

ENVISIONING EINDHOVEN

A Final Master Project report by Jorrit van der Heide



ABSTRACT

This report documents the design process undertaken to reinterpret the Social Progress Index (SPI) in a way that sparks excitement about the future. It outlines an iterative approach that explores the realms of design, artificial intelligence (AI), urban governance and participation. This report provides an analysis of the prototypes developed and offers a reflection on the design journey, that presents a digital platform for citizen storytelling as its outcome. It also discusses the next steps and considerations for moving forward with the project. Through this comprehensive documentation, the report aims to inspire further exploration and advancement in the intersection of design, AI, and participatory urban governance.

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1. INTRODUCTION

How should we, as a society, give shape to our trajectory toward the future? Upon first examination, progress may appear to be an autonomous force, methodically propelling us toward the futures envisioned by policymakers, tech giants, and experts. Yet, we must not forget that in a democratic society, envisioning our future is a shared responsibility, a task that all of us can - and indeed, must - participate in. This report offers a detailed account of my design process and underscores the need to look beyond obstacles in the immediate future, and appreciates the potential of imagination in catalyzing inclusive and community-driven urban development and governance practices.

At the beginning of the semester, I chose to steer my design endeavors within the scope of the SPIneyworld project, an initiative by the Research Institute of Sweden (RISE). During the semester, I was co-coached by Jeroen Peeters from RISE, which offered a context for my project within the scope of the SPIneyworld project. SPIneyworld aims to use design as a catalyst for reinterpreting the potential of the Social Progress Index (SPI), directing policymakers towards policies that emphasize social progress and sustainable urban development.

Over the course of the semester, as my design explorations advanced, the scope of my project moved from the development of a tool for policymakers in Umeå to a citizen storytelling platform to conceptualize the future of Eindhoven. I ultimately developed a tool designed to enable citizens to create narratives concerning their city's future with the aid of Artificial Intelligence. I aim to democratize futurist thought, infusing a sense of anticipation rather than apprehension into people's contemplation of what is to come. This report acts as a comprehensive record, presentation, and discussion of my design project's process and outcomes. It outlines my design investigation into the intersections of AI, citizen participation, storytelling, and governance. By presenting both the process and result of my project, my objective is to highlight the potential, as well as the constraints of AI-guided citizen storytelling as an approach for advancing inclusive, participatory urban governance and in doing so, re-envision the application of the SPI.

In this report, I will discuss and reflect on my exploration of AI citizen storytelling tools as a means to envision the future of cities. Firstly, I will examine the SPI and its limitations in addressing the complexity of social progress. I will then share the development process of an AI storytelling tool designed to facilitate citizen co-creation. I will then evaluate the tool's use and discuss its contributions to supplement the SPI in the context of future thinking, citizen engagement, and AI-driven design. Finally, I will conclude by reflecting on this project and its

significance and potential to inspire future endeavors of inclusive and participatory urban governance.

2. DESIGN CONTEXT

This Final Master Project was conducted in collaboration with the Research Institute of Sweden (RISE) as part of their Social Progress Innovation Sweden (SPIS) project. Initiated in March 2020, SPIS aims to establish an enduring and cross-sectoral organization in the city of Umeå dedicated to fostering innovative solutions for a wide range of societal challenges (RISE, n.d.). Within this overarching framework, my project centers on the Social Progress Index (SPI), a tool designed by the European Commission’s Joint Research Centre (JRC) to comprehensively measure social progress in Europe (The Social Progress Imperative, 2022).

The SPI serves as a paradigm shift away from the reliance on Gross Domestic Product (GDP) as the sole metric for measuring societal well-being and guiding public policy decision-making. By encompassing a multidimensional set of indicators, the SPI offers a more holistic and nuanced perspective on social progress, providing a comprehensive picture of a region’s social situation in comparison with other regions in Europe. In doing so, it empowers policymakers by highlighting areas that require improvement, enabling them to make informed decisions and monitor progress over time.

Moreover, the SPI embodies the European Commission’s values and aspirations for the future and, by extension, our collective vision as a European society. It signifies a step towards redefining the notion of progress beyond economic measures, embracing a broader understanding that encompasses the diverse aspects of human well-being and societal development. In this regard, the SPI not only represents a metric for evaluating social progress but also serves as a visionary framework, guiding us toward a future shaped by values such as compassion, sustainability, and inclusivity.

Basic human needs	Foundations of well-being	Opportunity
Nutrition and Basic Medical Care	Access to Basic Knowledge	Personal Rights
Water and Sanitation	Access to Information and Communication	Personal Freedom and Choice
Shelter	Health and Wellness	Tolerance and Inclusion
Personal Security	Environmental Quality	Access to Advanced Education

Figure 1. Framework of the European regional Social Progress Index.

Upon conducting a first evaluation of the SPI, the index seems to offer valuable utility as a tool for policymakers to compare and benchmark their regions in relation to other European counterparts (Jitmaneeoj, 2017; Beltrán-Esteve et al., 2023). Nevertheless, the utility of the SPI is not universal or without challenges. One inherent challenge lies in the complexity of translating the diverse dimensions of social progress into quantifiable indicators. Despite efforts to capture a wide range of factors, some aspects of social progress, such as subjective well-being and evolving dimensions that change over time, maybe challenging to capture accurately, while others may not be fully represented within the index, such as domains that are still lacking (Greve, 2016, p. 1016). In the discussion, I will provide a further account of what these domains might be. Additionally, the SPI relies heavily on available data, which can vary in quality and quantity across regions and may introduce biases or inaccuracies in the assessment of social progress. Furthermore, the SPI's focus on regional comparisons may overlook important nuances and context-specific dynamics within individual regions, potentially limiting the transferability of the practices of one region to the other (Estes, 2014). The index also poses a challenge for regions at the forefront of social progress. With limited role models to guide them toward the future, policymakers in these more socially advanced regions may face difficulties in effectively using the SPI domains to chart a course for continued advancement (Greve, 2016, p. 1016). It is important to recognize these limitations and consider the SPI as something that should be complemented with qualitative insights, local knowledge, and context-specific indicators.

Recognizing these limitations, the SPIsneyworld project emerges as a design-focused response within the broader SPIS program. This project takes a novel approach by designing and implementing prototypes that evoke immersive experiences associated with potential futures envisioned through the SPI, aiming to unlock new dimensions of understanding and engagement of the SPI and sparking an anticipatory excitement about the future, analogous to visiting Disneyland as a kid.

The project aspires to transform the city of Umeå, Sweden, into a place where the values embedded in the SPI can be tangibly experienced within the urban landscape, sparking an anticipatory excitement about the future, analogous to visiting Disneyland as a kid. The SPIsneyworld project explores innovative approaches to enhance urban governance, foster social progress, and create conditions for communities to thrive.

3. DESIGN PROCESS

In this portion of the report, my aim is to thoroughly outline the process I followed in this semester's design process, as can be seen in Figure 2.

