M2.1 Project Report

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Summary

This report documents explorations made in trying to define the structure, functionality, and aesthetics of a Repository of Transformation in the context of the d.centre | EU.

In the collaborative process of this project, several prototypes were designed to explore aspects of the Repository of Transformation, resulting in a high-fidelity prototype focused on the content uploading experience.

Based on these experiements, recommendations for the further development of the repository are discussed.

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Introduction

This report documents the process of exploring the concept of a digital learning ecosystem for transformation called the "Repository of Transformation" and aims to explain the design process, decisions, and developments made during the collaborative process of this project.

The document is structured as follows: First, I will explain the initial idea for a Repository of Transformation and show how my design process- and decisions have shaped this repository throughout the semester. Afterward, I will showcase my final demonstrator, a high-fidelity prototype that was made to showcase the current state of the repository. By reflecting on this process, I will then discuss my project's outcome and explain how I want to continue working on the repository in my final master's project. I will end with a conclusion. This brief introduction will also be followed by a note on the collaborative setting of this project.

A note on the collaborative setting of this project

This project has been part of the d.centre | EU initiative, a design-driven community that collaboratively aims to learn about and foster sustainable societal transformation. By uniting creative minds across Europe, d.centre | EU aims to concretize the theory and practice of creating sustainable futures. Within this setting, this project has been part of a collaborative effort of students, coaches, and experts to articulate what a Repository of Transformation - hereafter often referred to in this document as 'repository' - could be in the context of the d.centre | EU. Together with five students, we have worked on unpacking the complexity of how an online platform can express transformation. Through weekly discussions, we have been able to define our parts of this process, as well as ways to work together on developing principles and prototypes

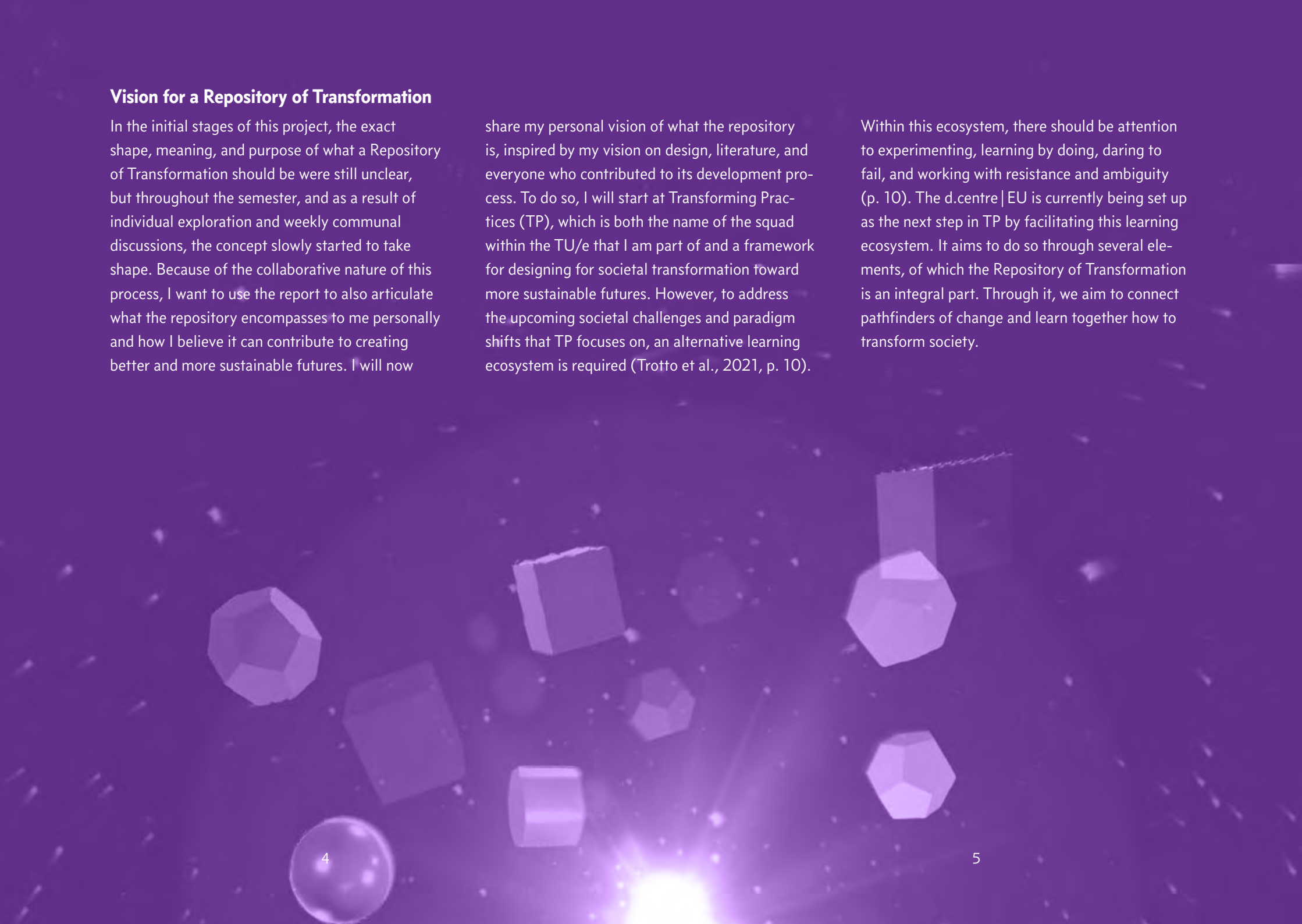
for this. This has been a process of learning together and has been, in itself, a transformation. I will now describe student projects that contributed to the design of the Repository of Transformation:

