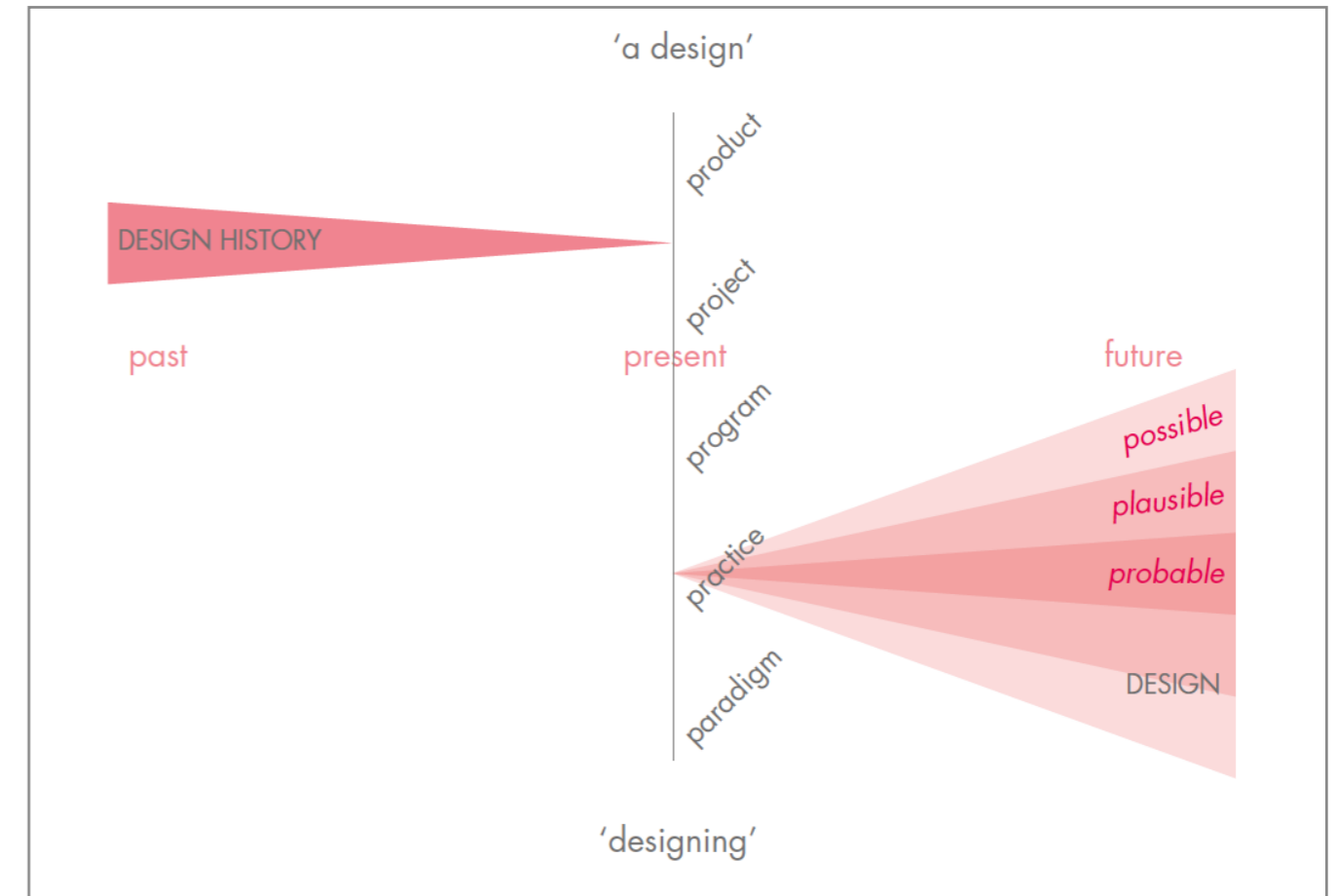


Figure 1 - Perspective of Design History and Designing (Göransdotter, 2020).

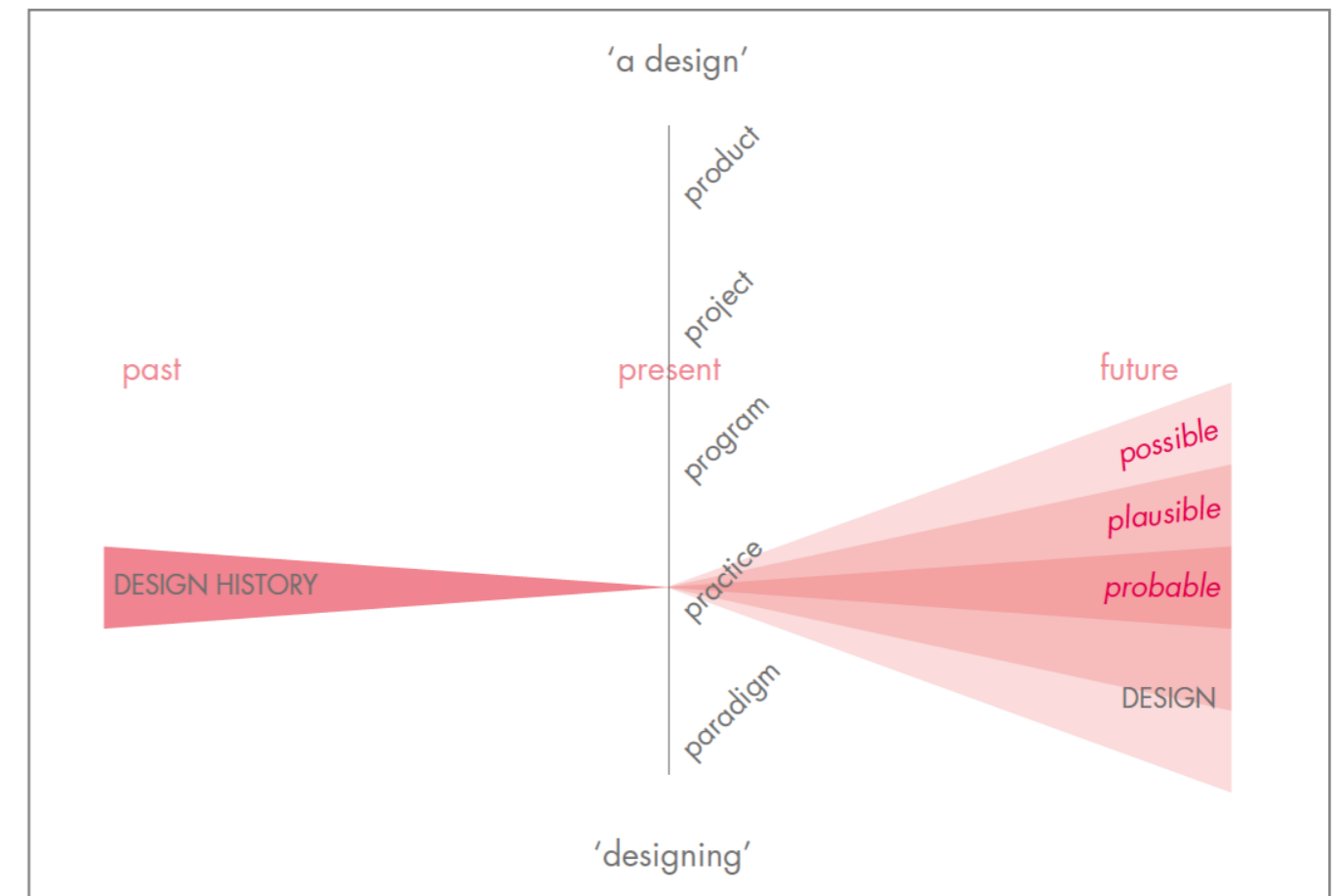


Figure 2 - Shift from product/project to practice (Göransdotter, 2020).

Context

A new future for Transforming Practices

With the development of the d.centre|EU, Transforming Practices moves into a new phase of collaboration and explores how the approach can be used in a larger context. By expanding its network of practitioners from the RISE Societal Transformation office in Umeå, Sweden and the TU/e Transforming Practices squad, the d.centre|EU aims to create a larger growing community that helps in creating transformative practices. This new platform is a European design-driven platform and is described as followed:

d.centre|EU is a design-infused ecology that jointly digs deep into, learns about, and fosters sustainable societal transformation. It endorses and expands on the ambitions of the New European Bauhaus to imagine and build together new sustainable, inclusive, and beautiful ways of living.

d.centre|EU brings together the creative pathfinders of change across Europe, to jointly scrutinize and concretise the principles and prototypes of beautiful, sustainable futures; in those futures, the lives of all beings are respected and actions to heal the planet are taken towards a horizon of collective and beautiful thriving.

As an ecology, **d.centre|EU is a learning playground** that interweaves four types of activities. We are jointly:

- **questioning** whether and how current products, processes, practices, and paradigms are compatible with realising sustainable futures
- **making sense** of what it entails to transform towards radical new ways of living and organising
- **finding paths** of imagining, prototyping, experiencing, evaluating, and reflecting on radical new ways of living and organising
- **pollinating** the wider EU community, by making societal transformation processes and practices applicable and scalable, thus stimulating beautiful, collective thriving.

d.centre|EU creates transformative practices, including tools, spaces, encounters, processes, programmes, and policies, to question the unquestioned, imagine the unimaginable and learn in paving new co-response-able ways of living and organising together.

Text written by Hummels & Trotto (2022) (unpublished)

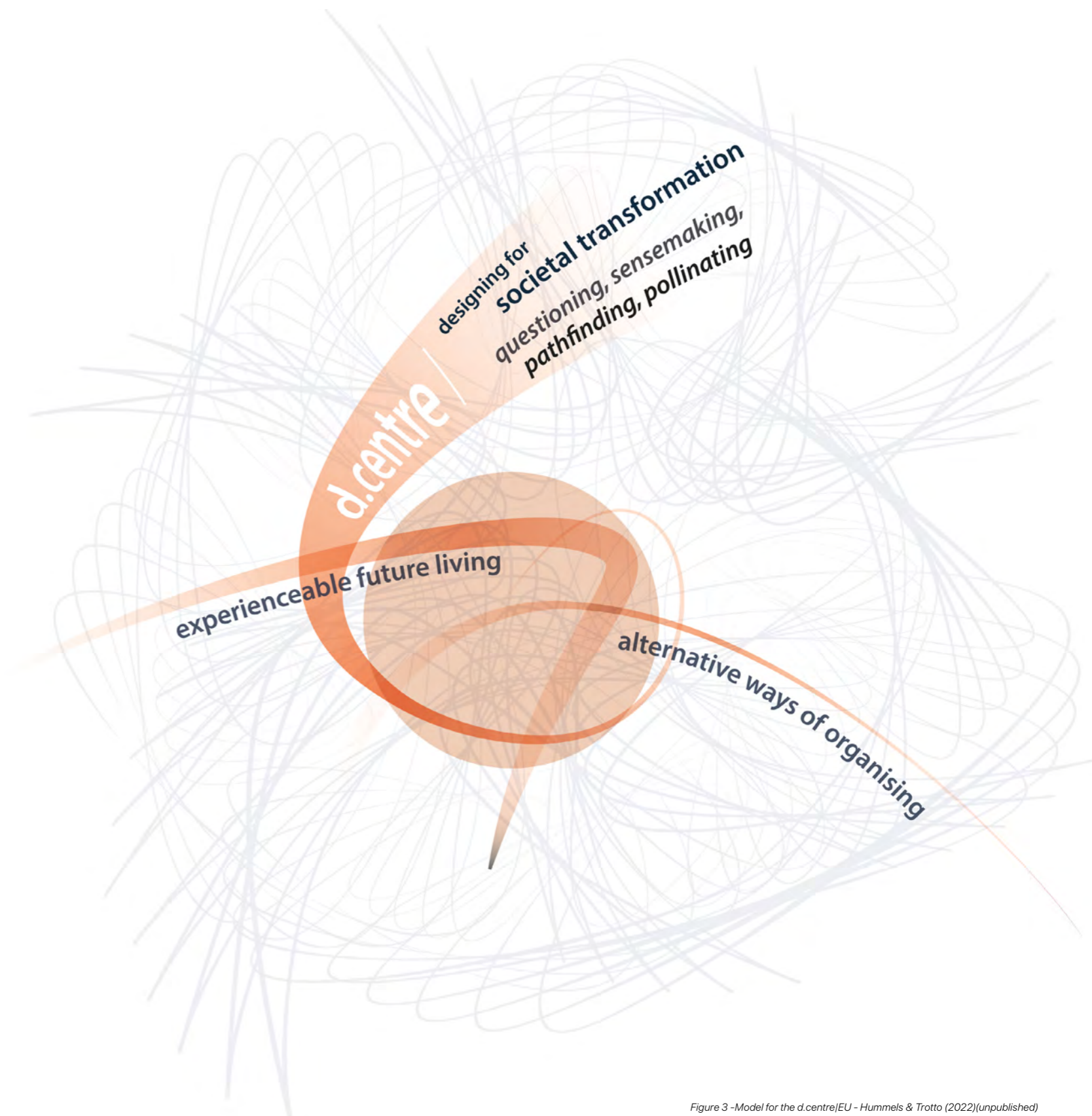


Figure 3 - Model for the d.centre|EU - Hummels & Trotto (2022)(unpublished)