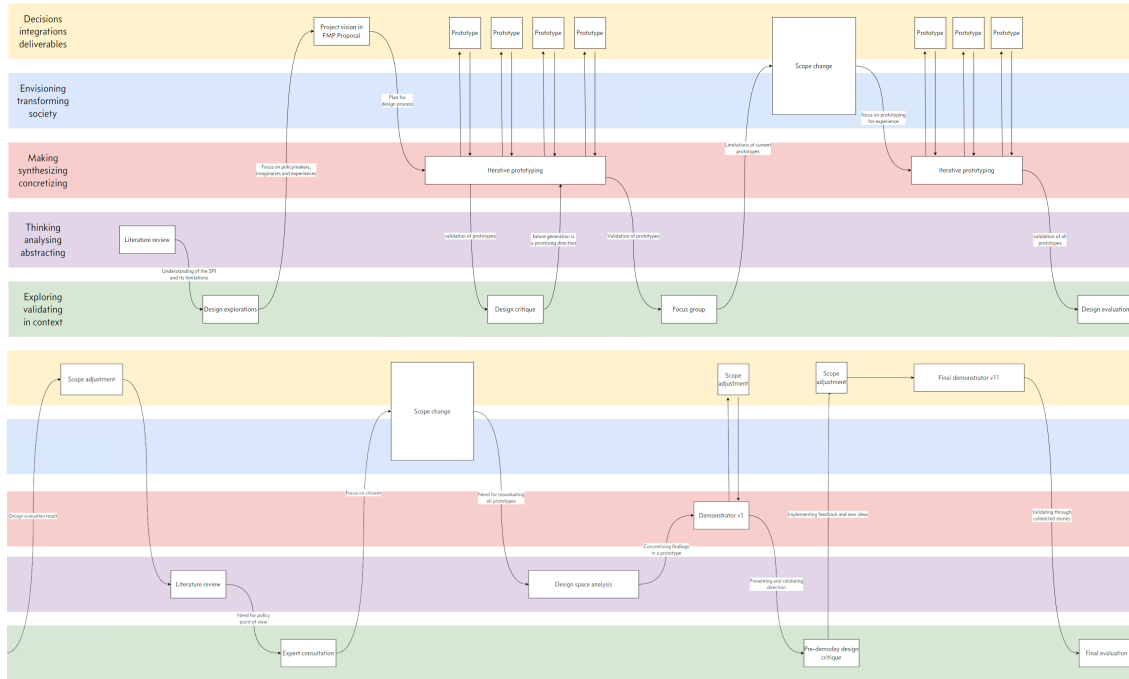


Figure 2. Visualization of the design process according to the model of Reflective Transformative Design (Hummels & Frens, 2009); see Appendix A for a bigger version.

Along with the design process, I will provide a reflective commentary on the crucial decisions made throughout it. First, I will present my exploration of the design context, employing Artificial Intelligence (AI) techniques to gain a deeper comprehension of the topic at hand. Subsequently, a deeper understanding of the societal role and influence of my project was achieved via a design critique session complemented by expert consultation.

In the ensuing paragraphs, I will further detail my design process, presenting a detailed account of the steps taken.

3.1 Design explorations using AI

In the early stages of the project, my main objective was to get a better understanding of the design context and solution space. To start with interpreting the SPI domains in novel and immersive ways right from the start, I used text-to-image AI methodologies to visualize the SPI domains. The goal behind this approach was to better understand the context and direction of

my project, assess the strengths and weaknesses of the SPI and identify areas where design improvements could be introduced.

During the design exploration phase, I used the open-source DALL·E 2 text-to-image generator by OpenAI (OpenAI, 2021) as a tool to conjure visualizations of conceptual cities. By questioning the AI on the SPI domains through thoughtfully selected text prompts, I sought to understand how these specific domains could shape the appearance and attributes of the generated cities. An example of this is a visualization of future cities centered around the domain of environmental quality and shelter, as seen in Figure 3. below. This exploration enabled me to deepen my grasp of the aesthetical characteristics of the SPI domains as seen in the generated urban landscapes, showing what these domains might entail in the future.

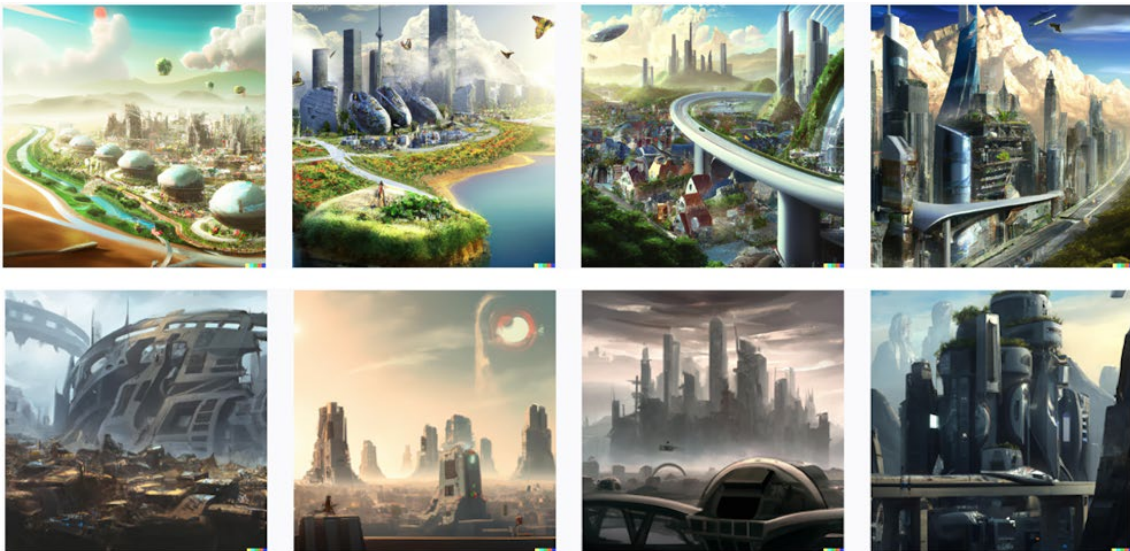


Figure 3. Example of and exploration into the domains of environmental quality (top) and shelter (bottom).

I also used this method to investigate the transformative capacity of language and its influence in directing AI to conceptualize fictional urban landscapes. In my attempts to understand the extent to which a substantial shift in visual aesthetics could be achieved using specific language,

I strategically selected different prompts and keywords. I found that even slight changes in wording held power to steer the AI to create vastly different visual outcomes.

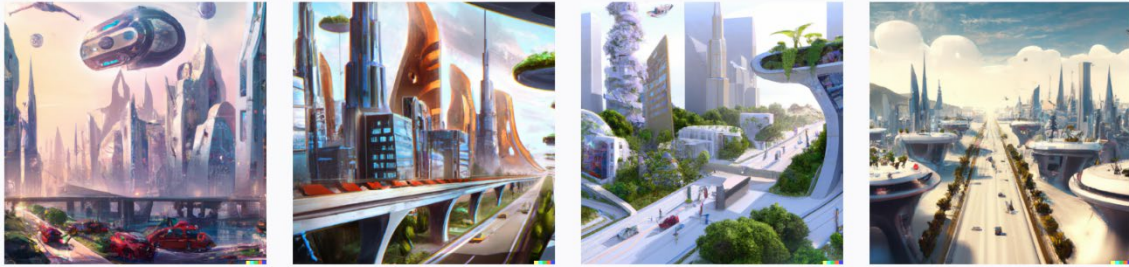


Figure 4. Results for the prompt 'Car-free city of the future.'