Sam van der Horst explored the historical perspective through the lens of Maria Göransdotter's work on Transitional Design Histories through the creation of a Design Archeology Research Kit.
Wesley Hartogs explored and pushed the boundaries of the aesthetics and back-end functionality of an RoT that would be available online.
Renate Voss has dived into the methods and theories around transformation and worked with how these are approached and used in transformation processes – a start in uncovering how these theories and methods have a role in the repository.
Rosa van der Veen focused on the necessary reflection to understand what has been transformed throughout these processes.
I focused on iteratively exploring the repository's structure, navigation, and aesthetics, focusing on concretizing the digital platform's functionality and, most notably, the content upload experience.

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

Vision for a Repository of Transformation

In the initial stages of this project, the exact shape, meaning, and purpose of what a Repository of Transformation should be were still unclear, but throughout the semester, and as a result of individual exploration and weekly communal discussions, the concept slowly started to take shape. Because of the collaborative nature of this process, I want to use the report to also articulate what the repository encompasses to me personally and how I believe it can contribute to creating better and more sustainable futures. I will now share my personal vision of what the repository is, inspired by my vision on design, literature, and everyone who contributed to its development process. To do so, I will start at Transforming Practices (TP), which is both the name of the squad within the TU/e that I am part of and a framework for designing for societal transformation toward more sustainable futures. However, to address the upcoming societal challenges and paradigm shifts that TP focuses on, an alternative learning ecosystem is required (Trotto et al., 2021, p. 10). Within this ecosystem, there should be attention to experimenting, learning by doing, daring to fail, and working with resistance and ambiguity (p. 10). The d.centre | EU is currently being set up as the next step in TP by facilitating this learning ecosystem. It aims to do so through several elements, of which the Repository of Transformation is an integral part. Through it, we aim to connect pathfinders of change and learn together how to transform society.