A new way of working

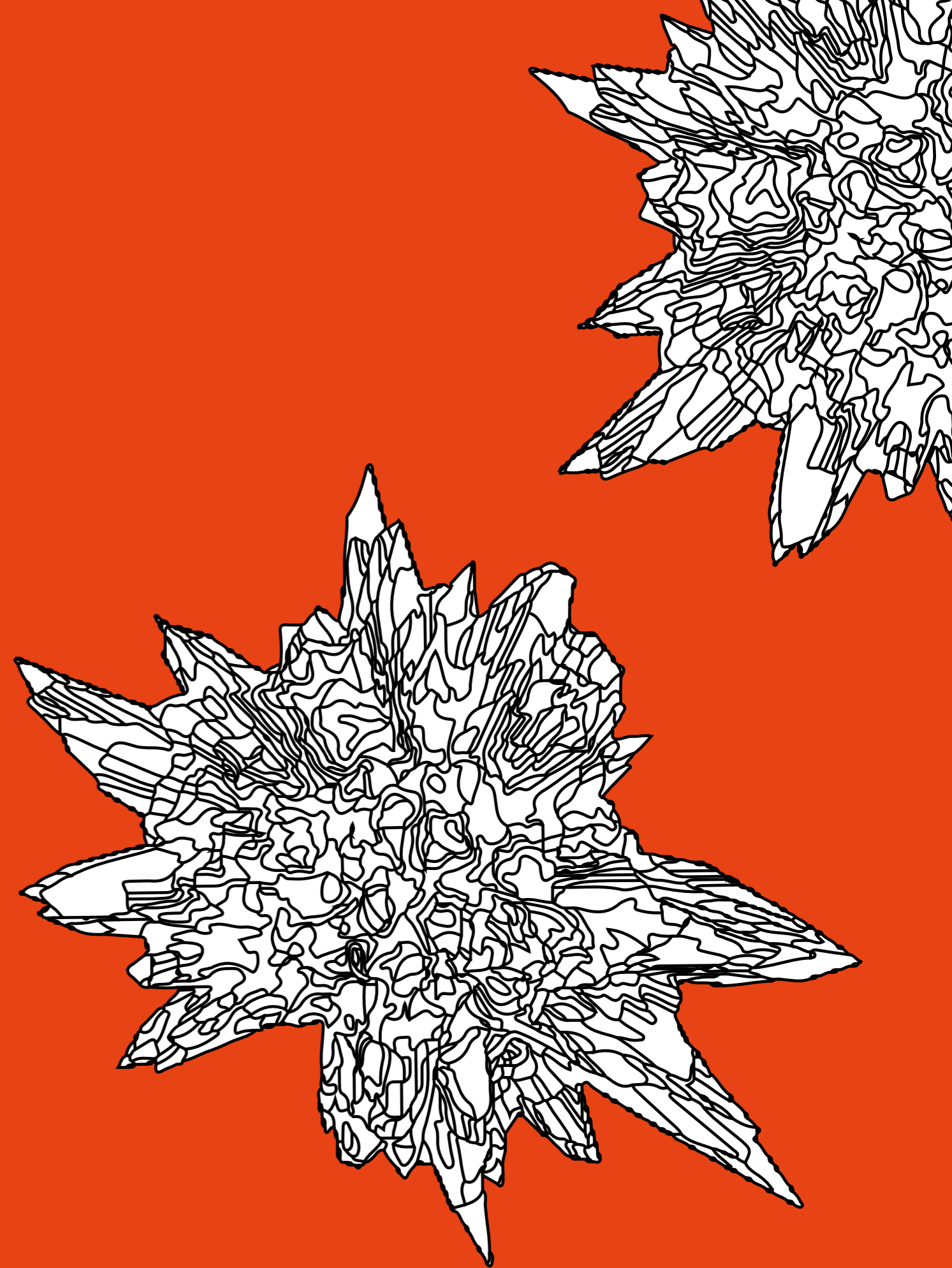
Collaborating on the development of the d.centre|EU

Designing for a complex initiative as the d.centre|EU is something that thrives in the collaborative effort to explore what would define the initiative and how we can facilitate this through design. With a group of master students and experts we have worked together to try to articulate what a 'Repository of Transformation' could be in the context of the d.centre|EU initiative. Through collectively exploring the boundaries of this repository we tried to unpack the complexity of how transformations can be made visible on a digital platform. With everyone having specific personal skills, competences, and interests, we have approached the 'Repository of Transformation' from various perspectives, as there was no clear set of boundaries and constraints to begin with. Through weekly discussions we have been able to define our own parts of this process, as well as ways that we could work together. This practice has been a process of transformation in itself, and a process of learning together.

As the effort of setting up such a digital platform requires a longer process than just one semester, we as a group of students and experts, had to find a way to create concrete goals within such a complex challenge. The group discussions have been moments of reflection while shaping the repository through different lenses. The work done by all of us is therefore not yet one whole but consists out of different facets of what needs to be considered when setting up a "Repository of Transformation", informing and inspiring each other.

Where I explored the historical perspective through the lens of Maria Göransdotter work on Transitional Design Histories, Wesley Hartogs explored and pushed the boundaries of the actual interface and back end of a "Repository of Transformation" that would be available online. Renate Voss has dived into the methods and theories that exist around transformation and worked on their approach to and use in transformation processes. This was a start in uncovering how these theories and methods would have a role in the Repository. Jorrit van der Heide explored how the processes of transformation could be translated into a platform, and Rosa van der Veen focused on the necessary reflection needed to come to an understanding of what has been transformed throughout these processes.

It is important to note that this collaborative process has been an experiment in itself. Working on design research processes within the Systemic Change research group involves working with complex societal challenges that are not bound to be 'solved' in one semester by one student. This practice, of working collaboratively on something that needs to be continued by both other students and ourselves in new projects and collaborations, reflects the reality of such complex processes and has therefore been a rich learning experience in how navigating complex challenges can exist through student collaboration.





Theoretical Background.

To understand the past and see how I can research that that has been, I explored a multitude of theories to take inspiration from and inform my design process. I build upon theories that approaches ways of observing the past, the ambiguity that is embedded in the past and historical perspectives and methods of researching the material remains of the past.

Observing the past

When looking at the past, we look at events that happened before the now. These events are historically described, and these historical accounts are often valued as the closest we can get to understanding what has happened. These accounts are ambiguous, in the way that they are perspectives on what has played out in the past but are not 100% accurate description of what has taken place. These accounts are contextual, and without their historical context ambiguity increases (Pollmann, 2000).

"It is a common view among historians that the meaning of representations of historical knowledge depends on the context in which the fact has function."
– Pollmann (2000)

Coherence in historical accounts is something that is often seen as a tool to claim something as truer and to counter ambiguity, but the presence of coherence does not equal truth. As Pollmann (2000) points out, "Untrue beliefs will not turn out to be true merely because they cohere with others". Coherence is an approach that can work in certain contexts but cannot be used to counter ambiguity. So how do we deal with this ambiguity in historical accounts and is it a bad thing that needs to be avoided at all costs? Can ambiguity in history be used as an advantage?

Much of this ambiguity in history arises from the fact that we are not physically able to observe what happened in the past. In the context of the observability of spacetime (relativity theory), Kosso (1988) goes into the difference between observable and unobservable information. Here observable information is defined as information transferred through the medium of light; this is unambiguous. Information gets ambiguous once we are unable to define it in terms of observation, this is the information we can feel or sense, but not see directly. In the

context of observational science it is important that information reaches the observer through interaction with the object and that the account of this interaction is credible. In much of empirical science direct observation is not possible and the observations are made through a credible a medium (e.g., telescope, microscope, binoculars).

"As Grover Maxwell has effectively pointed out, there is a significant ambiguity in the natural sciences as to what is to count as observable and is not. The question whether indirectness, as imposed by an imaging device such as a microscope, disqualifies an image for being an observation. The Ambiguity arises when we ask how much indirectness is tolerable." – Kosso (1992)

Kosso (1992) suggests that the same standards can apply to the observation of the past, as long as the medium through which the observation takes place is credible. The ambiguity of indirectness Kosso talks about can also be of use when observing the past, it is not something that is to be avoided completely. Embracing ambiguity in observing the past can lead to the integration of many perspectives in the observations of the past and even guide towards perspectives that used to be overlooked in more coherent and straightforward historical accounts.

Embracing ambiguity (in history)

With the approach of Göransdotter (2021) with Transitional Design Histories, the construction of histories or historical narratives build upon ambiguity to open multiple perspectives on the past. She proposes that Histories can be made as prototypes, these prototypes are described as followed:

"[...] histories made as prototypes should be open, possible to adjust and change after trying them out, but still solid enough to be able to provide a certain functionality or experience that allows for specific aspects of an idea or a proposal to be investigated."
– Göransdotter (2021)

The prototypes presented by Göransdotter in her dissertation are textual accounts of design history. Something that fits with the traditional way of reporting history, for historical knowledge is one way, or another accompanied by pieces of text (Pollman,

2000).

But traces of the past and historical knowledge can also be presented through visual or physical objects. In the book Cartographies of Time (Rosenberg & Grafton, 2010) a large mix of maps and objects is presented that hold visual information on the passing of time and the historical events that took place. But these visualizations of history also include pieces of text in the form of legends, dates, names, and titles.

If we take design as a context for exploring the past, we need to embrace the ambiguity. Ambiguity is at the heart of many of the inner workings of the design process (Linse, 2017; Herbes, 2022; Gaver, Beaver & Benford, 2003; Trotto & Peeters, 2015). In their research on ambiguity as a material for design, Gaver, Beaver & Benford (2003) identified three broad classes of ambiguity in design. Ambiguity of information, context, and relationship.

"Ambiguity of information finds its source in the artefact itself, ambiguity of context in the sociocultural discourses that are used to interpret it, and ambiguity of relationship in the interpretative and evaluative stance of the individual."
– Gaver, Beaver & Benford (2003)

In their description of ambiguity of relationship, they explain how this type of ambiguity in design can encourage people to consider the personal significance of things, behaviours, or events in their environment. Design can draw attention to the overlooked aspects of the environment to encourage reflection on their significance. In this way design can also help in exploring the past and its environmental and material remains, and through this trigger reflection on how the past influences the present and the future. So how do we study the environment and material remains of the past?

Studying the material remains of the past

The scientific practice of archeology developed the tools and methods to study the environmental and material remains of the past. Archeology studies places and objects from the past to form an understanding of what took place. Archeology does not just look at relics from ancient times but also researches the more recent past. In their observation

of the contemporary past (Burström, 2009; González-Ruibal, 2014), archaeologists use their approach to studying material remains of the past in a more recent context. This archeology of the contemporary past is a powerful tool to study the most recent past that has a big influence in our lives in the present.

Because of its focus on the recent past, this field of archeology has an advantage over archeological practice that researches older time periods. This advantage takes shape in the abundance of sources that go beyond the material and locational. They contribute to more nuanced histories and allow for the inclusion of alternative narratives that do not have a role in the larger historical narrative (Burström, 2009).

In his essay titled "creative confusion: modern ruins and the archaeology of the present", Burström (2011) mentions an interesting effect of the archeology of the recent past. He describes how most people associate archeology with the study of ancient history and that an archeology of the present can sound like a contradiction in terms. People are often surprised that the material remains of their own lives became a topic of interest for archeology, it is a discovery that forces them to reflect on the passage of time and on their own place in history.

"The individual is reminded that there was a time before his or her own life, and that there will also be a time after. One's lifetime is put into a larger context in which different periods of time converge and overlap in the present moment"
- Burstrom (2011)

In their practice archeologists collect, systematize, and interpret fragments. These are usually seen as broken or disconnected from a larger whole. It is this totality, or bigger history, one normally seeks knowledge of and tries to complete. The strength of archeology of the recent past is that it makes us realize that the fragment can be something even larger; it can be a way to deal with a past that is so extensive and complex that any attempt at an overall description would necessarily have to be a reduction (Burström, 2009). In this way archeology of the recent past embraces complexity and gives it a place in within the practice of writing history. The past, recent or ancient, is complex and there is no one narrative that tells the complete story. This complexity helps in highlighting biases in historical narratives and allows for the exploration of new perspectives.

The inherent power in material remains to make people remember is fundamental to archeology of the recent past. The encounters people have with material remains, and the narratives they share about them with archeologists and others, help to prompt memories and knowledge that would otherwise have remained hidden. These memories and this knowledge often include aspects that cannot be found in other sources and are invaluable to understanding the human dimension of the recent past (Burström, 2009; Tolson, 2014).

In its ability to extract information from the material remains of the (very) recent past, and the way archeology of the recent past can place this unique information in a larger context of sources enables the practice to create more nuanced and inclusive histories (Burström, 2009; Burström, 2011; González-Ruibal, 2014; González-Ruibal, Kersting & Olivier, 2018). These are strengths that are also at the heart of the method of transitional design histories, where the openness of the prototyped histories allows for the inclusion of multiple perspectives on the past and the focus on practice (Göransdotter, 2021).

Introducing Design Archeology

By combining both approaches of observing and exploring the past, I propose to create a design archeology. In which the re-engagement with the material remains of old design projects helps to prompt memories and allows for tacit knowledge to become visible again (Jürcke, Montes-Landa & Ceccarelli, 2021; Kuijpers, 2017; Sørensen & Rebay-Salisbury, 2013). In this design archeology you aim to reconstruct past activities through interacting with the material remains of past design projects. You extract the memories that are embedded in the material aspects of the design and by re-enacting the intended interactions (Tolson, 2014). By embracing ambiguity in this process, design can draw attention to the overlooked aspects of the objects and environments, and what processes played a role in its creation and encourage reflection on their significance for design practice (Gaver, Beaver & Benford, 2003; Trotto & Peeters, 2015). In this way Design Archeology can help in analysing the past and its material remains, and through this trigger reflection on how the past influences the present and the future, and inform design practice.





Design Process

In this section I will go through my design process. I will discuss the exploration of Transitional Design Histories and Maria Göransdotter proposal of histories as prototypes. I describe my dive into theories that discuss the observation of the past and perspectives in history and my integration of methods from archeology of the contemporary past into design practice. This section concludes by introducing the final design, the Design Archeology Research Kit.

Prototyping Histories

Maria Göransdotter defines transitional design histories and how they can be made and used as prototypes as followed:

“The program of transitional design histories merges methodologies and approaches from practice-based design research and historical research. I have proposed that design histories can be made and handled as prototypes, in a way similar to how prototyping is applied in design and design research. Following this, histories made as prototypes should be open, possible to adjust and change after trying them out, but still solid enough to be able to provide a certain functionality or experience that allows for specific aspects of an idea or a proposal to be investigated.”