Figure 5. Result for the prompt 'Human settlement without roads,'

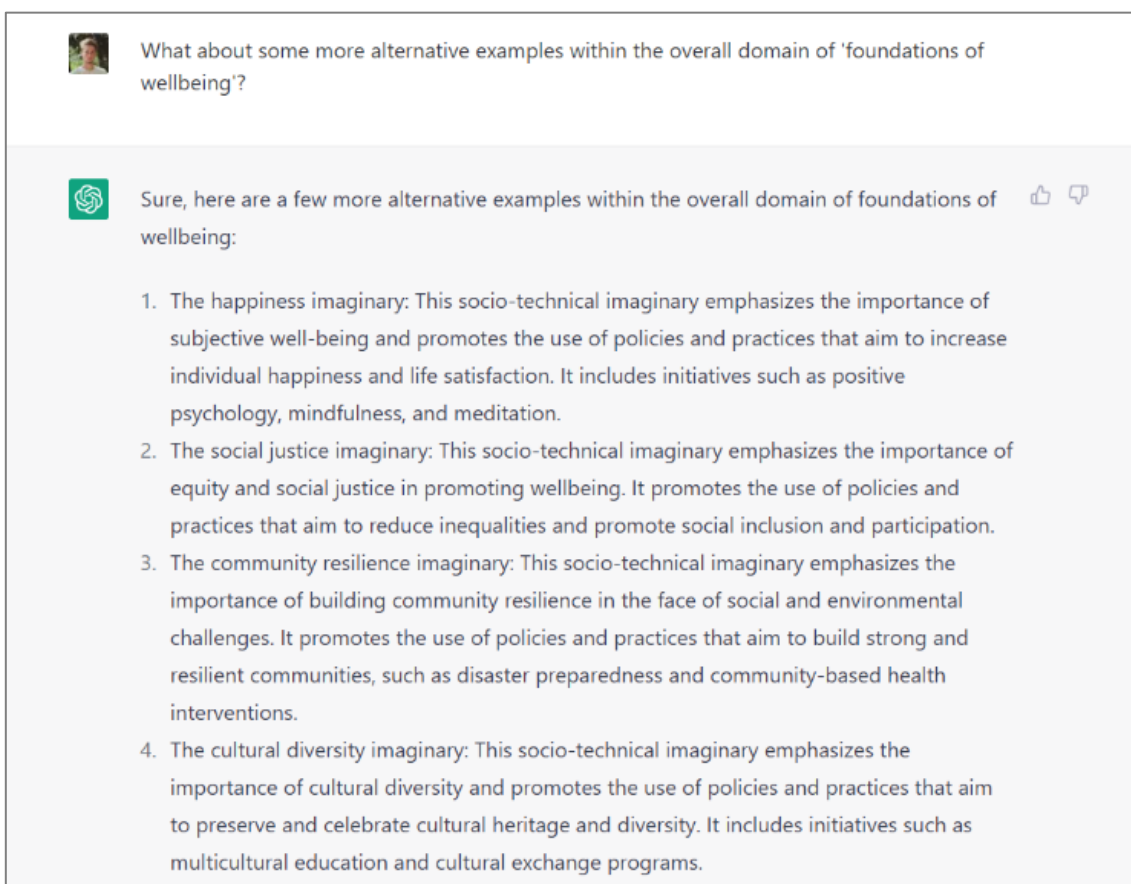
These explorations offered me a better understanding of how AI handles language, which became essential when crafting AI prompts, a task that required a substantial part of my efforts throughout this project.

Furthermore, the potential of the use of AI for imagining the future of the SPI domains became clear when I, in discussing my project with my fellow students, came to realize that the generated images sparked many people's interests. My aim was to explore if generated imagery can stimulate broader discussions and thoughts about the future trajectory of the SPI domains, forming a potential direction for reinterpreting the SPI in new and immersive ways.

3.2 Approaching the SPI from the perspective of imaginaries

While exploring the design context, I was introduced to the sociological concept of sociotechnical imaginaries (Jasanoff & Kim, 2015). These imaginaries represent collectively held visions of the future, demonstrating the impact of such visions on current societal practices. This concept intrigued me, given the interesting interplay it reveals between individual perceptions, beliefs, and the concrete actions they inspire. To delve deeper into this concept, I carried out an exploration using ChatGPT, an open-source, generative text-based AI

by OpenAI (OpenAI, n.d. a). Although imaginaries generally emanate from personal ideas and visions formed through societal interactions, the output generated by ChatGPT could be viewed as a summarization or collective embodiment of the existing dominant imaginaries. I do want to note that this approach has the risk of generating non-factual information, as is often the case with generative AI (OpenAI, n.d. b). This is as expected and is only beneficial for my approach as the output is meant to inspire new or underused perspectives on the domains, as I will explain below.



The screenshot shows a chat interface with a user prompt and an AI response. The user prompt asks for alternative examples within the domain of 'foundations of wellbeing'. The AI response provides four numbered examples: 1. The happiness imaginary, 2. The social justice imaginary, 3. The community resilience imaginary, and 4. The cultural diversity imaginary. Each example describes a socio-technical imaginary and its associated policies and practices.

What about some more alternative examples within the overall domain of 'foundations of wellbeing'?

Sure, here are a few more alternative examples within the overall domain of foundations of wellbeing:

1. The happiness imaginary: This socio-technical imaginary emphasizes the importance of subjective well-being and promotes the use of policies and practices that aim to increase individual happiness and life satisfaction. It includes initiatives such as positive psychology, mindfulness, and meditation.
2. The social justice imaginary: This socio-technical imaginary emphasizes the importance of equity and social justice in promoting wellbeing. It promotes the use of policies and practices that aim to reduce inequalities and promote social inclusion and participation.
3. The community resilience imaginary: This socio-technical imaginary emphasizes the importance of building community resilience in the face of social and environmental challenges. It promotes the use of policies and practices that aim to build strong and resilient communities, such as disaster preparedness and community-based health interventions.
4. The cultural diversity imaginary: This socio-technical imaginary emphasizes the importance of cultural diversity and promotes the use of policies and practices that aim to preserve and celebrate cultural heritage and diversity. It includes initiatives such as multicultural education and cultural exchange programs.

Figure 6. Example of a ChatGPT prompt and reply for exploring the SPI pillar 'Foundations of Wellbeing.'

During this design exploration, a varied collection of imaginaries emerged. These imaginaries, I believe, can serve as a lens, a perspective through which we can contemplate the future, so I sought to understand how these imaginaries could be employed effectively. I chose to adopt an iterative approach, placing emphasis on exploration through the creation of multiple digital prototypes in succession, each building upon the insights gained from the previous one. Aligned with the objectives of the SPIsneyworld project and in collaboration with Jeroen Peeters, I

aimed to explore how the SPI could be reinterpreted through the lenses provided by these imaginaries and, ultimately, develop a digital tool that could assist policymakers in the process of socially oriented urban decision-making.