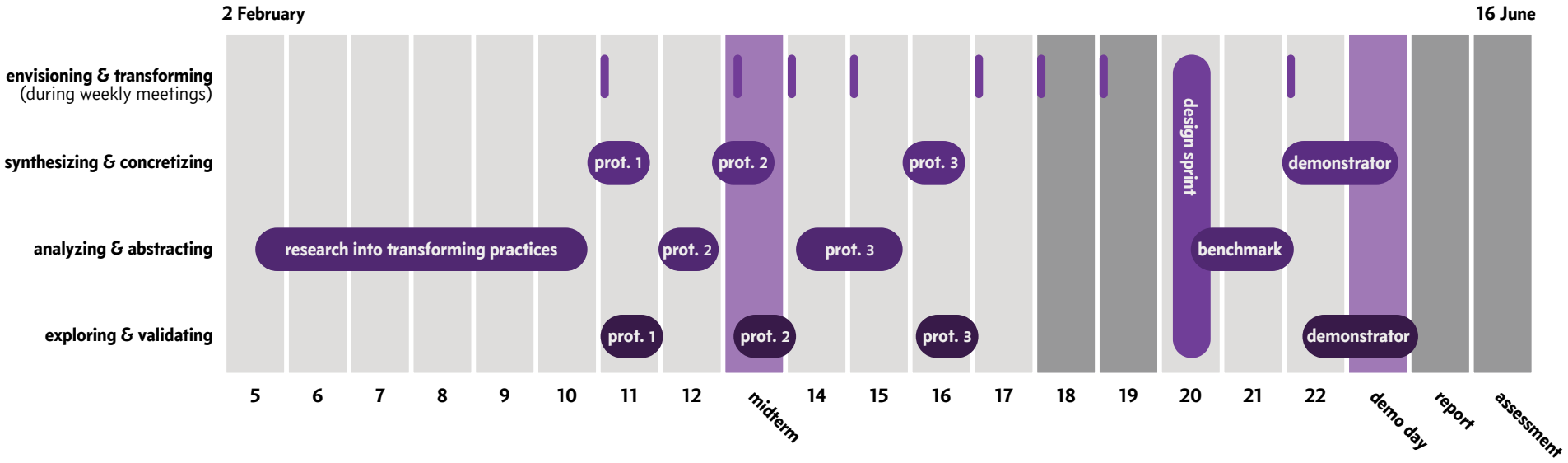


Design process and -decisions

In the design process of this project, the shape, properties, values, navigation, aesthetics, and meaning of the repository have all been explored and now have a different meaning than before. In this next section, I will showcase how several explorations made during this semester have contributed to the transformation of the repository.

In my design projects, I like to adopt an approach in which doing and experimenting are central. In addition to this, I like to work with digital materials as semi-rapid prototyping tools. Due to the nature of the design challenge, this approach has been particularly useful during this project. This is because, during most of the semester, the project's desired outcome still had to be defined, posing a challenge for all designers involved. To be able to work with this setting, I decided to design a series of mid-fidelity prototypes to explore the desired qualities of the Repository of Transformation, as well as uncover the technical requirements necessary to realize such a platform. I have identified five major phases within this process, which I will discuss in detail in the following sections.

I also want to note that not all of my design activities have been within the scope of my individual project but also that of the repository as a whole. The prototypes that were made also reflect this, as they have often contributed to the general vision for the repository and specific structures within my design project.



Exploration of reflection

Because this is my first semester in the TP squad, I started by researching the TP approach and -framework to try to understand the nuances of Transforming Practices, especially in the context of the d.centre. Additionally, I made an interactive, digital prototype to present my findings during the quarter-term presentations.

This first prototype (see Appendix A) was inspired by the TP framework as described in the Strategy for Change Handbook (Hummels et al., 2019). This book gives a detailed overview of activities and elements supporting TP. To validate my understanding of this framework and position myself compared to my fellow students working for the d.centre, I made an interactive prototype that focused on facilitating a reflective process by documenting a case study through a digital project mapping tool.

This iteration was the first step in defining my direction in working on the repository. Additionally, it was an experiment in trying digital tools for creating a network-centered digital infrastructure within a web environment, such as Vis.js and Sigma.js (Vis.js, n.d.; Sciences-Po médialab & OuestWare, n.d.). Using this prototype, and based on feedback received during the quarter term presentations, I got an initial understanding of the scope of my project, as well as ideas about the structure of the Repository of Transformation.

Screenshot of the first prototype (initial view)

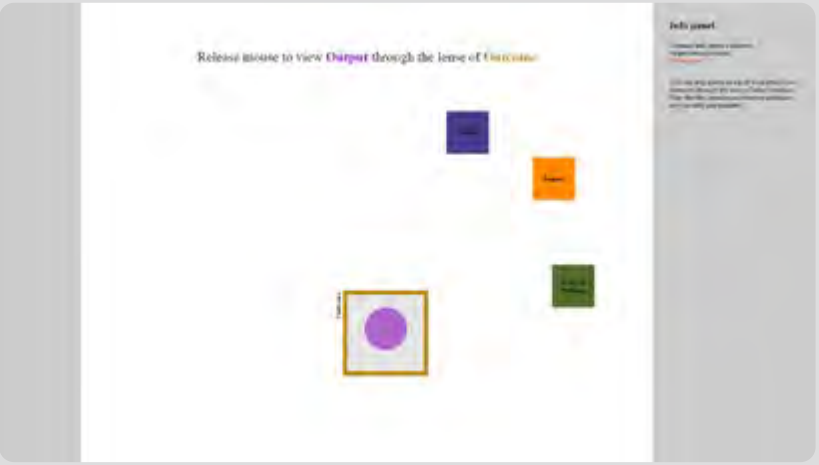
Screenshot of the first prototype (filled-in view)