In her dissertation she presents three elaborate prototyped histories, these histories are textual accounts of the development of the design practices surrounding the concepts of participation, use and methods in Scandinavia. She uses extensive archival sources to support these narratives and through these histories as prototypes she tries to answer the following questions:

» *What becomes visible in design’s conceptual frameworks, when a shift in positioning brings design history to the outlook of designing?*

» *Will histories for design be able to activate different understandings of core design concepts, in terms of the historicity of designing?*

» *What becomes visible as history relevant for design, when perspectives are taken on the past through core concepts in design? Will other historical contexts, actors, and ideas come into view, contributing to design history?*

To further understand the concept of Transitional Design Histories I had a meeting with Maria. In this meeting we discussed what the Transitional Design Histories could do in the context of the d.centre|EU, and what the opportunities are in further exploring the design possibilities with transitional design histories. We talked about tools for activating concepts and uncovering hidden traces as well as the role of physicality and interaction in transitional design histories and the lack thereof in the prototypes she presents in her dissertation. This is where we

identified design opportunities for transitional design histories, to further explore what the role of the visual and physical/material is in exploring the past of design practices.

Visualizing or Materializing history

In my exploration of the visual and the material, I used this division to explore what both concepts mean in the context of exploring the past and merged the insights of these explorations for several prototyping explorations.

Different ways of visualizing the past

There are many ways in which the past and the passing of time has been visualized. You have traditional timelines and chronological overviews. In the book cartographies of time (Rosenberg & Grafton, 2010) a spectrum of visual ways of showing the passing of time and the presentation of history is presented. I found inspiration in the complex multidimensional maps of Emma Willard (Figure 5-8), the maps of the meandering of the Mississippi river over time by Harold Fisk (Figure 11), the collection of geographical maps showing snapshots of the world at different historical moments by Edward Quin (Figure 10) and interactive visualizations like the “Chronographie Universelle” (Figure 9) and “Discuss Chronologicus” (Figure 4). These examples gave me insights on possibilities of visualizing the passing of time and past in a way that is different from the “standard” traditional timeline.

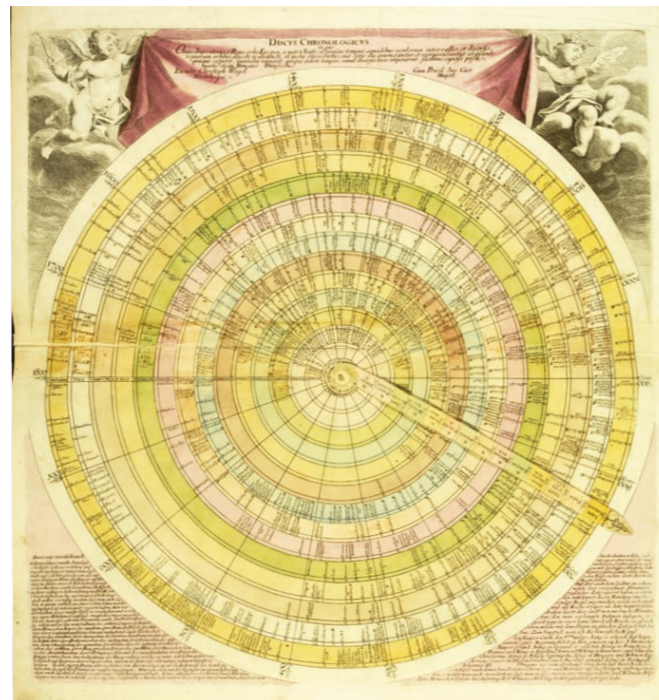


Figure 4 - “Discus chronologicus” by Christoph Weigel (early 1720s) From Cartographies of time (Rosenberg & Grafton, 2010)

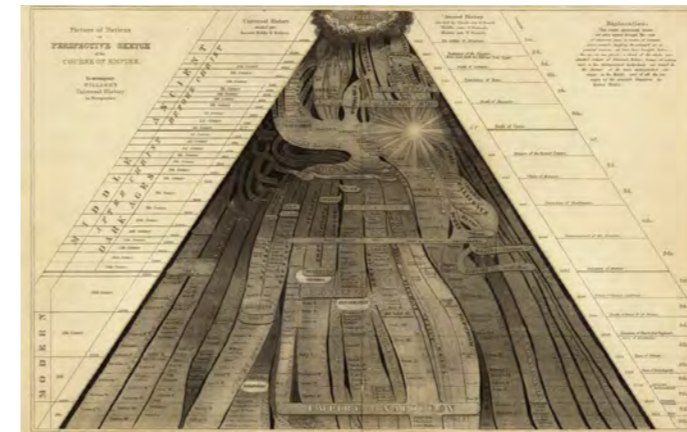


Figure 5 - “Picture of Nations; or Perspective Sketch of the Course of Empire” by Emma Willard (1836). From Emma Willard’s Maps of Time (Schulten, 2020)

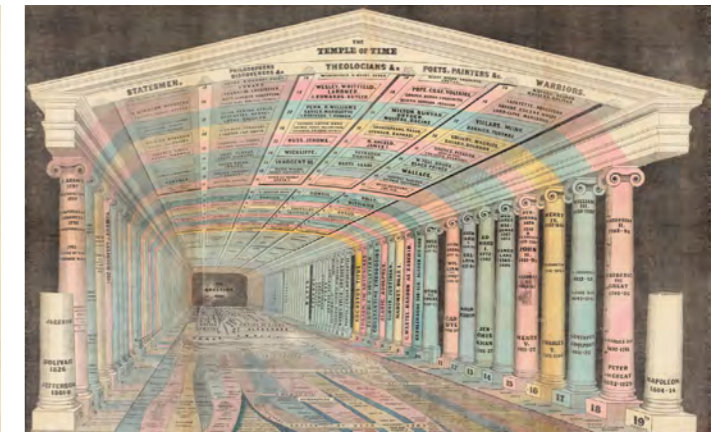


Figure 6 - “The Temple of Time” by Emma Willard (1846). From Emma Willard’s Maps of Time (Schulten, 2020)

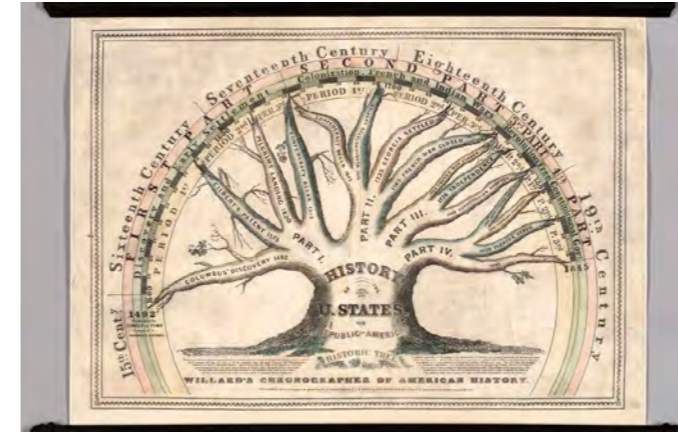


Figure 7 - “Willard’s Chronographer of American History” by Emma Willard (1845). From Emma Willard’s Maps of Time (Schulten, 2020)

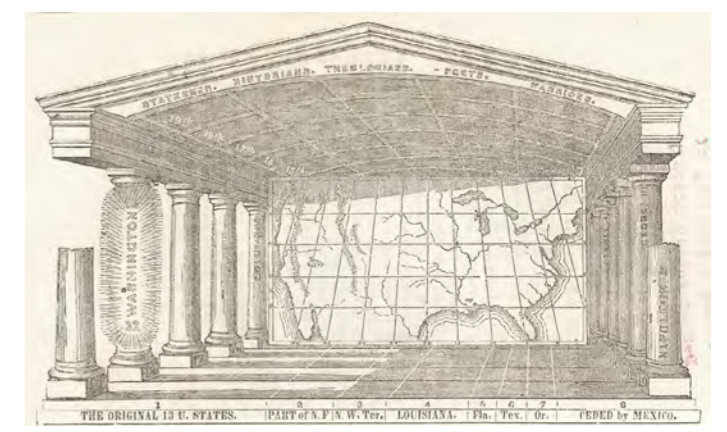


Figure 8 - “American Temple of Time” Emma Willard (1860). From Emma Willard’s Maps of Time (Schulten, 2020)



Figure 9 - “Chronographie universelle” by Jacques Barbeau-Dubourg (1838) From Cartographies of time (Rosenberg & Grafton, 2010)

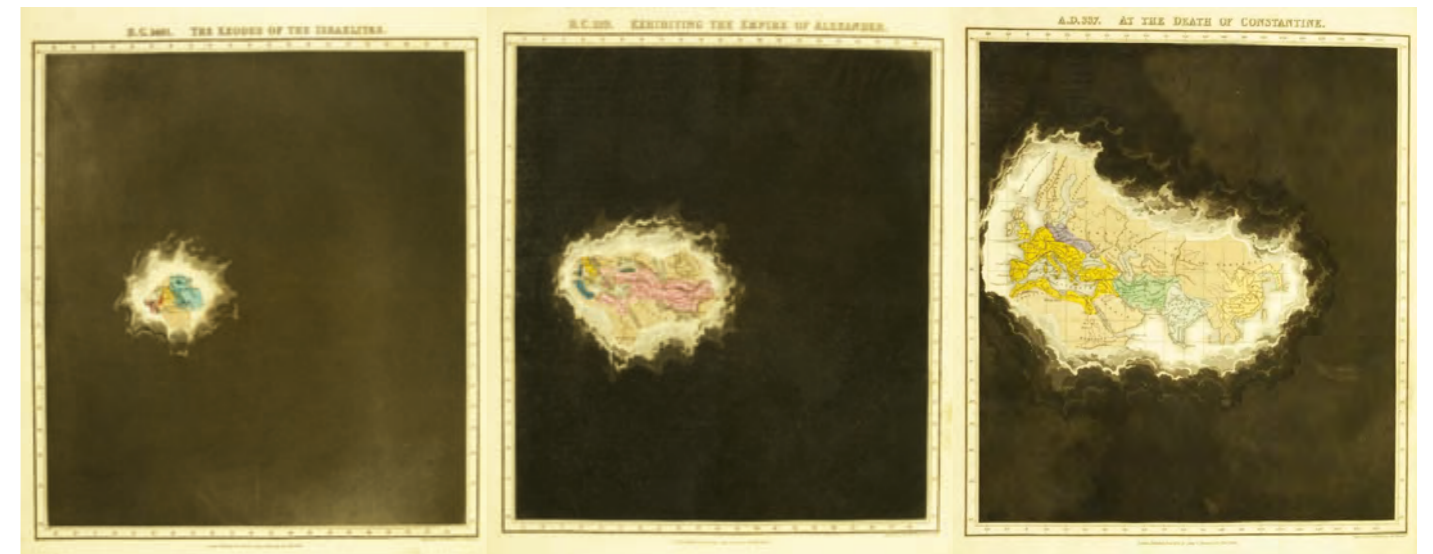


Figure 10 - “An Historical Atlas” by Edward Quin (1828) From Cartographies of time (Rosenberg & Grafton, 2010)

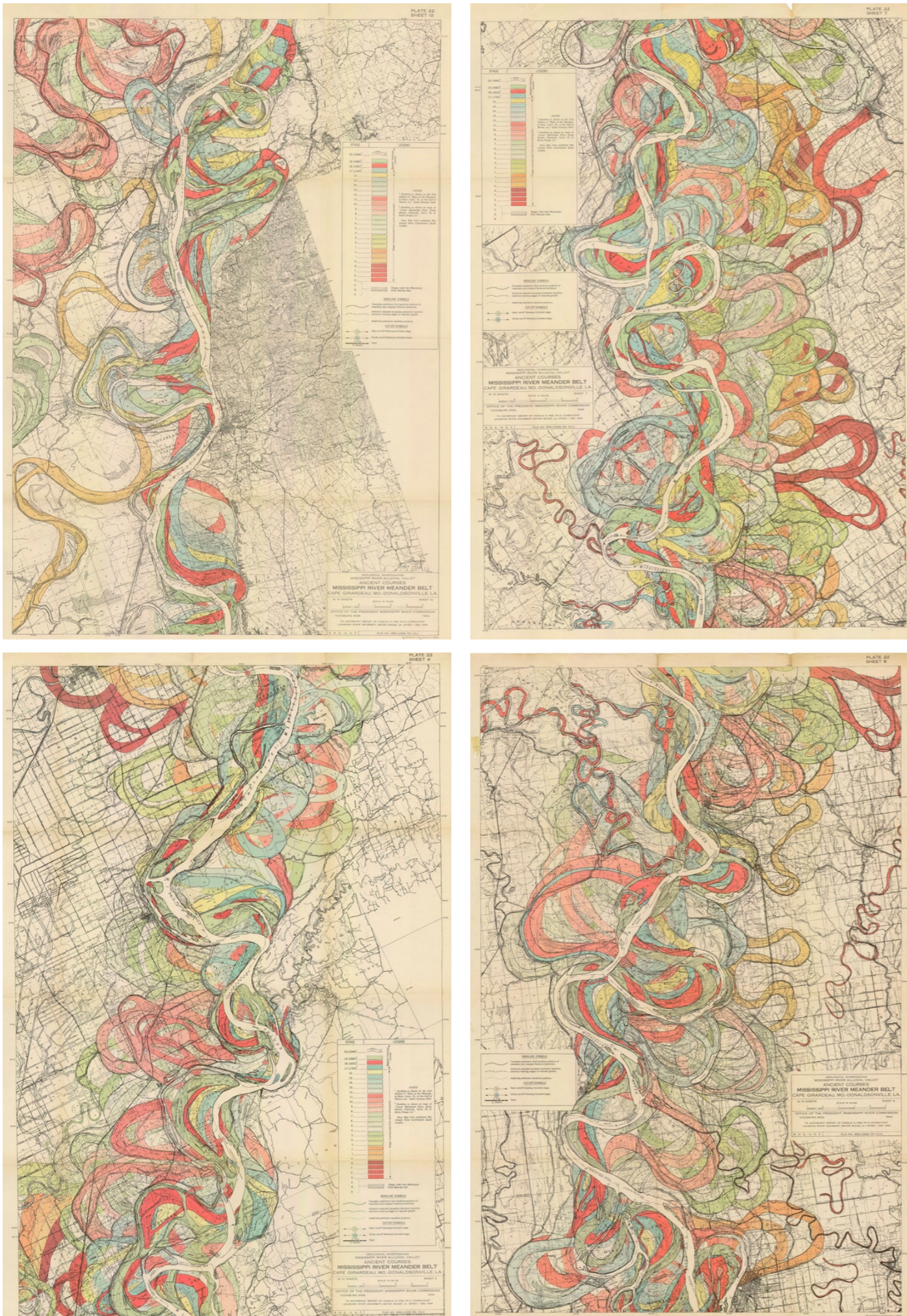


Figure 11 - "THE ALLUVIAL VALLEY OF THE LOWER MISSISSIPPI RIVER" by Harold Fisk (1944) From Radical Cartography (n.d.)