3.3 Digital Sandbox

To explore the ways in which to reinterpret the SPI, I adopted an iterative approach. As I like to work mostly with digital materials, I developed a digital sandbox on which my several prototypes could be managed and rapidly created. I provided a link to this platform in Appendix B. Building on my proficiency and familiarity with web technologies, I was able to rapidly prototype and effectively traverse through varied concepts and viewpoints. This was made possible by the utilization of Next.js (Vercel, n.d.), a web framework that I am experienced with from my prior project, enabling the rendering of both static and dynamic webpages using JavaScript.

To integrate AI functionalities within the prototypes, I designed a backend using API routes. Acting as intermediaries between the user interface and the AI models, these routes mapped specific web addresses on the site to the in and out-channels of the AI models. In this setup, the input data was processed within these routes before being forwarded to the AI models to generate future scenarios or narratives. Once the AI computations were completed, the output was relayed back to the front end, either for immediate display or further processing. Adopting this method granted me a substantial degree of flexibility, allowing for the repurposing of various AI functionalities. Additionally, it enabled potential interaction with external resources, further broadening the scope of possibilities and making the sandbox a convenient platform for the exploration of various design ideas.

3.4 Iterative Digital Explorations: Futures Generation 1

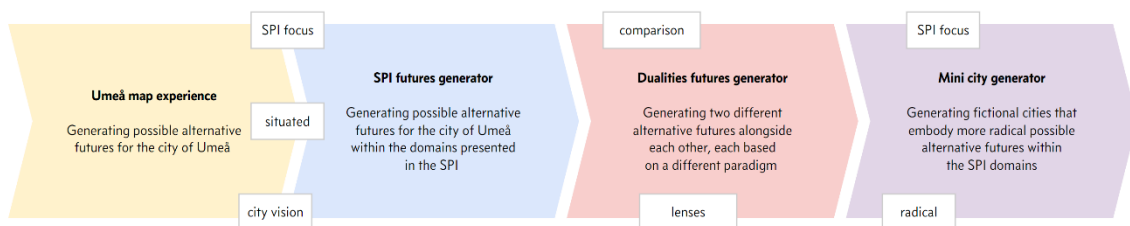


Figure 7. Annotated overview of the prototypes made during this phase.

In the subsequent section, I will highlight the prototypes I created in the sandbox, an overview of which is depicted in Figure 7. I will explain the design objectives that served as guiding principles during the development of these prototypes, providing a comprehensive explanation

of their intended purposes. Furthermore, I will discuss some of the details on how each prototype was realized, although a more detailed account of the programming that underpins their functionality can be found in the appendices. Furthermore, I will provide an analysis of the design considerations that played a significant role in shaping the evolution of the prototypes throughout the iterative process. In conclusion, I will engage in a reflection for each prototype, using the insights from using the prototype myself and letting others try it, to inform and guide the development of subsequent iterations.

3.4.1 Umeå Futures Generator

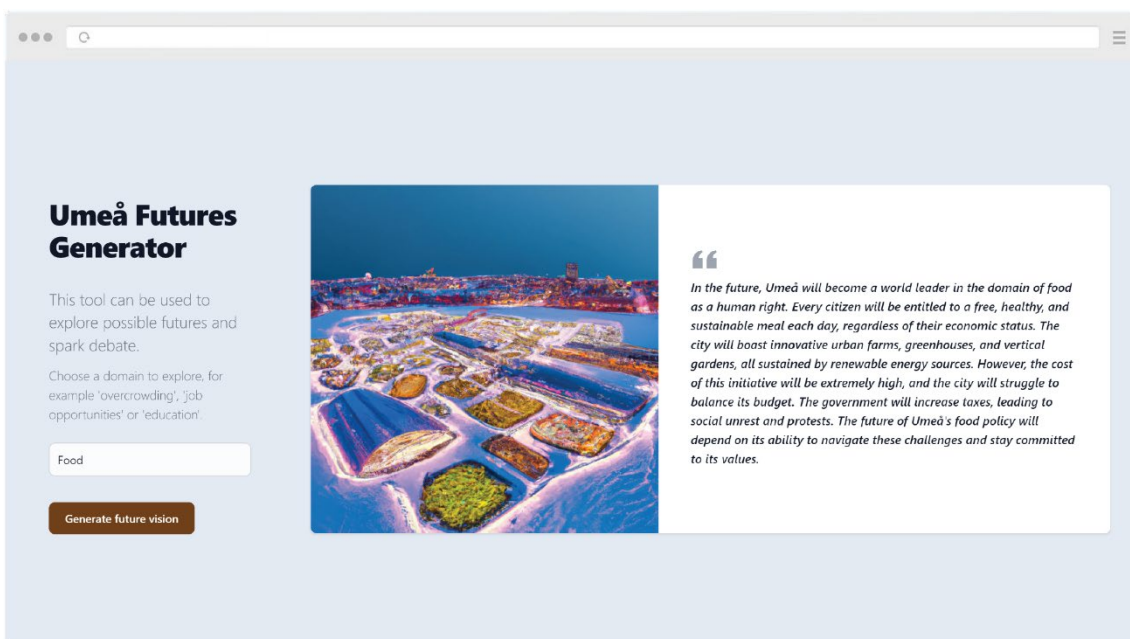


Figure 8. Screenshot of the Umeå Futures Generator.

Design Goal

The Umeå Futures Generator was my first exploratory venture in prototyping an AI tool to provoke meaningful discussions on future urban development in the domains of the SPI. Instead of focusing on direct citizen participation, it was developed with the idea of serving as an asset within local urban governance, used to facilitate innovative ideas in workshops or contributing to the richness of political debates, which was a direction that emerged from my discussions with Jeroen Peeters.

Prototype description

This interactive generator requires users to specify the domain they want to envision the future of. Upon receiving the input, the generative AI proceeds to craft diverse future scenarios,

presented as visions of how the city might evolve in time. These textual narratives are accompanied by corresponding AI generated images, aiming to enhance the user's immersion and understanding of the depicted future.

Design considerations

To generate these visions, the Umeå Futures Generator utilizes the capabilities of the ChatGPT 3.5-turbo model. The user's input informs the domain, while the lens - a perspective or paradigm for envisioning the future - is randomly selected from a list that I curated and have based on my explorations into socio-technical imaginaries. The list includes several value-driven lenses, like human rights, innovation, and environmentalism as seen in the source-code linked in Appendix C. It is important to note the distinction between the SPI domains and the lenses. While the SPI domains signify development areas, the lenses offer varied vantage points from which these domains can be viewed. For instance, an innovation lens might frame technological advancement and industrialization positively, whereas an environmentalist lens would depict it as potentially harmful.

The accompanying images are generated using DALL-E. The image prompt is constructed from the generated vision by ChatGPT, followed by the keyword 'photograph' to guide the type of visual output desired. The decision to include generated images alongside textual descriptions was a deliberate choice shaped by my initial explorations. These explorations highlighted the power of visuals in capturing attention and sparking curiosity, aligning with SPIsneyworld's objective of reinterpreting the SPI domains as an immersive experience. The purpose of the generated visions was to create scenarios that could be interpreted from multiple perspectives. By presenting these contrasting visions, the tool encourages users to question and reassess various aspects of urban development that are often overlooked or taken for granted in public discourse and policymaking.

The use of lenses was introduced with the objective of pushing the AI's output beyond dominant and conventional modes of thinking about the future. This mechanism prompts the AI to conform to a specific perspective, thereby enhancing its ability to generate distinct and less predictable future scenarios.