Exploration of lenses

My second prototype was made to explore navigation within the context of the repository. To realize the conditions for change as is done within TP, value and impact are often found not in use cases, people, or methods themselves, but rather in the connection between them (Hummels et al., 2019, p. 6). Within the repository, this poses a challenge: *How can we deal with- and structure large amounts of data, especially when the connections between data points are of more importance than the data points themselves?* Typically, to deal with the complexity inherent to TP, lenses allow an individual to consider different perspectives (Trotto et al., 2021). This second prototype explores how lenses can be used to deal with the complexity of information in the repository.

This prototype (see Appendix B) is another interactive and digital prototype that explores the aesthetics and navigational qualities of lenses in the setting of the Repository of Transformation. Several types of data exist within the repository, such as case studies, people, and methods. This prototype allows users to look at a given type of data from the perspective of another point of data.

I found that the visual feedback of the lenses in my prototype improved users' understanding of the current view. The latest version of the repository also uses lenses, but not in a way that helps users make sense of the complexity of the information in the repository. This is something that can still be improved in a next iteration of the repository.



Screenshot of the second prototype (initial view)

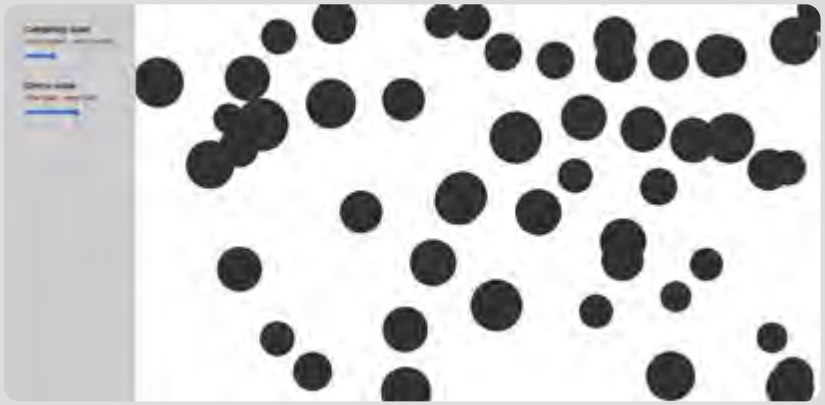
Screenshot of the second prototype (lenses in use)

Exploration of scales

To further explore how the complexity in the repository can be navigated, the concept of scales as described in the Strategy for Change Handbook can be used (Hummels et al., 2019, p. 6). This is especially important for considering how the outcomes and impact of transformation (two terms that represent critical information categories in the repository) are designed and given shape within the repository. In TP, scales are a type of lens that is used to consider various societal levels and dynamics. In the same way as scales can help us understand transformation and change, we want scales to be a tool that can help users make sense of the complex information structure in the repository.

My third prototype (see Appendix C) is a digital interactive exploration on how scales can make information within the repository more accessible and navigable. Using a slider, the level of detail of the content can be shown. Using a second slider, the change of information over time is visualized. Using these two sliders, people can personalize and play with the content in the repository.

I found that using sliders to show or hide certain types of information, user can control the amount and type of information they take in. For example, it can be used to build up the complexity of information over time while a user dives deeper into a particular subject. What is challenging about this type of interaction is that a decision has to be made on which information nodes are shown or hidden at which level of detail, and I foresee issues in defining this for complex issues. In my perspective, a first implementation of the repository that can be implement in a small and controlled setting would be required to explore this type of interaction further.



Screenshot of the third prototype

Screenshot of the third prototype using a filter for scales

Design sprint

To further concretize my project in the stage before demo day, I took a few days to do an intensive design sprint (Knapp et al., 2016) to jumpstart my work on a demonstrator for demo day. A design sprint consists of several days, each with its own purpose:

On the first day, ideation techniques are used to map a design case. This method helps create a better overview of a project setting.

The second day's theme is sketching. By sketching, several iterations can be drawn out in quick succession.

On the third day, prototypes are made. In my case, this was the first step in building my final demonstrator, the process of which I will describe in the next section.

Ultimately, I decided to consider my final demonstrator as a fourth, high-fidelity prototype. This prototype serves as an exploration of yet another part of the repository, namely that of adding content, while also demonstrating my vision for the repository.