Different ways of materializing the past

The materialization of the past is embedded in our surroundings, it takes shape as objects, buildings, cities, infrastructure, etcetera. How does the past shape these artifacts and features that we find around us? This is where archeology comes into play, archeology tries to extract information and knowledge from these material remains of the past, and through this aims at uncovering hidden historical narratives.

To see how I could use an archeological approach, I tried to analyze objects around my room and see what information I could extract from my personal artifacts (Figure 12). In this process I tried to categorize the artifacts in different categories that relate to my personal development and how they represent my past. By doing this I gained insight in what I could extract in this auto-archeological approach. By discussing this with fellow students I realized that the information embedded in this materiality is highly personal and that it is very dependent on your worldview and historical perspective. Its significance can be clear to yourself, but it is ambiguous to others and even to describe this significance you will need to deal with ambiguity, expressing it in words is not sufficient. You want to express how the knowledge and meaning in these objects changes over time and how that is linked to you as a person. I found that a visual aid can help in expressing this development and the values that are part of it.



Figure 12 - Categorized personal objects from the past



Prototyping interactive visualizations

With the inspiration taken from the historical visualizations of the past and the insight I got from exploring what information the materiality of the past holds, I made a series of prototypes that build upon these insights. I will now describe each exploration and its iterations and the accompanying reflections; the explorations are collected as videos to show the interactions that plays a role in the prototypes.

First exploration - drawing trajectories of time

The first prototype (Figure 13) was a processing sketch that allowed the user to draw trajectories by using two "onscreen"-sliders. One for the x-axis and one for the y-axis, it was inspired by the maps of Harold Fisk (Figure 11). Once a trajectory was drawn, a new random color line could be drawn from the starting position. The goal was to allow users to create multiple historical trajectories.

Reflection

The prototype is two-dimensional in its expression, the line can be easily defined and traced. The controls are very clear but do not provide a lot of freedom, this makes the experience not very interesting and lacks the ambiguity that is needed to engage the user in a reflective process that is needed to create meaningful insights. Just as the controls lack freedom, the reset for different colors lacks the freedom of choosing a color which inhibits creativity and expression.

Iteration: Adding slider-potentiometers for controls

By adding a slider-potentiometer to control the x- and y-axis provides a more embodied and tactile control when drawing the trajectories, but it does not provide enough freedom for expression (Figure 14).

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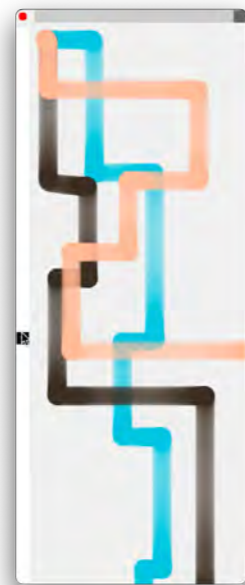


Figure 13 - First exploration

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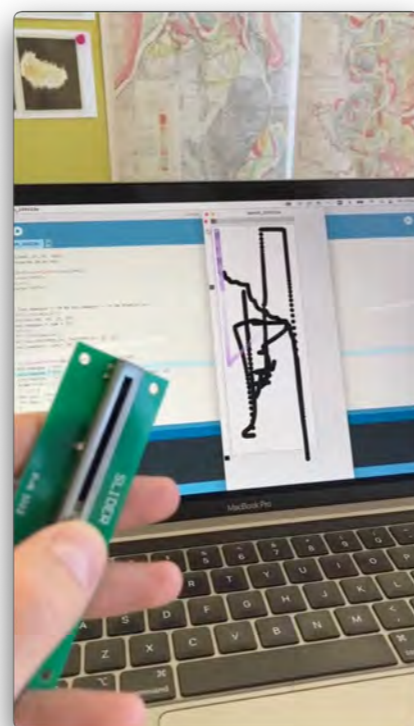


Figure 14 - First exploration with slide-potentiometer

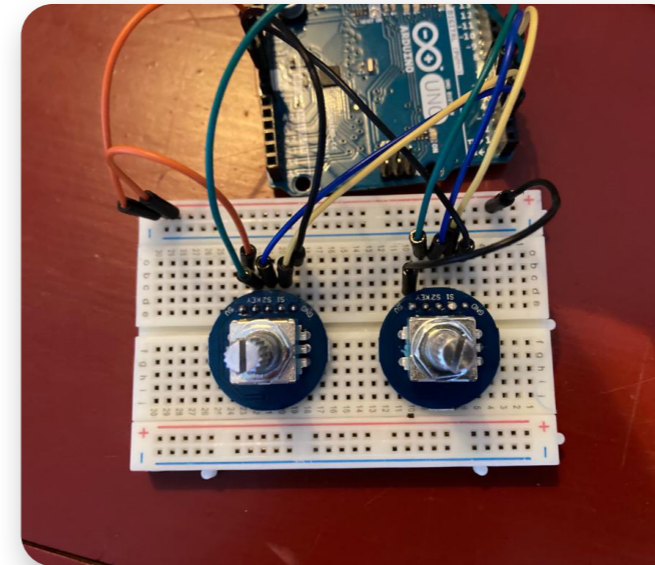


Figure 15 - Iteration 1, two rotary encoders as for control

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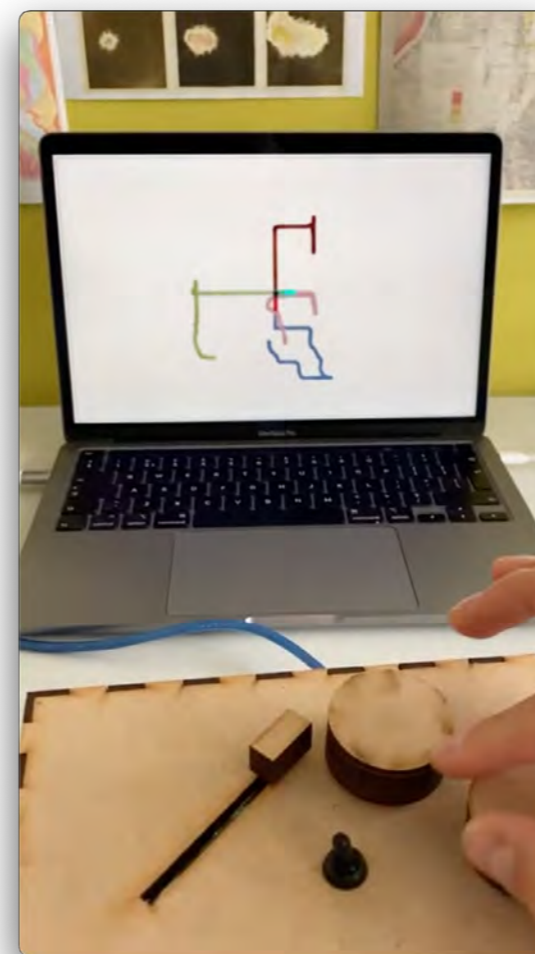


Figure 16 - Iteration 2, more directions to draw trajectories

Iteration 1

Based on the insights from the first explorations a controller was made that used two rotary encoders to control the drawing of the lines, the buttons integrated in the rotary encoders functioned as reset buttons (Figure 15). The controller still used the same sketch but allowed for more freedom of control and thus more freedom of expression. The controls could also be shared, which allowed for trajectories to be drawn in collaboration.

Reflection

The two rotary encoders give more freedom to draw on the screen, but the starting point top left still limits the directions in which to draw. With more freedom and interaction in the controls, the processing sketch becomes a limiting factor when freedom is needed. The clicking of the rotary encoders makes the controls feel incremental, this might feel like it is limiting the number of steps you can take and can be counterintuitive with the fluid motions on the screen.

Iteration 2

This iteration used the new controls from the previous iteration and introduced a new version of the processing sketch (Figure 16). The starting point was placed at the center of the screen which allowed the user to draw trajectories in more directions.

Reflection

Starting from the center gives more freedom in motion of drawing, the rotary encoders are more useful here as a controller of the trajectories. The starting point of the screen allows for nonlinear trajectories to be drawn. Drawing trajectories remains a fairly straightforward way of visualizing the past, it lacks a certain ambiguity.

Second exploration – shaping periods of time

In this second exploration a new type of visualization is introduced. A sphere that is made up of a certain number of vertices influenced by Perlin-noise (Figure 17). The height and movement of the intersecting points of these vertices is controlled by the controller that is coupled to the Perlin-noise (two rotary encoders). The aim is to allow users to visualize their historical perspective on the past

Reflection

Controlling the sphere is engaging and inviting. Tuning the shape to the users preferred specs is quite straight forward, but because of the noise and movement there is no full control of what the shape might look like with every click of the rotary encoder, this creates ambiguity that invites for exploration and allows for appropriation of the created shape by the user.

CLICK IMAGE FOR VIDEO

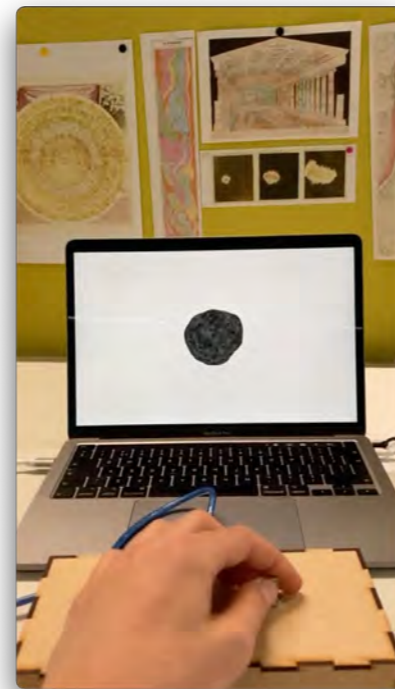


Figure 17 - Second exploration, sphere as visualization

CLICK IMAGE FOR VIDEO



Figure 20 - Iteration 2, color filters

Iteration 2

A new element was added in this iteration, an acrylic stand that can be placed in front of the screen that allows for different color filters to be placed on the created visualization (Figure 20). The idea was that the color filters allow for different ways of perceiving the colors that you can create with the slider. This addition gives the user an extra level of depth in exploring the values they want to express.

Reflection

The color filters allow for different ways of perceiving the colors. This addition gives the user an extra level of depth in exploring the values they want to express. This addition seems a bit unnecessary and is not an addition that would benefit the use of the design.

CLICK IMAGE FOR VIDEO



Figure 18 - Iteration 1, color control

CLICK IMAGE FOR VIDEO

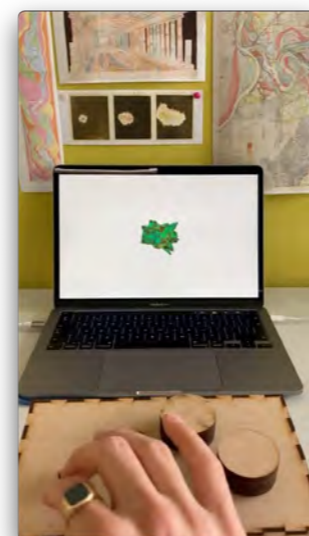


Figure 19 - Iteration 1, color control

Iteration 1

To allow for more freedom and customization, a slider was added in combination with a three-position toggle switch for Hue, Saturation, Brightness (HSB) control (Figures 18 & 19). This allowed the users to control the full spectrum HSB values that would determine the color of the sphere.

reflection

The ability to change the HSB-values, gives a nice extra level of interaction, it allows the user to visualize their expression of values in another way. Thus, enlarging the level of freedom that the controller offers. By not indicating which switch position is coupled to which variable allows for extra exploration. By adding the ability to change color, there is more room for appropriation of the created visualization.

CLICK IMAGE FOR VIDEO

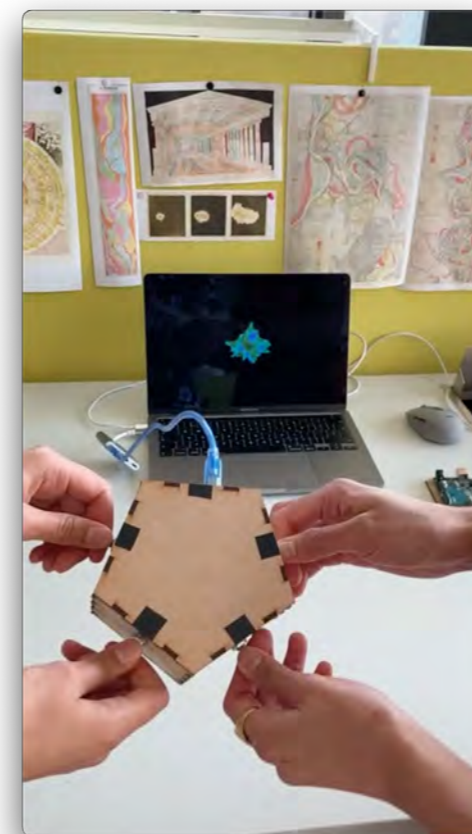


Figure 21 - Iteration 3, two person control

Iteration 3

In this iteration the controller is transformed from a control-pad style to a portable object (Figure 21). It features 4 rotary encoders, which are linked to the height and movement of the intersecting points of vertices on the sphere. 2 for height and 2 for movement. This allows two users to co-create the shape on the screen and have a conversation through the visualization. The controller has an internal accelerometer, this allows for the user to turn rotate and observe the visualization in multiple direction by moving the controller.