Reflection

Upon reviewing the performance of this prototype with Jeroen Peeters, I realized that the AI output's quality and consistency fell short of the intended goals. While some generated visions presented engaging narratives on the utopian-dystopian spectrum, many lacked the desired depth and intricacy, with either the utopian or the dystopian aspect overruling the narrative.

Despite these shortcomings, the tool demonstrated some valuable elements. Its capacity to employ varied lenses to trigger conversations, offer fresh perspectives, and break away from stereotypical thinking about the future was quite promising and in line with the intended purpose. Building on these insights, I felt encouraged to delve deeper into the concept of a future generator, with the aim of refining its functionalities in the subsequent iterations of the prototype.

3.4.2 SPI Futures Generator

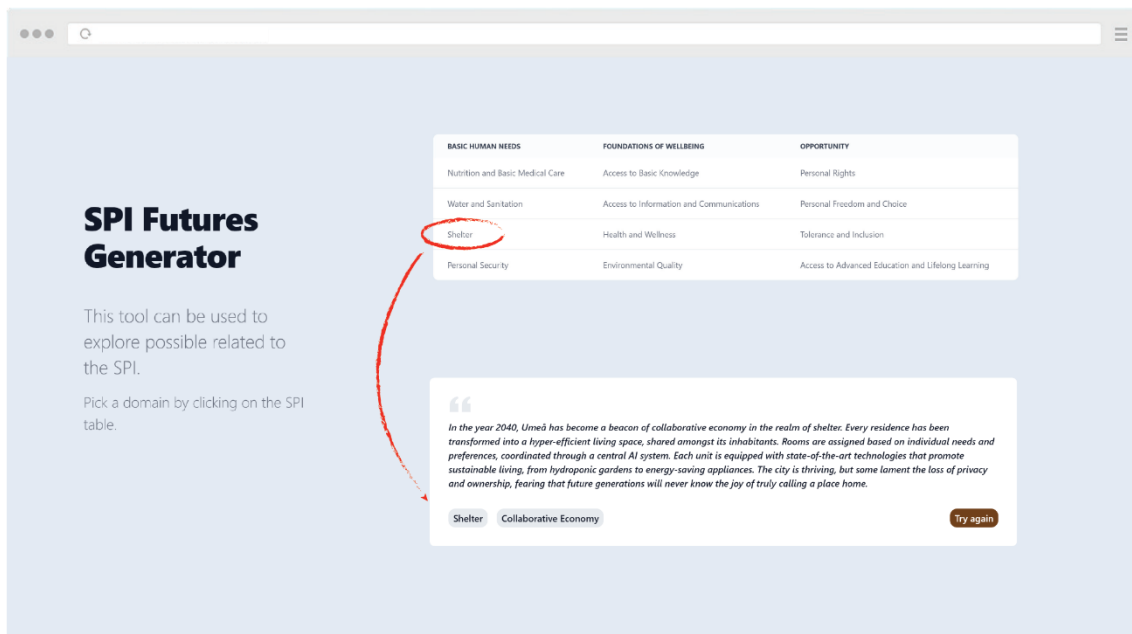


Figure 9. Edited screenshot of the SPI Futures Generator.

Design goal

The SPI Futures Generator represents an evolution of the Umeå Futures Generator, tailored specifically to explore visions related to the SPI. This iteration focused on showcasing and explaining the SPI domains to explore what the future of these domains could entail.

Additionally, it aimed to resolve some of the shortcomings of the previous version, by providing more nuanced narratives.

Prototype description

The prototype functions similar to the Umeå Futures Generator, but as input it uses a table containing the SPI domains. Users can pick a domain from this table to initiate the model, which then outputs a textual vision for the future of Umeå. Alongside this vision, labels with the chosen domain and the randomly picked lens are displayed.

Design considerations

The prototype adheres to a similar format as the Umeå Futures Generator but adopts modified ways for picking a lens and prompting the AI. Firstly, the paradigms are now chosen from a more extensive list that is also generated by ChatGPT, including more diverse value paradigms, such as smart cities, community-led development and regenerative design. Secondly, the prompt for the AI was modified according to known best practices, personal experiences and extensive testing. Specifically, I found that providing long prompts with excessive details tends to confuse the AI, adversely affecting the output. By breaking down complex prompts into smaller, more manageable components or by providing an example text within the prompt, the prototype achieved better outcomes.

Building upon the previous prototype, several enhancements were also implemented to improve user experience and transparency. To address the black-box nature of the lens selection in the previous prototype, I incorporated labels in the output results, explicitly indicating the chosen domain and lens used to generate each vision. This addition allowed users to discern the specific factors contributing to each generated outcome, which improved the clarity of the visions generated and made it easier to converse about the qualities that emerged in the presented visions.

The image generation functionality was removed from this prototype to observe the impact of (a lack of) imagery on the overall experience.

Reflection

Through extensive iteration of the text prompts in the development of the tool, I noticed substantial enhancements in my intension for the image and the AI-generated results compared to the earlier iteration. These improvements were largely due to a more nuanced understanding of AI input handling on my part, leading to a more accurate and cohesive generation output.

The code improvements that were made for this can be found in Appendix D.

During the development of this prototype, I also explored the optimal length for the generated output. Striving to balance the computational demands of AI models like ChatGPT with environmental considerations, I sought to generate comprehensive yet concise content. Through experimentation, I found that a text length of 250 - 500 words often offered a comprehensive exploration of the generated visions. However, to reduce generation time and the associated monetary and environmental costs, along with adhering to the limitations set by hosting providers for running background functions, most prototypes use around 250 words for their output. I will further discuss the consequences of this decision in the discussion.

Additionally, when discussing the prototype with fellow students and my coaches, I found that the image generation feature was a feature people who experienced the first prototype found missing. Upon reflection I realize that this decision does not align well with the aim of SPIsneyworld either. Therefore, the use of visuals is something I aim to explore more during the project.

3.5 Focus group evaluation

A focus group session was utilized to evaluate the futures generator prototypes developed thus far, which was done in a design carousel setting. The design carousel is a collaborative evaluation methodology designed to facilitate active participation and engagement in a design workshop or group setting (Transforming Practices Squad, n.d.). Participants move from one activity to another at set intervals, promoting a diversity of perspectives, cross-fertilization of ideas, and the practice of iterative design thinking.

3.5.1 Method

Session setup & participants

For this session, I employed an adapted version of the SPI Futures Generator. My aim was to analyze how the use of images and a map on the one hand and the prototype on the other would influence the discussion ensuing around the SPI domains, to find promising directions for my process and validate my efforts on AI-enabled futures generation.

The focus group session encompassed three rounds of discussions, with the future of Eindhoven as the central topic. This change of city aimed to make the prototype better adjusted to the participants, who were more familiar with Eindhoven. More about this decision can be read in the discussion. The session was attended by three participants of the carousel format, and as these were chosen at random, no specific inclusion or exclusion criteria were used. The participants were all master students in industrial design, in the age group of 20-30 years old.

For this session, the prototype was modified to better accommodate the focus group setting by making it usable for multiple people and making it specific to the context of Eindhoven. On the adapted prototype, several future visions for the city of Eindhoven were generated for a single same domain, displaying them side-by-side, each adopting a distinct lens. The output of this prototype was exclusively text-based and concise in order to serve as a discussion starter within the focus group setting.