Final demonstrator

Based on the design sprint, I decided to make my own version of the repository that focuses on adding content to the platform. My goal for this was twofold. In the first place, I wanted to further explore the interactions within the repository by looking at the requirements to facilitate an open way to add content. On the other hand, I tried to communicate our vision for the repository to an audience on demo day.

Facilitating open content uploading

Regarding the first goal, I wanted to explore how I could offer an open content uploading experience. For this, I did a benchmark analysis, looking at other learning platforms and digital libraries for inspiration. This research showed that current major platforms are not equipped to handle the relationship-based type of data we aim to create. To approach this issue from another perspective, I looked into the possibilities and limitations of HTML5, the markup language used to create web pages (Lachlan Hunt, 2010). Since the repository is meant to be a digital platform, the possibilities and restrictions of web technology have given me a demarcation on what types of content would make the repository as open as possible. I implement as many of my ideas in the final demonstrator as were possible in the scope of this project.

Aesthetics & Three js

The second goal meant that the aesthetic qualities of the demonstrator were paramount, and to accomplish this, I decided to use Three.js (Three.js, n.d.). Three.js is a WebGL-based JavaScript library meant to create and display animated 3D computer graphics for the web, and it is the same library that Wesley Hartogs used in his version of the repository (Hartogs, 2022). There are several reasons why I chose a web-based solution built on Three.js for this demonstrator: It supports structuring

information in three dimensions, which gives us richer ways to shape the repository. It is also lightweight and cross-platform so that it can run on all devices. Moreover, it can be made into a progressive web app (Google, n.d.), so it can be either run in the browser or as an app or program and works offline. Finally, it is open-source and thereby encouraging inovation through collaboration.

*Repo*duction*

The result of this process is a demonstrator that I called 'Repo*duction,' as it aims to reproduce knowledge in the digital format of the repository (see Appendix D). Within this prototype, I implemented several interactions that allow users to reproduce a case study in the format of the repository:

Users can add information nodes. The user can construct these semi-rich types of data by adding an information type, a name, and a description. Additionally, users can upload files.

Users can change node shapes to create different groupings of information, either in accordance with the different node types or according to their own conceptual model of the information. Currently, four different node shapes are supported. To make the platform more open for users to share their own content types, uploading private 3D files is also an option that I did not have the time to implement.

Users can change the position of nodes, either relative to the origin of their project or with respect to other nodes. This mechanic allows the grouping of different node types and colors in space and determines the strength of the connection between nodes.

Users can define which nodes have had an impact on the transformation process by creating a cloud of influence surrounding them. The user can also determine the size of this cloud.

Several other functionalities that I conceptualized are not implemented at the time of writing, such as changing node colors, adding and removing origin points, removing nodes, searching for content already in the repository, and spreading impact clouds to groups of nodes. I hope to be able to implement these functionalities in the future still, as I aim to continue this project as my final masters project.

Creating a new node

Positioning nodes relative to each other

Example of an impact cloud

The information panel

Discussion

In this section, I want to reflect on the output of this design project. I will first highlight the implications of this project and why it matters. Afterward, I want to touch upon the limitation of my prototypes and the design process as a whole, including my current vision of the repository. Finally, I want to make recommendations that I will discuss further in the future plans section.

Firstly, I want to express that I am quite content with the results of this project and especially proud of the final demonstrator. The experimental approach that was taken in combination with the weekly group meetings improved our concept of the Repository of Transformation continuously, and I can see much progress in creating a platform that can serve as the next step in the evolution of Transforming Practices. I also can see some limitations in my approach, which I want to detail in this section.

My exploration of reflection in the repository showed how linear processes ordered in a single dimension (time) could not document a case study's process and the uploaders' reflection process in a satisfactory format. Looking back at this iteration, a more open way to input information was desired, and for the reflective part, more theoretical substantiation is needed to make the reflection useful.

My exploration of lenses showed that navigation in the repository could be structured through lenses. This improved peoples' conceptual model of the repository's structure, making navigation more effective and clear. Since this has not yet been adequately implemented in the repository, this is something I recommend exploring further in the future.

My exploration of scales showed that filtering information in the repository helps to immerse in the complexity of the platform's content gradually. Overall, I believe using content filters such as scales makes the repository more accessible for people not used to working with complex information. This also poses questions and challenges, as deciding what content needs to be visible at what level of detail is already a complex issue.