Reflection

This controller allows the user to be more connected to the visualization through the embodied interaction the accelerometer creates. The interpersonal interaction that is created through the 2-person control can illicit interesting conversations, but this takes back the freedom that is part of the single users' abilities to create and appropriate a visualization. The goal in this iteration would be more towards discussion of past perspectives than exploration of past perspectives.

Defining the design space

Merging insights from theory and prototyping



The previous design explorations offer a multitude of uses, and the ambiguity that is part of the visualizations gives the users the opportunity appropriate these visuals and use them to explore past perspectives and trajectories. This multitude of can be explored from the perspective of multi-stability, as it is coined in post-phenomenology:

"A technology can always be put to multiple purposes, can always fit into multiple contexts, can always be meaningful in different ways to different people, can always evolve differently within different cultures [...]. At the same time [...] any technology is always limited with regard to what it can mean and how it may be used." - Rosenberger (2020)

The question that originates from this, is what the stabilities are for the design? These stabilities need to be defined based on the contexts of use. To find these stabilities and better define this context of use, I revisited the 3 design spaces I defined in my FMP-proposal [Appendix D]. These design spaces are defined as followed:

- *Experiential concepts move towards designs of experiences or rituals that allow people to experience different histories.*
- *Supportive concepts move towards tools that allow people to explore their historical perspective.*
- *Symbolic concepts move towards the confrontational designs, that force people to reflect.*

The current explorations are a mix of these three design spaces, but would find their place more in between the experiential and supportive realm. I would redefine the design space that the explorations are placed in as:

"Concepts that move towards designs of experiences or rituals that allow people to explore their personal historical perspective."

This redefinition of the design space helps in the defining the context of use. It will be a setting in which

users are asked to explore their past and see how their personal historical perspective plays a role in how they perceive the present and look towards the future.

To explore what this means in terms of design qualities I revisited the qualities that are part of histories as prototypes as proposed by Maria Göransdotter (2020). Histories as prototypes need to be:

open, possible to adjust and change, allow for investigation, and solid enough to provide a certain functionality/experience.

These qualities can be matched with the qualities for aesthetic engagement and dealing with ambiguity and complexity as described by Trotto and Peeters (2015). When you design for aesthetic engagement:

The design should not reduce the complexity of the experience that it elicits, but it should respect it to an appropriate degree, so it can open up complexity.

The design needs a degree of open endedness, and it should create complexity and ambiguity so it can allow a person to interpret their own meaning.

And a design embodies a balance between all the users' abilities and it addresses all of the users' skills and elicits true expression of the user in the interaction that they have with that artifact, it can afford a personal perspective based on the users total being in the world: the uniqueness of the users body and their past experiences.

These qualities also fit with the types of ambiguity in design as defined by Gaver, Beaver & Benford (2003). Especially the one concerning ambiguity of relationship. Since this type of ambiguity in design invites people to consider the personal significance of things, behaviors, or events in their environment. Through using this ambiguity in design, the designer

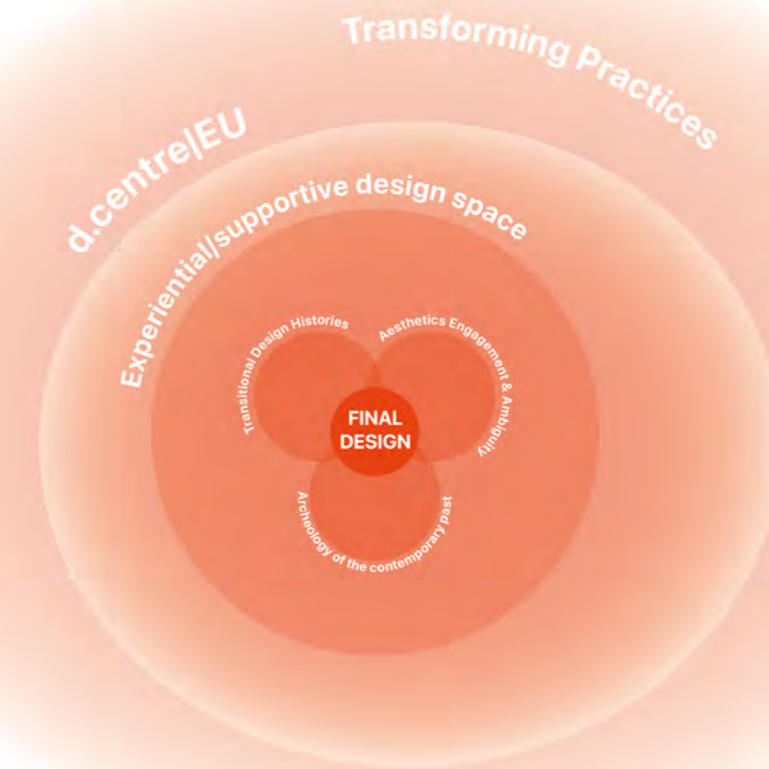


Figure 22 - The final design space

can draw attention to the overlooked aspects of the environment to encourage reflection on their significance.

The final design plays around with these qualities that are found in aesthetic engagement, ambiguity in design and histories as prototypes with the aim to create awareness of how the past plays an important role in uncovering the present and working towards the future.

Placing this design space with the design qualities in the context of the d.centre|EU helps define the stable uses the design should have. Since the d.centre|EU is a new direction of Transforming Practices, it is a logical step to look towards the past of Transforming Practices as an area of interest. The d.centre|EU will be partly made up of designers and can be seen as a design challenge in itself, it would be useful to understand how past design projects related to Transforming Practices can inform the development of the d.centre|EU.

To extract new knowledge and information from these old projects that can inform the development of the d.centre|EU, I took an approach that builds on Archeological practice. Specifically archeology of the contemporary past, since they work within a past where there is an abundance of sources (Burström, 2009; González-Ruibal, 2014). To expand the

possibilities of Maria Göransdotter's work of histories as prototypes I want to extract knowledge from the material remains of old projects. Because there is hidden knowledge in those remains that only the designers know of, it is not the reports and the papers that I want to use as sources of information, but I want to find out what is hidden in the remains. What the unwritten past is of these projects and by building on the practice of archeology I aim to extract this information.

Based on these insights the following set of requirements for the final design was created:

- *Visualization and interactions need to embrace ambiguity and complexity, and allow for investigation and appropriation.*
- *The aesthetics need cannot distract from the experience, therefore the prototype needs be of high fidelity.*
- *The material remains need a central role, since they are the artifacts of exploration.*
- *It needs to be portable; archeologists go to sites for their investigation.*
- *The user is the operator, not me. So apart from a short how-to, I should only be needed as an interviewer.*

With these requirements I created the final design: the Design Archeology Research Kit (D.ARK).



The Design Archeology Research Kit

The practice of design is future oriented, designers make propositions that help to imagine, experience and research new futures. But design can also learn from its past and use this knowledge that is embedded in the past to inform and shape current and future practices.

The Design Archeology Research Kit (D.ARK) helps to extract knowledge from the material remains of old projects. D.ARK supports the user in re-constructing past experiences through ambiguous visualizations. This ambiguity allows the user to appropriate and give meaning to the visualizations, which aides in recounting the past from new perspectives.

Through taking an approach that builds upon archeological practice, designers can gain new insights about their practice from analyzing the material remains of past projects. This 'Design Archeology' can help navigate the complex 'now' through uncovering the hidden past and shed light on a multitude of possible, plausible, and preferable futures.

The Design archeology Research Kit needs four elements to function. D.ARK exists of three of these elements, the controller, the date-set module, and the visualization software. The fourth element that is essential to the functioning of D.ARK is the presence of material remains of the to be explored project.

Controller

The casing of the controller is made of MDF and Acrylic. It holds an Arduino Uno that has four rotary-encoders and an accelerometer connected to it. These five sensors provide the input needed to manipulate the visualization on the screen. After the date-set module has been used to provide the first input, the controller will be initialized, and the user will be able to control four variables in the visualization by turning the rotary encoders. To reset all these values one of the four rotary encoders is pressed, which in return resets the visualization.

These variables are:

- The maximum height of the peaks
- The colors that make up the shape
- The contrast between the shape and the background
- The dynamic movement of the colors and peaks

The integrated accelerometer allows the user to rotate the shape on 3 axes by rotating the controller in the corresponding axes. This enables the user to view the shape from all possible angles.

Visualization software

The visualizations are made with the Processing 4 software. The processing sketch [Appendix A] uses the input from the date-set module to determine the number of vertices for the initial shape. After receiving this input, it initializes the controller to receive input for 4 variables that were mentioned before. The Sketch uses Perlin-noise to create the dynamic variation in color, peaks and movement, this noise is controlled through the input it receives from the controller.

Date-set module

The casing of the module is made of acrylic. It holds an Arduino that has an TM1628 Led display module and a button connected to it. The date-set module provides the initial input that defines the number of vertices that make up the visualization. The longer ago the date that is entered the more vertices will make up the sphere of the visualization. The reasoning behind this is based on the idea that the longer ago something happened the more time it has had to become more and more complex and have a larger impact, thus the visualization being more complex. After the first initialization the module can be used any time to enter new points in time.

Material Remains

Without the presence of the material remains the Design Archeology Research Kit has no subject for analyses. The material remains affords the user to tell narratives about these material remains and how the interaction would work. The material remains illicit reflection and help to prompt memories and uncover hidden knowledge about the design process and design practice.

Exploring the past

Using the Design Archeology Research Kit

In the context of the development of the d.centre|EU, a new step in collaborating through Transforming Practices (TP), D.ARK was used to investigate the material remains of projects from designers that are actively involved in TP. The projects were selected based on their importance either for the development of TP or the development of the designer in relation to TP.

Interview set-up

The interviews were set-up to be semi-structured [Appendix B]. The designers were asked to bring the material remains of a project, or I would visit them at the location where these remains were stored. The remains would be placed central, and the Design Archeology Research Kit would be set up around it.

I would start with asking them to pick a starting date and enter this in the date-set module. We would then use this date, that often represented the official start of the project, as a starting point for going back in time and try to uncover what brought them to the project. From this we would further explore the details of the project and try to extract knowledge from the material remains. We would do this while moving forward in time and trying to connect the past to the present and try to open new perspectives on how the past project influences the present. From the present we would then try to envision how the past will influence the future.

The sessions would take somewhere from 60 to 90 minutes. The recording of the sessions consisted of the screen recording of the visualizations and the audio of the conversation. This resulted in a narrative that was recorded as a dynamic visualization combined with the recorded conversation [Appendix E - video with examples of narratives].

A day after the session a survey [Appendix C] was sent to the participants that asked about their experience with D.ARK and their perspectives on the past.

The following designers/project matches were interviewed with D.ARK



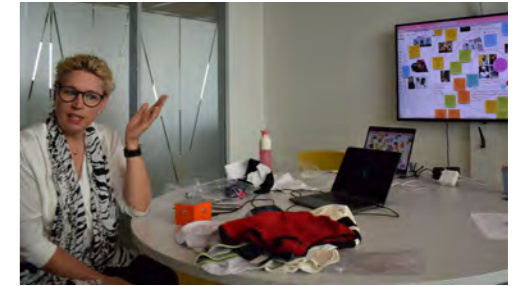
Maarten Smith – Philosophy at Work (2018)



Jeroen Peeters – Nodes (2011)



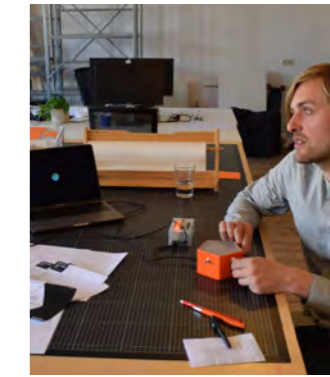
Philémonne Jaasma – [x]changing Perspectives (2018)



Cindy van den Bremen – Capsters (1999)



Caroline Hummels – Embodied Encounters Studio (2016)



Jop Japenga – Hidden Design (2013)



Sander van der Zwan – Gardeners of Organisations (2018)

Analysis of sessions

Defining themes of interest

The sessions were transcribed, and these transcriptions were combined with the input from the survey and analyzed through an approach similar to an inductive, semantic thematic analysis (Braun & Clarke, 2006). Through this analysis two main themes were derived; *Using D.ARK to explore the past* and *Insights extracted from the past*. The theme “Using D.ARK to explore the past” could be divided in the following subthemes: *Interaction, Visualizing, and Experience*. The theme “Insights extracted from the past” was divided in the subthemes of *Development, Reflection on Product, and Reflection on Practice*. I will now shortly discuss each main theme and their corresponding subthemes with the support of analyzed data. The participants are anonymized, to differentiate between quotes, the quotes are marked with a P following a unique number that corresponds to one of the participants.



Figure 23 - Main themes, with subthemes

Using D.ARK to explore the past

This theme touches upon the experience of using D.ARK and the task of extracting insights from the past. It describes the interactions, visualizations and experiences the participants shared throughout the interview and in the survey.

Interactions

The participants used the controller in a way that they deemed fit, for example the reset button would be used to select endpoints of certain time-periods. By resetting the visualization, a clean slate was created to start a new part of the narrative from.