Procedure

In the initial round, participants were individually asked about their envisioned future for Eindhoven and the inspirations behind their responses. This allowed for the exploration of individual perspectives and aspirations.

In the second round, a printed map of Eindhoven, adorned with various images of the city, was utilized as a visual aid to stimulate discussions around a selected SPI domain. Using notes and drawing supplies, participants collectively envisioned the future of the city within the chosen domain.

Lastly, the third round involved the custom-made prototype, which generated unique, text-based visions for each participant within a newly selected domain. Participants were once again prompted to engage in collective discussions, exploring and envisioning the future of the city within this specific context.

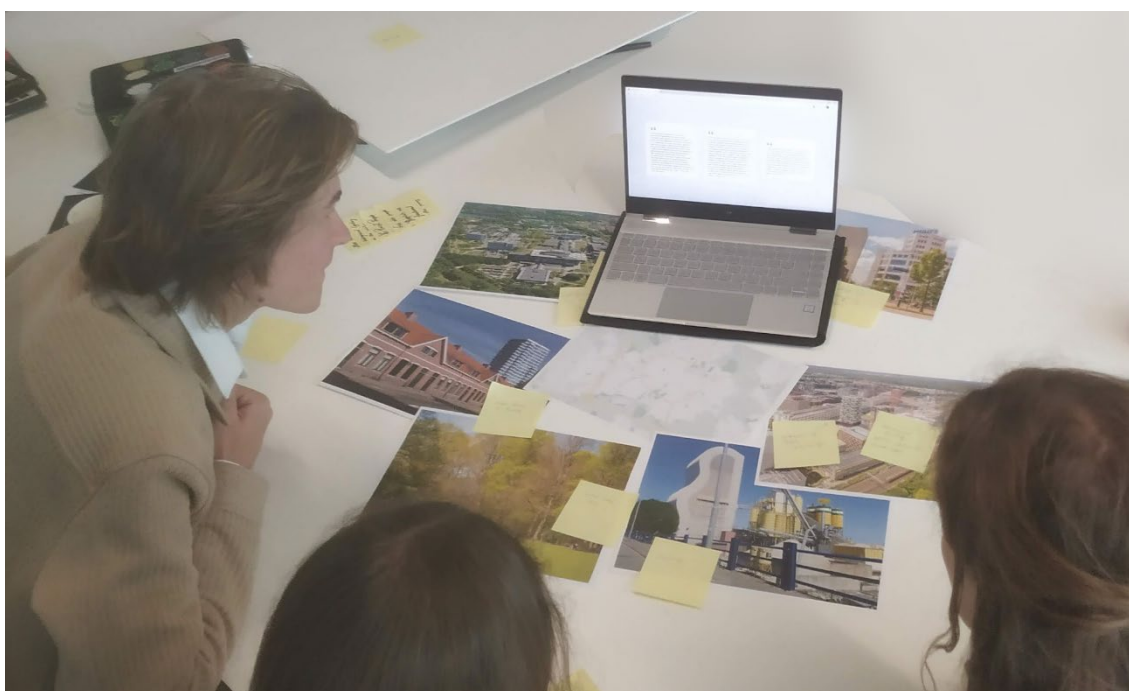


Figure 10. Picture of the focus group session.

Results

During the sessions audio was recorded which was transcribed immediately after the session. To analyze the session, a thematic analysis was done. For this, the transcript was coded on the themes discussed to identify key patterns and trends, the full results of which can be found in Appendix E.

From the carousel session, I observed that individual contributions were often centered around personal ideals. What stood out in the initial discussion was the adoption of a more idealistic perspective on the future.

A different attitude could be seen in the communal discussions using the map and images. The addition of both the map and the images made the discussion far more engaging and context-specific, revolving more around Eindhoven's unique situation and locations within the city. The participants exhibited more enthusiasm in reimagining the city's physical layout and drew inspiration from Eindhoven's already successful practices.

Finally, the prototype was used together with the map, a decision I will reflect on below. The use of the prototype and map together stimulated comparative thinking among participants. Using the visions presented, it encouraged them to consider multiple viewpoints, and this resulted in more unconventional ideas, such as apartment buildings that collect your data and sell it so you can live there for free. I want to note that this could also have been the result of the same topic being discussed for a longer time towards the end of the discussion when the prototype was deployed. Additionally, the prototype brought to light some more dystopian possibilities of the future, steering the tone of the discussion.

Reflection

Overall, my main findings are that the visual aids provided by the map elevated the quality of ideas and perspectives shared during the carousel session. Additionally, the use of a comparative view seemed to somewhat broaden the scope of the solutions discussed.

It also highlighted the need to look at the more dystopian lenses, and their effect on the visions presented. As the aim of SPIsneyworld is to approach the future with enthusiasm, the functioning of the prototype as observed does not yet align well with this aspiration.

Furthermore, the exercise underscored the importance of context in shaping discussions about the future. The most compelling and engaging ideas were those that were rooted in the specific context of Eindhoven, revealing a need for more localized, situation-specific approaches in future envisioning. This seems to be an interesting point of departure for further exploration, as it resonates with making the SPI domains more visible in public space as intended by the SPIsneyworld project.

3.6 Iterative Digital Explorations: Futures Generation 2

3.6.1 Dualities Futures Generator

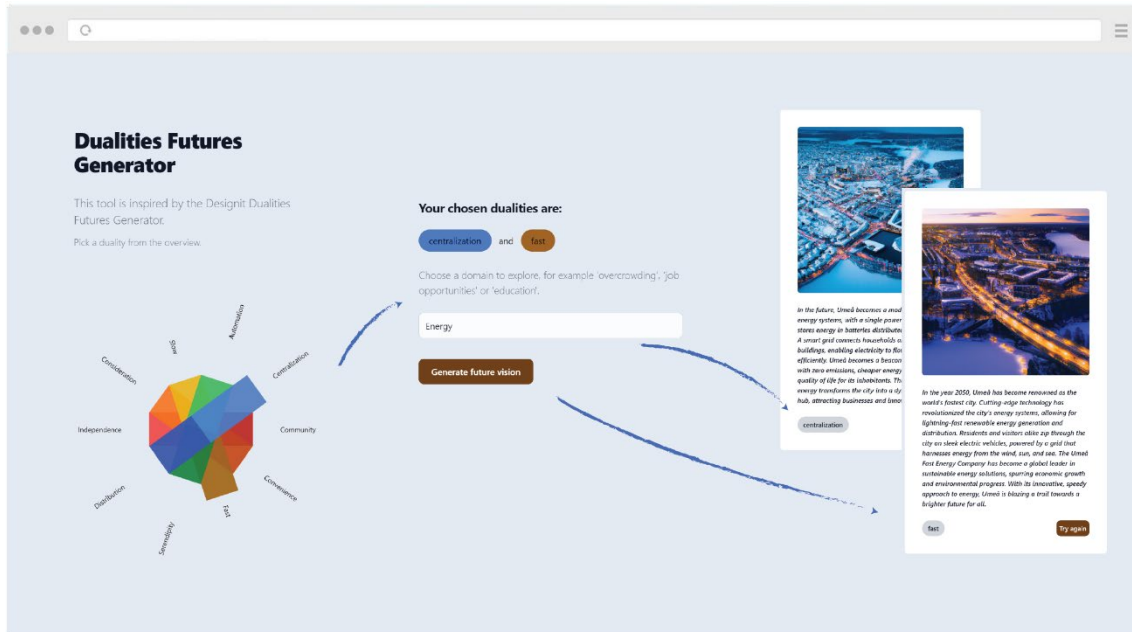


Figure 11. Edited screenshot of the Dualities Futures Generator.