My exploration using the final demonstrator was intriguing, as it made it a lot easier for people to understand the purpose and functionality of the repository. It also gave me much feedback on how the repository can be further improved. Especially the impact clouds need work, as the current form has proven to be too simplistic and not sufficiently in accordance with how impact works within transforming practices. Also, the theoretical framework for determining impact is still not in a mature enough state to implement. Another element that can be improved is how recommendations for linking to content already part of the repository work. The suggestions are currently random and not substantiated by data, making their use unintuitive in my demonstrator.

Looking at the design process as a whole, most of the findings have come into being through feedback from experts, the other students that were working on the repository, or people from the TP squad. To further improve the quality of the validation of my prototypes and the functionality they explore, a more broad user base would have been desirable.

Based on this discussion and the project process as a whole, I want to end this discussion by giving some recommendations for elements that need to be explored for further improving the Repository of Transformation in the future:

- The **navigation** of the repository needs to be refined, especially concerning the use of lenses and the management of the complexity

within the repository.

A theoretical substantiation is needed to determine the **aesthetics and navigation of impact**. These features are vital for facilitating learning in the repository, yet in the current version insufficiently explored.

Artificial Intelligence (AI) can provide several benefits for the repository. It can, for example, make recommendations for connections between nodes and help us better understand how impact is created in transformational processes.

The repository is meant as a **learning platform**, but its current structure is not optimized for this. Further research can show how the shape and navigation of the repository can be inspired by its purpose as a learning platform.

The **community aspect** is a significant functionality of the platform, as the d.centre aims to connect pathfinders of change through the repository. The role of the community on the platform and the ways of communication and interaction should be explored in the future.

Other areas that need to be explored later are the platform's inclusivity and energy use.

Overall, for the further development of the platform, I propose an initial deployment of a first version of the repository to use as a sandbox to explore the elements mentioned above within an initial user group. This would provide a rich environment for the repository to mature.

Future plans

In the future, I hope to further work on making the Repository of Transformation a reality. In my Final Master Project proposal, I will go further into detail on this.

Conclusion

In this project, I have explored the concept of a Repository of Transformation concerning its shape, meaning, functionality and purpose. In doing so, prototypes were made to experiment with the design of several elements, namely reflection op case studies and the use of lenses and scales. As a final demonstrater, a high-fidelity prototype was made to explore the inputting of case studies and demonstrate the current shape of the repository. Finally, some recommendations are given to help develop the Repository of Transformation in the future.

Acknowledgments

I want to thank my fellow students, Wesley Hartogs, Sam van der Horst, Rosa van der Veen, and Renate Voss, for this semester's inspiring and motivating collaboration. I also want to thank my coaches, Caroline Hummels and Ambra Trotto, for their time and guidance this semester. Finally, I want to thank all the experts that have supported me, both within the squad and at RISE.

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Appendices

Appendix A: Personal reflection

In this reflection, I look back at my design project on the Repository of Transformation regarding my development as a designer. I will first briefly introduce my vision and identity to put my development into the context of how I want to develop myself as a designer. Afterward, I will reflect on the design research process in general, focusing on the particular collaborative setting of this project and my personal circumstances this semester. Finally, I will discuss my development within the several areas of expertise, which I will relate to my goals as a designer.

Vision

I am worried about the challenges that society faces, such as the climate crisis, polarization, and individualism. It intrigues me how technology mediates our relationship with these complex issues, and as a designer, I feel responsible to be part of a positive movement toward bringing about change and facilitating transformation.

During my master's research project, I came into contact with Transition Design, which interested me in further exploring the branch of social transformation design. I felt that design can provide the tools to facilitate working towards change within complex socio-technical settings, so I decided to join the Transforming Practices squad in the second year of my master's, where I found a like-minded community of designers.

In this community, I hope to further develop myself as a designer who can unravel complex structures to create the conditions for radical social transformation.

Identity

I consider myself a designer inspired by the potential impact of design in addressing complex problems. My interests in politics, philosophy, sociology, and technology have shaped me as someone who continuously analyses the world around me and is motivated by trying to comprehend the complex systems I encounter around me.
In design processes, I am driven by exploration and doing. I like to use technological tools to create explorative experiences while using philosophical resources to substantiate and steer my inquiries.