“One feature of D.ARK changed the way I recalled the past: the ‘reset’ button. When I finished a story, I clicked restart, which neatly rounded it off, and opened space for the next one. Having the reset button afforded me the opportunity of recounting the history of our project in terms of short stories.” – P2

The visualization would dictate the interaction with the controller more than the controller would dictate the visualization. Once the participant was familiar with the controls and possibilities, the controller became fairly intuitive, and it would not distract from the creation of the visualization. Which resulted in the participants own intuition steering the interactions rather than the interactions blocking this intuition.

“As soon as I was familiar with the possibilities of the visualization, I noticed that I was trying to make a visualization that I already envisioned- rather than let the dynamics or knobs steer my exploration of the thing that I was trying to visualize.” – P1

The date-set module created afforded the participants to enter points in time as part of the narrative. Although it would not have a direct visual effect on the visualization, it did support the creation of a narrative and provided multiple point in time from which a narrative of the past could be formed.

The controller also had its limitations in terms of interaction, all participants needed a short explanation on how to operate the controller and date-set module. Since it has no labeling on what the knobs do, and the visualization is ambiguous users need time for exploration of the controls to see what variables are controlled by which knob and what the possibilities

are in terms of visualizing. In many of the sessions the visualizations would become more representative for the narratives that were told, because the participants discovered the possibilities and limitations of the kit.

“I realize that it takes some skillful coping for some of the aspects of visualizations to change. I would like it to more responsive so I can fidget a little more, so it is a more direct continuous visual” – P7

The exploration of the controls is also inviting and a good way to since it can be difficult to explore the past, and by exploring through physical embodied interaction with the controller experiences from the past could be recounted in a new way.

“It opens up alternative stories by messing with the way I would normally construct or tell my history” – P3

Visualizations

The ambiguity in the visualizations afforded the participants to appropriate the specifics of the visualizations to support their narratives about the past. They would describe periods or moments in time as vague, spiky, chaotic, dynamic, colorful, rounded, calm, uniform, bleak, etcetera.

“It became more rounded” – P5

“It starting to bubble a bit more” – P2

“It was red, it was an intense time” – P5

“It is not spiky but is a bit whimsical. Well i am not sure if it is whimsical, but it went into a lot of directions.” – P5

“I am going to make the background blurry, because the contrast with other design research methods is starting to fade” – P1

“Yeah, it is quite a monstrosity, but that is what needs to be, because it was very messy” – P1

“Let’s introduce some vagueness, green is a bit too much right now. Alright, a little vague. A young future, somewhere it is structured but it is also uncertain.” – P2

By affording this way of giving meaning to the visualizations, certain elements of the past that are hard to describe in words could be expressed visually

and, in this way, support the narratives that were told. This supporting role also helped to extract certain values and experiences that are embedded in the past but are hard to define and explain.

“I have a feeling, yeah, the complexity is more and more visible. And at the start those spikes are way larger, so it needs to be a bit more like this, yes nice. So, it is continuously moving, so we’ll twist it like this and then I’ll add a nice bit of red. Red because there is hope, hope that the design will do its job” – P2

“I thought it was nice to add a visual to my story representing especially the first phase of the project.” – P5

Some of the participants expressed some difficulty or hesitation when asked to visualize a certain period in the past, but through visualizing they would often find a visual that matched the narrative that they were trying to convey.

“I am not sure if I’m able to visualize that, which year shall we start from?” – P5

“I find it difficult to visualize a shift from one period to another with this system because it erases the previous states. You are not able to morph the previous one with a new version, I notice that I need to be able to see what I have created previously, so I can base the new version on that.” – P1

Experience

Through their experience with D.ARK the participants were able to find hidden knowledge and new perspectives on the past in the material remains of the projects that were analyzed. They expressed that these insights were helpful in understanding where they came from as designers and how their practice has developed over time.

“The experience with D.ARK made me see new relations in past developments” – P6

“D.ARK allowed me to creatively construct an alternative story about the role of the thing and through it allowed me to see how its use changed over time.” – P3

“It allowed me to start my story of the past not with what is a logical start of the story for me, but by first associatively and metaphorically link the created shape or, the way that the

shape can change, to events from the past (I might remember these events precisely by means of the digital shape that I encounter). This first creative link I could find was the start of my story. By doing so it messes with how I would normally tell my history, and so opens up alternative stories.” – P3

“It is a reflection that already existed, but that is now put in the spotlight and gets illustrated” – P4

“It helped me place iterations/instances of the project as different milestones/signposts in my development as a design researcher.” – P4

“It was nice to have an occasion to look back at the process after a few years. Most retrospectives we do don’t go back this long. That enables reflections on the more indirect consequences/impact of our work” – P6

The experience also showed them how they deal with their past and how they value it. It helped them to see how they are not always capable of recounting past activities the way they would like to.

“The experience made me think about how serendipity is probably a larger factor in a design process than you perhaps as a designer want to admit. And that rationality is super timely/temporary: because “it made sense at the time” is a phrase that keeps repeating in my mind. And this resonates with so many other things in life; it is a phrase for a reason. So exploring the past without being able to re-imagine the context (‘there and then’) feels a bit unsettling. And then personally the experience highlighted for me a slight discomfort in looking back because I personally rather look ahead into the near future and even more at the here and now. I value the far-away-past but the close by past feels a bit like (overstated) ‘wasting time’ (what has been done has been done).” – P1

Insights extracted from the past

This theme touches upon the narratives that the designers were able to construct through using dark. It describes the development, reflection on project/product, and reflection on practice that the participants shared throughout the interview and in the survey.

Development

In their narratives the participants describe how the role of project/product develops over time, but also

how their own perspectives, and perspectives of others develop over time. These developments are often something that is not obvious and do not really happen overnight, it takes time to see that these shifts have taken place and to realize that the designers themselves or project/product has a new role.

“It is an interesting thing that is happening with this archeological research. Because after I left the TU/e, the design got a new purpose, for it became the perfect example for Transforming Practices, and could Caroline Hummels use it to explain and illustrate Transforming Practices.” – P1

“It has taken quite some time before I realized that my responsibility will stop at a certain point, and that is embedded in the part where I am not the one to finish something, I am not the one that will improve theories, or introduces new ideas, but I am also not the one that make the final product. I am located in-between those two positions, I am the bridge since I can do a bit of both, and I am good at being that bridge.” – P4

Reflection on Project/Product

Putting the material remains central to the narrative that is being told forces the participants to reflect on the purpose of this product/project over time. And what values they extracted from it as well as the values that it holds for the present and the future.

“It has become part of examples by means of which I can tell a story about Transforming Practices.” – P3

“I don’t think you can put the means central. Because then the means will be the answer, and I think that is stupid, that is not possible. Even if the means is very flexible, I don’t think you can make a single solution, even if it is very versatile.” – P1

“It helped me realize how it is very typical of my interest and abilities, both in terms of what I like and am good at, and what I need help with - it became an example in that way” – P4

“It served its purpose, that’s how it is for me personally. I was very strict about the end of my PHD, being the end of the research. But ideally the design continues to develop and is put to use.” – P1

The participants often described the relationship they have with the material remains, and how it can trigger memories.

“It is funny and in a way sad, that a lot of the things that we have done, the dementia project, the only thing I have left from that is the video. The only material traces I have from the past years are books with notes and post-its, and that has been a large part of my work. But the things we have made, I have the RWS tool, but that is dusting away somewhere, you don’t use it anymore” – P3

“In this conversation that we are having, the design is being opened up again, but most of the time is just sitting in the corner and I don’t think about it at all. And when I am reflecting on it now, there are a lot of feelings and memories that are coming back, [...], there are a lot of feelings and images like that that are coming back, and this is the primary function the design has at the moment, reminding me of relaxedness of the period of designing this. But its function has stabilized right now, it is very clear what it is at the moment.” – P2

“The design, the remains that we see here. I would rather chop that off. And I think I have done that in a way, because if I would really care about it, then it would not be here in this storage.” – P1

Reflection on Practice

Through the narratives surrounding the material remains a lot of insights about design process were uncovered. The participants reflected on these insights and how their current practice is being influenced by their practice from the past, and how they deal with the remains of past projects.

“Using D.ARK showed me what I like to do and want to do also in the future, but also showed me what skills and competences I need from others to move further, onto a next level of quality and completeness for things I design.” – P4

“Revisiting the project taught me the relevance of having explicit design principles or guidelines as a studio. Not just to set us apart from others, but also to have a shared view within the team.” – P6

“Looking back on the design helped me reconnect my present identity with my past identity - where I appreciate and view my past identity as a design researcher more

clearly from what it is now and what I have learned since those milestones/iterations of the project.” – P4

The participants shared anecdotes about their interactions with users and other designers and how those played a role in their development.

“One of the students that came to interview me, proposed a theory that as a designer when you are young you are very creative and that that creativity decreases over time. And that touched me deeply. Because I believed that was totally wrong. But this is still bothering me, and in the background I keep questioning if it is true that you can only have this fresh outlook because you lack the experience.” – P5

“It also shows a different way of working, that is based on our collective idea of what design is. I am good at that and that is my task as a designer, and it is funny to see that if I work by myself I do not get much further than a lo-fi prototype.” – P4

“Other Social Designers that I relate to are a lot more product focussed, while I am more process focussed and moved towards that transformation of the system.” – P5

Several participants expressed how they prefer to move on, and rarely actively reflect on old projects.

“I think many designers would lose interest at some point. You are done with the project and want to move onto the next thing.” – P1

“I rarely go back to my past activities, the only moment would be when I am making a CV and I need to present myself for a possible employer” – P3

One participant asked for the recording of the session in the middle of the interview, because they realized that they said something that was relevant for their current practice and PHD.

“[...] I give back what I thought of during the design process, the thing I can’t express in words. Can I have the audio recording afterwards, because this session is helping me with the narrative I am constructing for my PHD.” – P5

Presenting Insights

A Manifesto For Design Archeology

To present my insights from theoretical research and the sessions, I created a manifesto for Design Archeology. This manifesto builds upon the setting I created in the D.ARK sessions and on the themes presented in the analysis.

In the manifesto I aimed to generalize the concepts that are central to the Design Archeology Research Kit. In this way it provides guidelines on how to conduct "Design Archeology". With this manifesto I attempt to lay the foundation for what it means to do archeological research in a design context and present a new method of making histories as prototypes as presented in Maria Göransdotter's dissertation (2020).

A Manifesto for Design Archeology

The practice of design is future oriented, designers make propositions that help to imagine, experience and research new futures [1, 3, 6, 10, 12, 13]. But design can also learn from its past and use this knowledge that is embedded in the past to inform and shape new practices of creating futures [6]. The practice of *archeology of the contemporary past* [2, 5, 8] is a powerful tool to study the most recent past that still impacts our everyday lives. By taking an approach that builds upon this practice, designers can gain new insights in their design practice from analyzing the material remains of past projects [14]. This *Design Archeology* can help navigate the complex 'now' through uncovering the hidden past and shed light on a multitude of possible, plausible, and preferable futures [7].

1. The past is ambiguous

Embracing ambiguity in observing the past can lead to the integration of many perspectives in the observations of the past. Using ambiguity can guide towards perspectives that used to be overlooked in more coherent and straightforward historical accounts. The design process is ambiguous and not linear, there are always explorations that turned out to be a dead end. But these dead ends hold valuable information. This information that can be useful to recall and might inspire a change in present and future practice.

2. Centralize the physical remains

To talk about the past, one needs to make it physical. Researching the past without its material traces is difficult. The re-engagement with the material remains of projects helps to prompt memories and allows for tacit knowledge decisions to become visible again [9, 11, 16]. The memories are embedded in the material aspects of the design and the intended interactions [17]. Design can draw attention to the overlooked aspects of the objects and environment to encourage reflection on their significance [4]. In this way Design Archeology can also help in analysing the past and its environmental remains, and through this trigger reflection on how the past influences the present and the future.

3. Go back from the start

A point in time is needed to start investigating a project and its material remains. The official start date of a project allows for this exploration since it is a clear point in time, that can often be defined as a "day/month/year". Picking such a specific point allows for two interesting questions to be asked; "why is this seen as the starting point?" and "what lead up to this point in time?". These questions help with opening up new perspectives and can uncover the underlying values and assumptions that influenced the project.

4. Relate to the present

To quote Shakespeare: "what's past is prologue" [15], when past knowledge is "dug" up it is important to relate it to present day practice. How has this informed current practice and why was this information ignored or used to inform current practice. By relating it to the present bias can be uncovered and points of change can be identified.

5. Translate to the future

These points of change are where we can start from when looking at the future. The different perspectives in the present, originating from trajectories in the past uncover many potential futures and can highlight what is preferable for whom, for what, and what scale of future vision [6]. Translating the excavated knowledge from the past, through the present, to the future provides opportunities to discover what transformation in practice is needed to imagine, research and prototype new futures.

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This manifesto is part of the
 Design —
Archeology
Research Kit



Discussion

Scope of analysis

The themes presented in the analysis show the general insights that were derived from the interview and survey answers. Through my approach of using analysis it is possible that more interesting themes and insights have been overlooked. For example, the narratives that were told are not analyzed as such, but the focus of the analysis was put on the impact of the design. These narratives are valuable for reconstructing a larger past of TP. To research what this overarching narrative is and how constructed narratives are interconnected would be a study in itself. This study would also include a larger group of (design) practitioners where more material remains should be explored.

Scope of interviews

Transforming Practices is not only a design community, it also includes practitioners from many other fields in academia, government, and business. To create a more comprehensive narrative about the past of TP, these people need to be included in this archeological research. It will be interesting to see how non-designers form narratives extracted from material remains and how these narratives can be relevant for their practice.

In this same scope it would also be interesting to use D.ARK with designers that do not have an affinity with TP. How do designers that are not used

to designing in complex ecosystems, deal with the ambiguity of visualizations and is there a difference in constructing narratives from material remains between TP designers and non-TP designers. This process could lead to new ways of designing tools for Design Archeology.