Design goal

Various interesting directions emerged from the focus group session, such as the positivity of the AI and the use of situated imagery, these will be explored in later prototypes. Before that, however, I wanted to further pursue a prototype that compares a future using two separate lenses like the prototype used in the focus group. Based on the focus group session, I found this to be an interesting quality, and although it did not resonate specifically well with the participants of the workshop, I saw value in this functionality for policymakers to enable them to approach decisions for future-oriented policies in a new way.

Prototype description

The Dualities Futures Generator, originally conceptualized by the design studio *Designit* (Dualities: Futures Generator, 2022), served as the inspiration for my prototype. This concept involves incorporating a user input of two lenses and a domain to generate a website for an imaginary startup company from the future.

In my version of the prototype, I embraced this format with a distinct alteration. Instead of generating a single future vision, the prototype produces a dualist future, presenting two similar

versions of the future. Each vision is associated with a specific lens, enabling users to compare the effects of different lenses on the imagined future. The details can be found in Appendix F.

Design decisions

I was drawn to Designit's original approach, where they used a duality framework to create scenarios of potential alternative futures. Through collaboration with various stakeholders, they developed several dualities as lenses for exploring the future, each providing two contrasting perspectives. I adapted this approach, allowing users to explore a domain's future through a combination of different factors. Specifically, I used the duality-based lenses and the associated user interface presented in their work to see how these would be different than the imaginary-based lenses I used so far.

All other functionality was developed by me. In my version of the generator, the emphasis lies on comparing dualities within a domain. This approach allows users to discern how the application of different value-based lenses can influence and shape the envisioned future. By enabling users to explore this dynamically, I aim to foster deeper reflections on the potential trajectories of the future.

Reflection

The prototype was again discussed with fellow students and my coaches. I found that this iteration enhanced users' awareness of the diverse array of future trajectories and underscored our agency in shaping them. Each decision we make steers us along a distinct path, branching away from numerous alternative possibilities. This realization emphasized the profound impact our choices have when contrasted with the range of alternatives.

I also gained a new level of appreciation for Designit's storytelling approach. By presenting speculative futures as a startup website, they managed to transform the ordinary into something engaging. Their fusion of storytelling and design added a layer of value to the concept of a future generator. Inspired by this, I aimed to incorporate similar techniques to elevate the presentation of my prototypes, aligning my work with the SPlsneyworld concept.

3.6.2 Mini City Generator

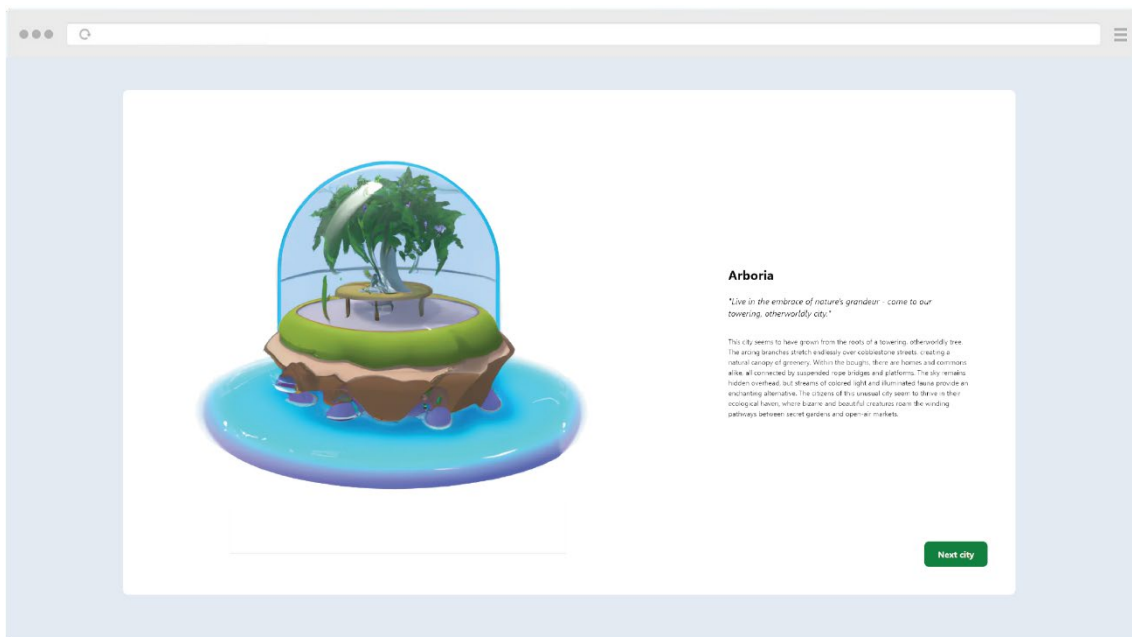


Figure 12. Screenshot of the Mini City Generator.

Design goal

With the Mini City Generator, my primary objective was to explore if the use of fictional city scenarios would be beneficial to interpret the SPI in fresh ways. As I solely worked with the imaginary-based lenses so far, I wanted to let loose the converging effect they have and explore if more novel perspectives could emerge from a more open-ended approach rooted in fictional speculation.

Prototype description

In the interface, users can generate unique, sky-suspended island cities, each with its own thematic identity. Each of these islands forms a unique city with its own fictional name, slogan, and description, all centered around a specific theme. This includes a distinctive name, slogan, and description that serves to depict an alternative vision of how urban life could be structured in the chosen domain. This deviation from the known urban fabric invites users to imagine and interrogate radically different approaches to urban organization.

Design considerations

The Mini City Generator operates similarly to its predecessors, generating different elements of the output sequentially. It first creates a description of the city, which then serves as an input

parameter for generating the city's name and slogan. Although no user interaction is built-in, the city still adheres to the vision of reinterpreting the SPI domains.

The images for these hovering islands were a particular challenge. I wanted to create a borderless representation of each city, to give users a cohesive aesthetical experience. More information on how this was achieved can be found in Appendix G.

Reflection

The Mini City Generator was received by fellow students as an underwhelming prototype. As there was no user interaction and the output was not situated, it fell short in creating the more radical, imaginative visions I hoped it would bring about. However, it did highlight the tension between innovative thinking and the practical implications of these visions, which can also be seen in the domain of policymaking. It emphasized the importance of grounding future visions in feasibility. Balancing these two aspects — the imaginative and the practical — is inherently difficult, yet I will attempt to do so using additional AI prompts in further prototypes.

3.7 Iterative Digital Explorations: Presentation and storytelling

After the focus group session and my reflections on the Dualities Futures Generator and the Mini Cities Generator, I recognized the need to work more on the presentation of the generated visions in my prototypes. It became apparent that the format - relying often on textual output – but mostly the interaction – filling in text or pressing buttons - was insufficient in terms of engagement and capturing the attention of users as per the ideal of SPIsneyworld. By shifting my focus towards the presentational aspect, this moment marked a pivotal aspect of my design process.