Design process

The collaborative setting of this design project was an educative and challenging experience this semester, In which I discovered new ways to work together on a shared project. Working together and having weekly discussions proved to be an effective way to shape the repository over time. This made it hard to plan concrete design steps, as a direction you explored could become obsolete the following week. I overcame this by continuing my exploration process until the last week and making my demonstrator based on the knowledge we collectively had at that time.
Another challenge for me this semester has been organizing and planning. Because of several personal circumstances and a busy extracurricular program, I did not have the time to come to the university very often. This made it hard for me to structure my time well, resulting in a project in which the time distribution was skewed. I am glad I could make up for this in the later stages of the project, and by having much time to work on the final demonstrator, I am very content with the result of this project.

Areas of expertise

Throughout my education, I have developed myself in different expertise areas. I have engaged with most of the expertise areas during this project, focusing on Technology and Realization and Creativity and Aesthetics.

Creativity & Aesthetics

During this project, the aesthetical qualities of my work have been vital for communicating my vision of the repository. Three.js has allowed me to translate aesthetical user experiences to the web while also providing the means to use programmatically generated art in visuals and deliverables, as I did for my demo day stand.

Technology & Realization and Math, Data & Computing

The most significant development during this semester was in the area's of Technology and Realization and Math, Data and Computing. I had experience with web design before this project, however, the nature of the repository platform encouraged me to rethink the classical idea of what a web experience means. Through this perspective, I learned to work with several new technologies, such as WebGL, Tree.js, PWA's, Vis.js, Node.js, and others. Learning to work with these web-based software solutions has made me much more flexible in my digital prototyping resources and more efficient in developing experiences for the web.

User & society

Although the user and society competence has not been addressed very specifically during this project, the setting of the repository as a learning platform grounded in a social setting has shaped my design project under the surface. Through my research into TP in the initial stage of this project and through being an active student in the TP squad, I also learned a lot about design for social innovation, and I also consider this part of my U&S competence.

Business & Entrepreneurship

Working with Ambra Trotto has been my first experience working with an external expert on my projects, and working on a project for the d.centre has given me a first experience working on a project with an external stakeholder.

To conclude, in this reflection, I have shared my vision and identity and looked back at my design process this semester. I have also identified some key insights into the design research process. Finally, I have shared my development in several areas of expertise.

In the following appendices, you can find the source code of my web-based prototypes. For a complete overview of all prototypes, you can visit this **GitHub repository**.

Appendix B: First prototype

You can view the source code for this iteration **here**.

Appendix C: Second prototype

You can view the source code for this iteration **here**.

Appendix D: Third prototype

You can view the source code for this iteration **here**.

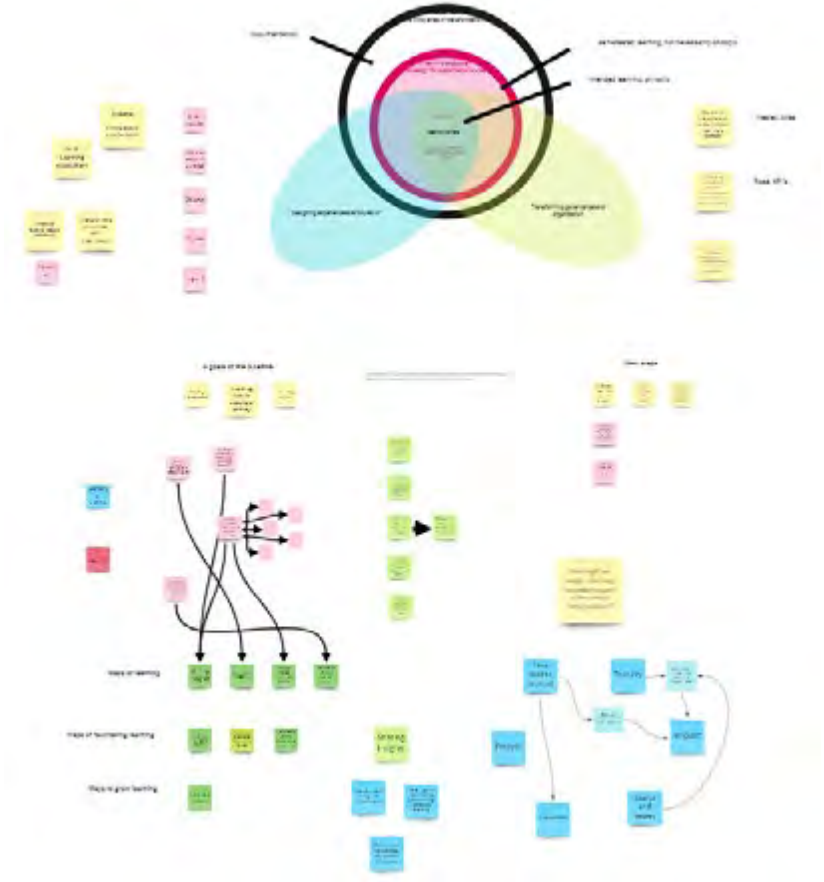
Appendix E: Final demonstrator

You can view the source code for this iteration **here**.