Limitations of design

The design has its limitations, the four variables allow for manipulation, but the rotary encoders used to control these variables could also be replaced by other forms of input. Other types of input-sensors (flex sensor, slide potentiometer, capacitive touch, magnetic paint) were explored in earlier iterations of the controller. The rotary encoders were selected because they provided more stable input and allowed for more precise control. It is still valuable to explore different ways of interaction (for example motion-tracking) that can invite for the exploration of the past, and see what qualities are embedded in other forms of providing input.

The sensitivity of the controls is a point for improvement in the current experience. The sensitivity of the rotary encoders is not balanced enough. This creates a lack of direct feedback with for example the variable of background contrast, it took participants a fair number of rotations to have the contrast change significantly. More balanced controls and more direct feedback will create a better experience. Another

element that missed clarity was the influence of the date-set module, the effect of this module was too subtle for the timespans (10 - 30 years) that were discussed in the interviews. The effect of the input provided by the module needs more work so its purpose for the visualization will be clear to the users.

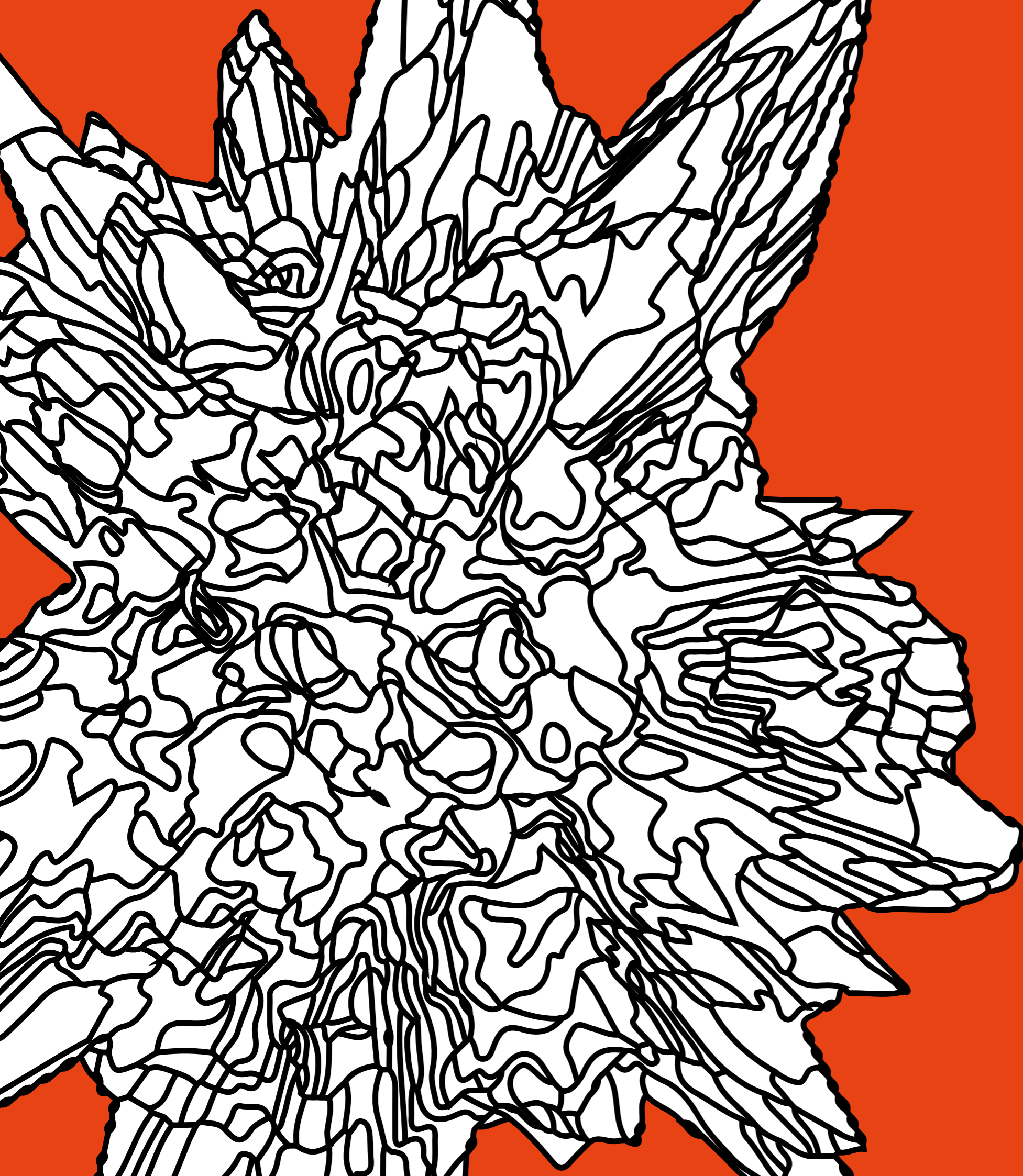
By introducing the controls of the visualization in two parts, date-set module and controller, you create a split in interaction. This helped in creating a controller that does not distract from the visualization. But the date-set module was used more than once in the interview settings, which creates a distraction from the actual visualizing on the screen. A possible solution for this would be to integrate the date-set module into the controller to allow a more seamless experience.

Future directions

D.ARK is one way to explore material remains of old design projects, but there are many more possibilities to do design archeology. Where D.ARK uses ambiguity in visualization to support the construction of narratives from the material remains, there are many more opportunities to create tools that can support the construction of narratives about the past. D.ARK in its current form still needs an interviewer to help in the construction of the narrative through asking questions and pointing towards interesting directions. A future direction of design archeology can be the exploration of an auto-archeology that allows designers to explore

their design past and its material remains in a personal setting. This could build on principles of cultural probes (Gaver, Dunne & Pacenti, 1999), that would allow designers to collect information of material remains in their personal design environment.

D.ARK currently focusses on the analysis of material remains of old design projects. It would be interesting to explore if D.ARK could also be used in a non-design setting, and support archeologists in their attempt to reconstruct past narratives and contexts. Especially in the context of archeology of the contemporary past D.ARK could for example help in the extraction of narratives from material remains in an interview setting where archeologists try to clarify or confirm uses of objects that were found.



Conclusion

Through using D.ARK the designers were able to form a narrative from the material remains of old projects. These narratives helped to explore their understanding of past design activities. The designers were able to uncover information about their past practice that helped them to understand their current way of working and their relation to TP. It gave insight into their development as a designer as well as the development of their projects in relation to TP. The experience made them reflect on their ability to reconstruct the past, and the role the past plays in their practice. It allowed them to explore new perspectives on their past, their development as designers and the development of their practice. They were able to form a better understanding of their past and extract knowledge that informs their current design practice and opens up towards envisioning new future practices.

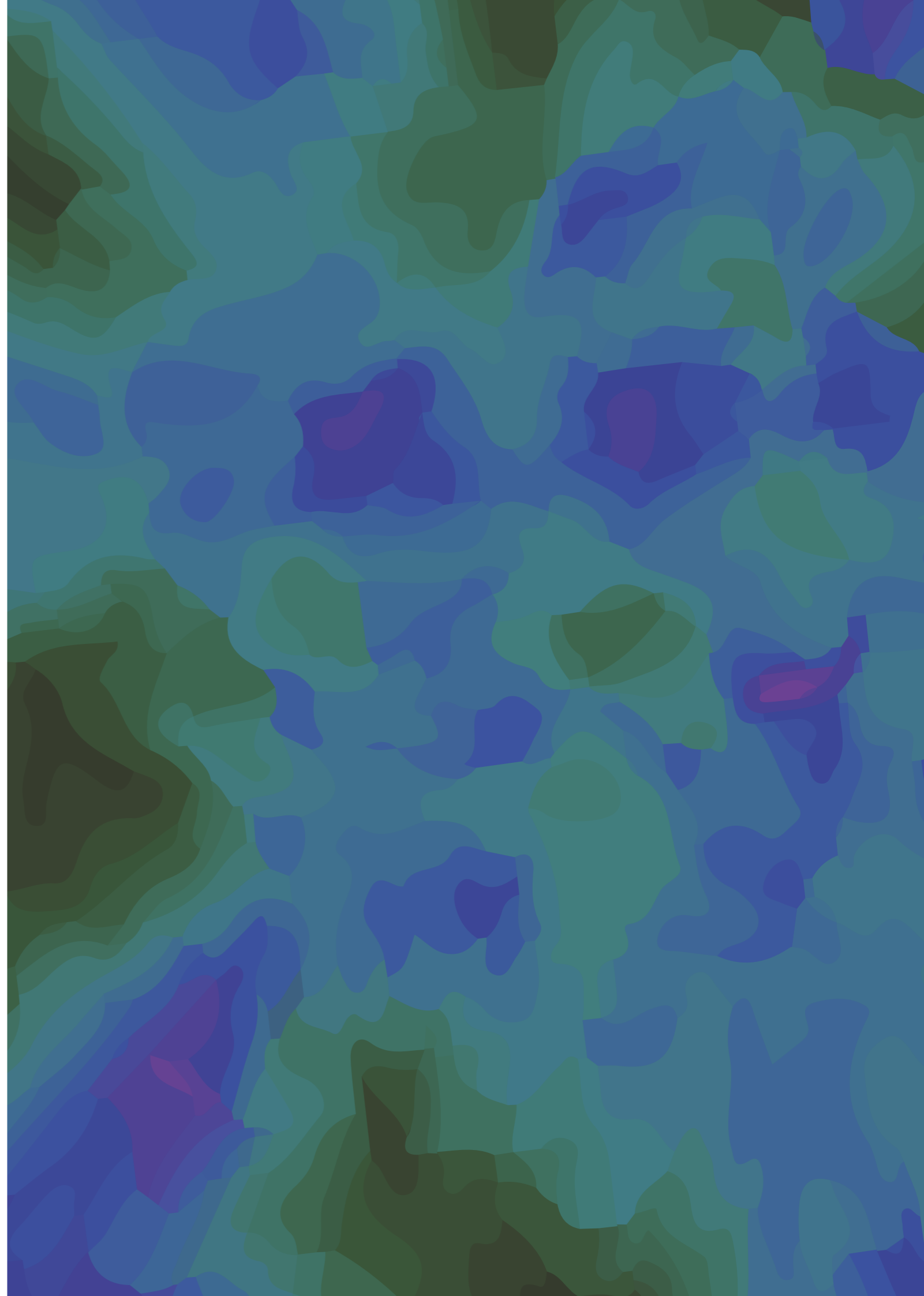
In the context of the d.centre|EU the Design Archeology Research Kit played an important role in showing the importance of the integration of the past and the understanding about past practices to inform current practices and imagine new futures. D.ARK and the principles presented in the Manifesto for Design Archeology, supported in helping to understand how the d.centre|EU relates to Transforming Practices in the context of the past, and how this relation could look in the future.

What's past is prologue

With the Design Archeology Research Kit and the Manifesto for Design Archeology I explored a new direction for Transitional Design Histories and histories as prototypes. I hope to continue this work and further explore how the past can be used as a material for informing design practice. I feel like I just got started, and this work is just the prologue of many more design research explorations into the past.

Acknowledgements

First of all, I would like to thank Caroline Hummels and Ambra Trotto for the opportunity to work within the context of the d.centre|EU, and explore my interest in the value of past and history for design. Secondly, I want to thank my fellow students that worked in the same context for the weekly inspirational meetings. Thirdly I would like to thank Maria Göransdotter for her enthusiasm about my exploration of her dissertation of Transitional Design Histories. Your kind words were a great motivation. I also want to thank all the participants for their openness about their past and providing so much insight in the history of Transforming Practices. Finally I would like to thank my fellow graduate students of the second floor corner for all the good times.

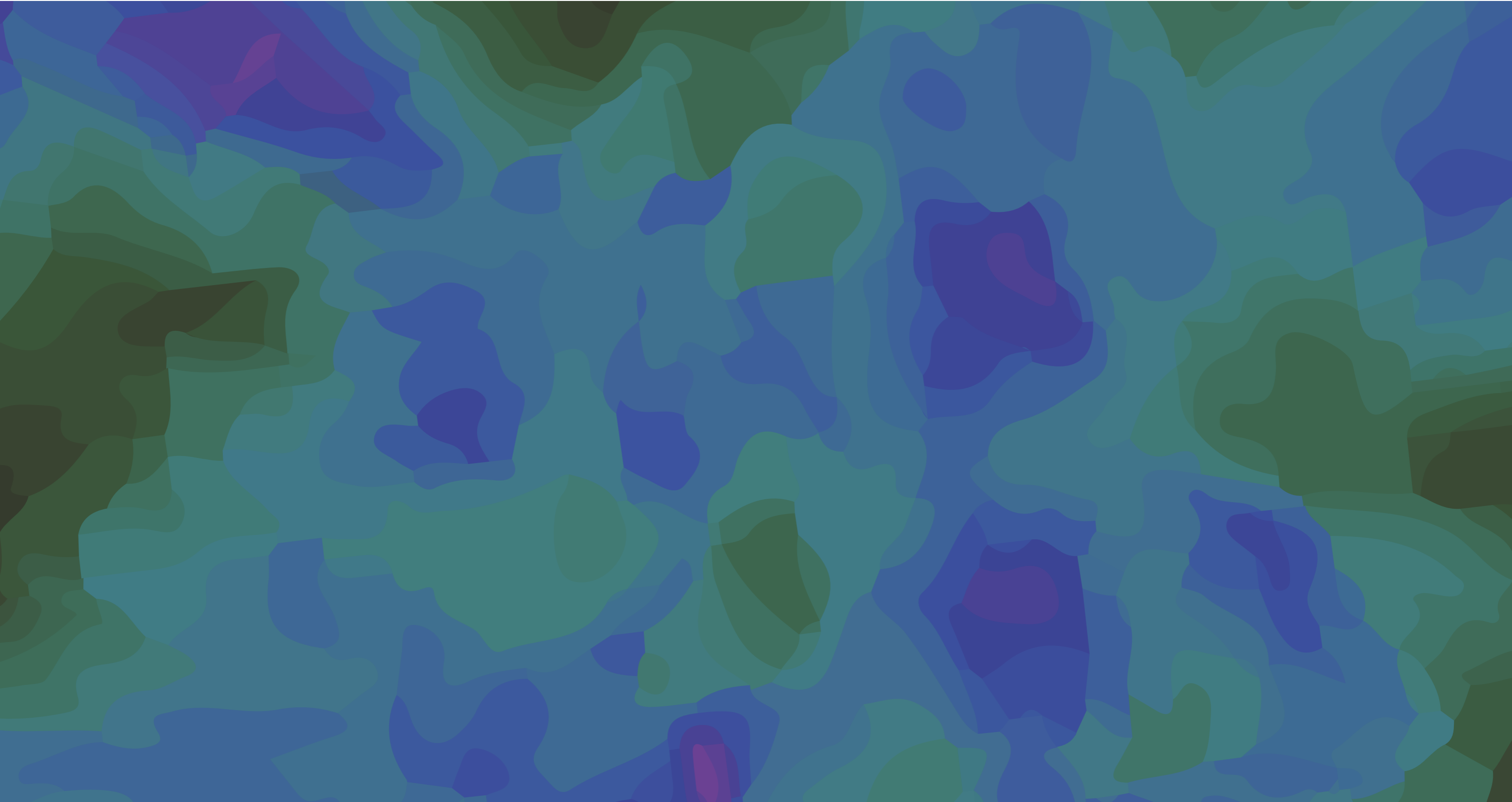


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Appendices

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Appendix A - Processing Sketch

MPUTEapot_Rotary_4x__2Arduinos

/*Sketch by Sam van der Horst*/

```
import processing.serial.*;
import processing.opengl.*;
import toxi.geom.*;
import toxi.processing.*;
import peasy.*;
```

```
ToxiclibsSupport gfx;
```

```
Serial port1; // The serial port1
Serial port2; // The serial port2
```

```
//setup variables
```

```
String StringPort1 = "";
String StringPort2 = "";
```

```
int interval = 0;
int U;
```

```
float backColor = 0;
```

```
float dateSet;
```

```
PVector[][] globe1;
PVector[][] globe2;
PVector[][] globe3;
```

```
int total = 250;
float bolbingMax = 5;
float phase = 0;
float colorMutator = 0.04;
float speed = 0.003;
```

```
float numL1 = 0;
float numR1 = 0;
float numL2 = 0;
float numR2 = 0;
float Yaw;
float Pitch;
float Roll;
```

```
float RED;
float GREEN;
```

```
float BLUE;
```

```
boolean drawCircle = false;
int click = 0;
color circleColor;
PFont Concretica;
PImage logo;
```

```
PeasyCam cam;
```

```
void setup() {
  // Fullscreen
  //size(600, 600, P3D);
  fullScreen(P3D);
  colorMode(HSB, 360, 100, 100);
  smooth();
```

```
  // setup lights and antialiasing
  lights();
  smooth();
```

```
  // setup arduino input
```

```
  String portName1 = Serial.list()[3];
  String portName2 = Serial.list()[4];
```

```
  port1 = new Serial(this, portName1, 115200);
  port2 = new Serial(this, portName2, 115200);
```

```
  delay(100);
```

```
  port1.bufferUntil('&apos;\n&apos;');
  port2.bufferUntil('&apos;\n&apos;');
```

```
  delay(100);
```

```
  //check display size
```

```
  println(displayWidth, displayHeight);
```

```
  globe1 = new PVector[total+1][total+1];
  logo = loadImage("logo.png");
```

```
}
```

```
float xoff = 0;
int randSeed = 0;
```

```
void draw() {
```

```

background(numR2);
noCursor();

// CLick mouse to display logo and values received from controller
if (click == 1) {
  Concretica = createFont("SK Concretica.ttf", 20);
  textFont(Concretica);
  textSize(20);
  fill(13.6, 92, 90);
  text("Bolbingmax: " + numR1, 50, 110);
  text("Colormutator: " + numL1, 50, 170);
  text("Contrast: " + numR2, 50, 140);
  text("Speed: " + numL2, 50, 200);
  noFill();

  image(logo, 1200, 80, 800/4, 650/4);
}

int vert = (3 + int(dateSet)/10);

float total = map(vert, 3, 302, 250, 3);

float colorMutator = 0.0004*numL1;

//If date is entered Start up Controller
if (millis() - interval > 1000) {

  // send single character to trigger DMP init/start to initialize controller
  if (dateSet > 0){
    port1.write('&apos;r&apos;');
    interval = millis();}
}

pushMatrix();

// translate everything to the middle of the viewport
translate(width / 2, height / 2);

// 3-step rotation from yaw/pitch/roll
rotateY(-Pitch/20);
rotateZ(-Yaw/20);
rotateX(-Roll/20);

noStroke();

```

```

//Draw Sphere
for (int i = 0; i < total+1; i++) {
  float lat = map(i, 0, total, 0, PI);

  beginShape(TRIANGLE_STRIP);
  for (int j = 0; j < total+1; j++) {
    float lon = map(j, 0, total, 0, TWO_PI);
    float bolbingMax = 5*(numR1/150);

    float xoff = map(sin(lat)*cos(lon), -1, 1, 0, bolbingMax);
    float yoff = map(sin(lat) * sin(lon), -1, 1, 0, bolbingMax);
    float zoff = map(cos(lat), -1, 1, 0, bolbingMax);
    float pNoise = noise(xoff+phase, yoff+phase, zoff+phase);
    float r = map(pNoise, 0, 1, 200, 400);
    float rad = (0.1*r)/pNoise;

    float x = rad * sin(lat) * cos(lon);
    float y = rad * sin(lat) * sin(lon);
    float z = rad * cos(lat);
    globe1[i][j] = new PVector(x, y, z);

    if (i!=0) {
      PVector v1 = globe1[i-1][j];
      PVector v2 = globe1[i][j];

      // Color with Perlin noise

      float redShift = map(r, 200, 400, 0, RED);
      float greenShift = map(r, 200, 400, 0, GREEN);
      float blueShift = map(r, 200, 400, 0, BLUE);

      float cNoise = noise(phase + colorMutator * v1.x, phase + colorMutator * v1.y, phase
+colorMutator * v1.z);
      float hu1 = map(cNoise, 0, 1, 0, 360 - redShift);
      float hu2 = map(cNoise, 0, 1, 0, 100 - greenShift);
      float hu3 = map(cNoise, 0, 1, 0, 100 - blueShift);

      fill(hu1, hu2, hu3);

      vertex(v1.x, v1.y, v1.z);
      vertex(v2.x, v2.y, v2.z);

    }
  }
endShape();

```

```

    }
    popMatrix();

    phase += speed*(numL2/80);
}

// Register mouse State
void mouseClicked() {
    if (click == 0) {
        click = 1;
    } else {
        click = 0;
    }
}

// Receive and split values by Arduino's
void serialEvent(Serial thisPort) {

    // Port 1 (COM 4) controller
    if (thisPort == port1) {

        StringPort1 = thisPort.readString();
        if(StringPort1 != null){
            StringPort1 = trim(StringPort1);
            String[] Valuesport1 = split(StringPort1, ",");
            if (Valuesport1.length >= 7) {

                numR1 = float(Valuesport1[0]);
                numL1 = float(Valuesport1[1]);
                numR2 = float(Valuesport1[2]);
                numL2 = float(Valuesport1[3]);
                Yaw = float(Valuesport1[4]);
                Pitch = float(Valuesport1[5]);
                Roll = float(Valuesport1[6]);

                println(Valuesport1[0]);
                println(Valuesport1[1]);
                println(Valuesport1[2]);
                println(Valuesport1[3]);
                println(Valuesport1[4]);
                println(Valuesport1[5]);
                println(Valuesport1[6]);

                interval = millis();
            }
        }
    }
}

```

```

        delay(U);
    }
}

// Port 2 (COM 11) dateSet
if (thisPort == port2) {

    StringPort2 = thisPort.readString();

    if(StringPort2 != null){

        StringPort2 = trim(StringPort2);

        String[] Valuesport2 = split(StringPort2, ",");

        if (Valuesport2.length >= 0) {

            dateSet = float(Valuesport2[0]);

            println(Valuesport2[0]);

            interval = millis();

            delay(U);
        }
    }
}
}

```

Interview Questions

Part	Actions	Duration	Questions
Intro	Explain the research and introduce the tool	5 min.	-
Part 1 Past	Enter the start date of the project in controller	15 min.	How did it start? What was the context? What activities led up to the start of the project? Can we pinpoint previous events that were influential to this project?
Part 2 Present	Enter the endpoint of the project in the controller	15 min.	Why is this the endpoint? How was decided the this was the finish? What was the state of the project at this point?
Part 3	Analysing what happened in between start and end	10 min.	What are the most significant take-aways in-between the start and the end?
Part 4 Future	What role does the project play now?	15 min.	How did the project develop after finishing, is it really finished? What is the impact? How would you describe its relevance?
Part 5	What were the driving forces of the project?	10 min.	Where there many parties involved? Was it funded by external? What was their influence? How are they still involved? Did the project impact them?
Part 6	How would you describe the transformation of the project over time?	10 min.	

Experience Survey

Thank you for participating in the Design Archeology Research Kit (D.ARK) interview. We hope it brought you new insights. In this survey we would like to ask you a few questions about your experience with D.ARK.

(Vragen mogen ook in het Nederlands worden beantwoord)

* Vereist

1. Name *

2. How did the experience with D.ARK change your view on the project? *

3. How did interacting with D.ARK support your exploration of the past? *

4. How do you value the past? How did the experience with D.ARK changed your perspective on the past? *

5. How do you relate the discussed project to the present? *

6. How do you relate the discussed project to the future? *

Deze inhoud is niet door Microsoft gemaakt noch goedgekeurd. De gegevens die u verzendt, zal worden gestuurd naar de eigenaar van het formulier.

 Microsoft Forms

PUTTING IT INTO PRACTICE

The prototypes made by Göransdotter are mainly textual and are based on extensive archival historic research. To create similar prototypes can be useful for the development of the DCEC, to do this in the timeframe of one semester will not be realistic. Therefore, I want to build upon the methodologies from transitional design histories and create a framework that supports the prototyping of transitional design histories within the context of the DCEC.

Possible designs can be placed in three design domains. Experiential, Supportive, and Symbolic. These three domains help me to identify my concepts, give direction to my design process and uncover the design space of this project.

Experiential concepts move towards designs of experiences or rituals that allow people to experience different histories.

Supportive concepts move towards tools that allow people to explore their historical perspective.

Symbolic concepts move towards the confrontational designs, that force people to reflect.

Examples for frame of reference:

What's going On?: Participatory perspective taking in urban planning through Virtual Reality.
By: Sam van der Horst.
Master Research Project (TU/e). 2020

House of memories: an interactive museum installation focused on daily life with dementia.
By: Sanne Beijer.
Final Master Project (TU/e). 2022

Scaffolding shared imagination with tangible design.
By: Maarten Smith, Sander van der Zwan, Jelle Bruineberg, and Pierre Lévy
Academic Research (TU/e). 2021

Examples for frame of reference:

[X] Changing Perspectives: an interactive system for participatory sensemaking.
By: Philemonne Jaasma
Doctoral Thesis (TU/e). 2017

BIAS: exposing hidden values through facilitating subjective data representation.
By: Milou Weerts, Rosa van der Veen, and Sam van der Horst
Master Project (TU/e). 2019

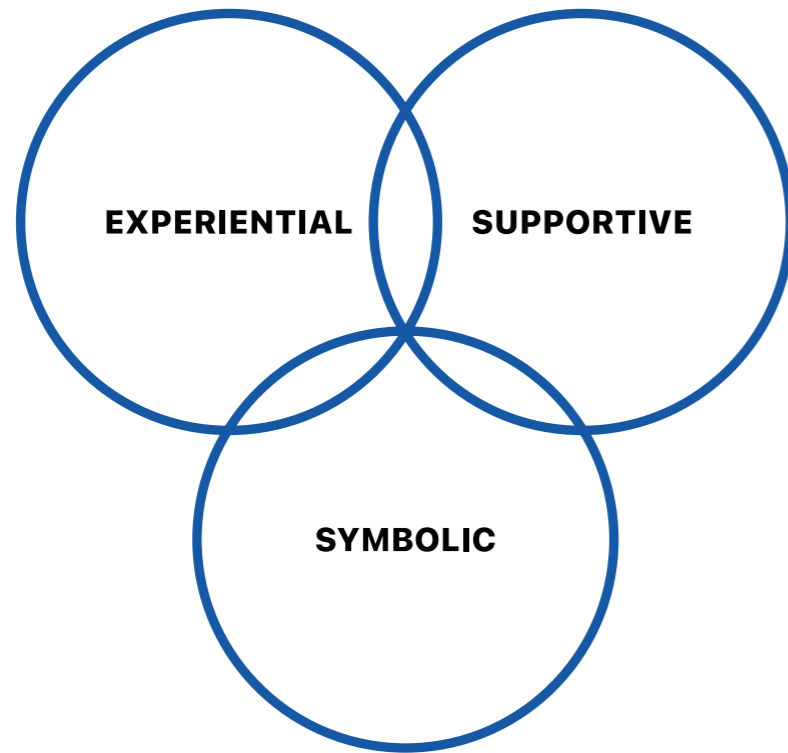
Caring Pregnancy Toolkit: empowering Eritrean women in antenatal care.
By: Axel van Boxtel
Final Master Project (TU/e). 2021

Examples for frame of reference:

Inclusieve samenleving: De toekomst van de Gouden Koets? Een kwalitatief onderzoek langs alle provincien
By: Afdeling Buitengewone Zaken
Company Project. 2021

Exquisite profiles: an archive of valuable identities
By: Bennadetta Della Costa
Graduation project (DAE). 2021

The Community of Symbiosis
By: Loes Voermans
Final Master Project (TU/e). 2021



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