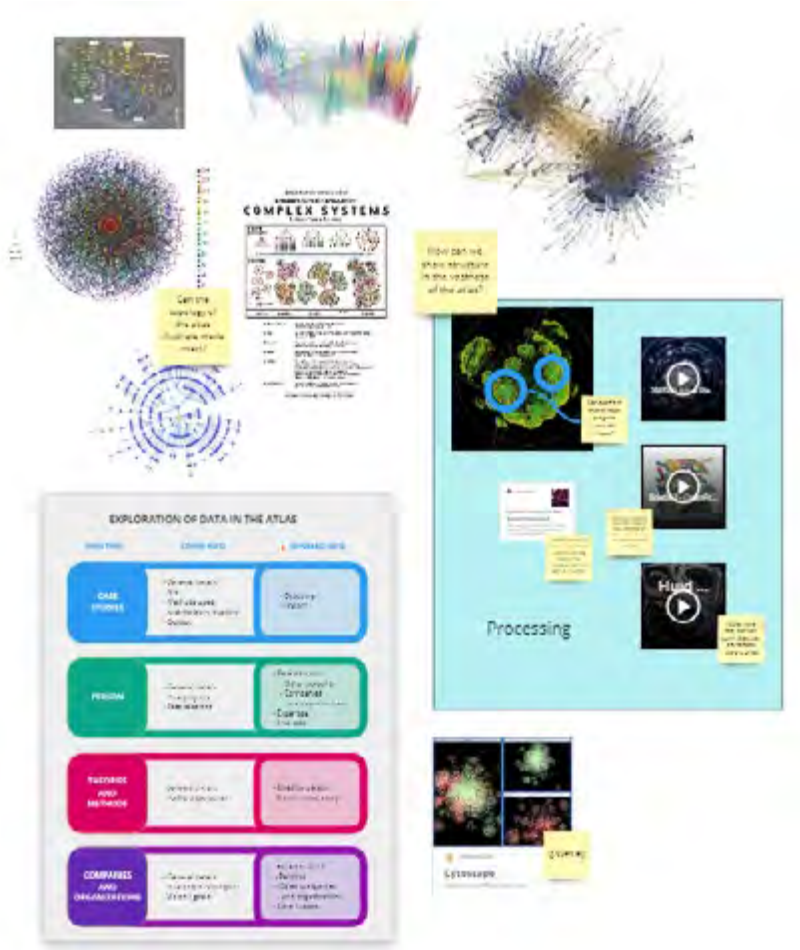
You can visit the we app **here**.

Appendix F: Other design activites

During this project, I explored a lot of directions that I did not document in this report due to the limited lever of detail I can go into with the given word count. Because of this, I decided to share some of my ideation activities in this appendix.



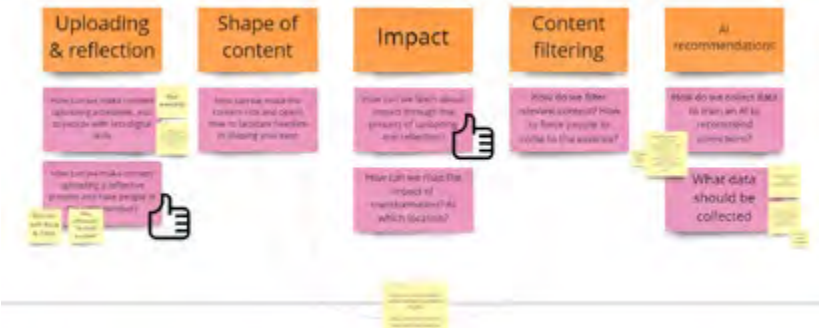
Exploration of the role of learning in the d.centre



Exploration of topological visualizations in the repository

Defining the long term goal of the repository as part of the design sprint

Questions for the repository as defined in the design sprint



Mapping challenges in the design sprint

Note-n-map process of the design sprint

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