In tandem with this change, I started to envision a different target audience for my design, inspired by a podcast by Bristol Bath Creative R&D on 'Reframing Digital Placemaking' (Bristol+Bath Creative R+D, 2021). The discussion emphasized the significance of community-led practices over centralized decision-making, leading me to question the use case for the tool I am developing. Instead of viewing the future of our cities as solely determined by experts and decision makers, I realized the necessity of empowering citizens to shape their own urban futures. This shift toward a more democratic approach also aligned well with the SPIsneyworld project, which I will further explain in the discussion.

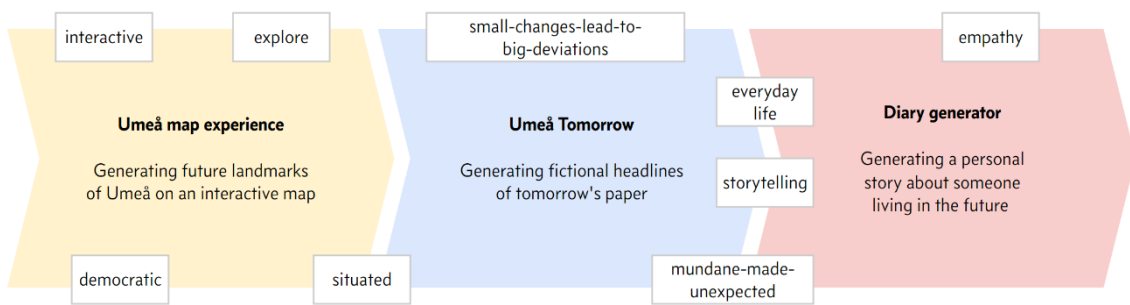


Figure 13. Overview of the prototypes made during this phase.

During this phase, I developed three prototypes aimed at exploring diverse approaches to presenting future-thinking scenarios, as seen in Figure 13. In the following section, I will provide an overview of these prototypes, outlining their objectives and design considerations.

As the prototypes in this paragraph were all presented during the design evaluation session described in the next chapter, I will provide more details on the evaluation in that section.

3.7.1 Umeå Map Experience

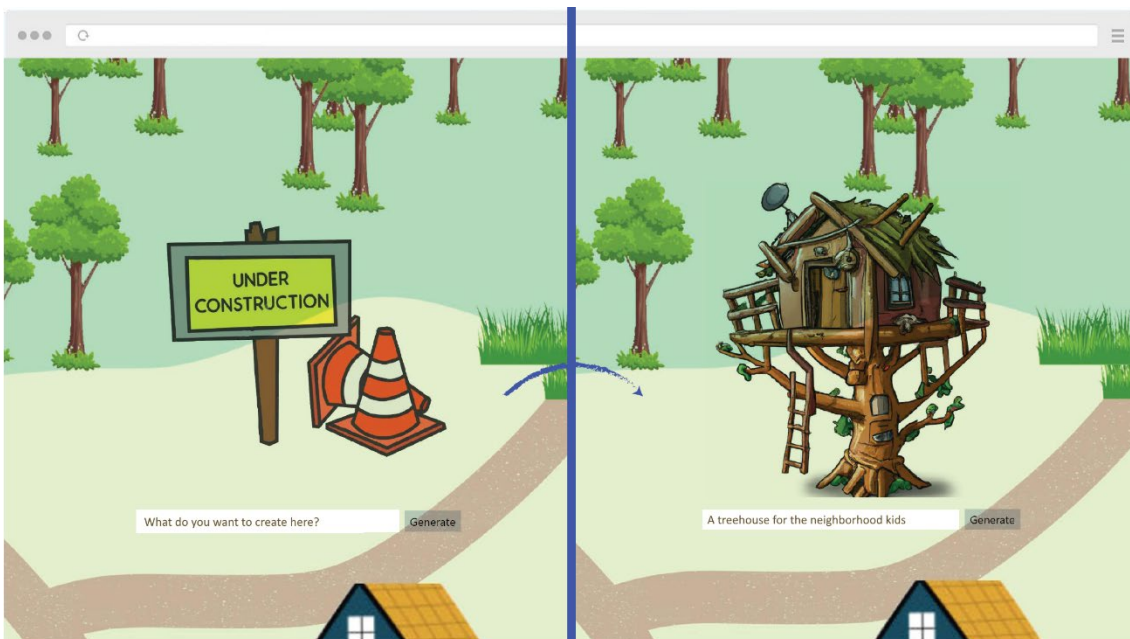


Figure 14. Edited screenshot of the Umeå Map Experience.

Design goal

To design a more engaging experience for reinterpreting the SPI in the context of Umeå, I made the Umeå Map Experience. Maps have always been fascinating to me, evoking a sense of

curiosity and a desire to explore. They serve as visual representations of unknown places, and often possess an aesthetic allure, incorporating vibrant colors and artistic styles. Additionally, during the focus group, the map and imagery of the city emerged as the main attributes that heightened the quality of the discussion. As such, the design objective of this prototype was to delve into the application of interactive digital maps as a medium for presenting situated future visions in an engaging manner.

Prototype description

The prototype features a stylized map of the Umeå area, allowing users to interact with it by dragging and exploring different locations. The interface provides diverse attributes and details pertaining to specific areas within the city, with the aim of heightening users' comprehension and engagement. A notable feature of this prototype is the strategic placement of orange traffic cones throughout the city. These cones symbolize potential urban transformations, indicating sites where future scenarios can be generated. Users are prompted to share their ideas and preferences for these areas through an input prompt positioned beneath each cone. Subsequently, an image corresponding to the provided description is dynamically generated, seamlessly integrating with the map's visual style and superimposed onto the designated location.

Design considerations

The visuals in this prototype are generated using an approach similar to the Mini City Generator, while specific keywords are appended to ensure cohesive artistic styling and aesthetic consistency.

Another design consideration was the inclusion of interactivity within the Umeå Map Experience. The objective behind this decision was to create a sense of adventure, discovery, and engagement for users as they explored the map, aimed to spark a sense of excitement in contemplating the future.

To capture user attention and spark curiosity, orange traffic cones were utilized as indicators of potential urban transformation. These cones were chosen as a universally understood symbol, ensuring that users would immediately recognize their significance. The intention was to prompt users to contemplate the potential changes represented by the cones and encourage them to contribute their own ideas for the future.

To further enhance user engagement, the decision was made to present images without textual descriptions. This aimed to inspire a broader interpretation of the future scenarios. By relying

solely on visuals, users were encouraged to imagine and explore a wider range of possibilities. This allowed them the freedom to perceive and conceptualize the future in their own unique way, fostering a more diverse and personalized experience.

Reflection after design evaluation

An important feature of this prototype is its reliance solely on images, without textual descriptions. This design choice was driven by the belief that when it comes to envisioning the future, visual representations can provide a platform for broader interpretation and more extensive exploration. This belief hinges on the assumption that written descriptions can, at times, inadvertently restrict and limit the bounds of individual imagination.

In addition to the exclusive use of visual elements, the prototype embraces the concept of situatedness (Trotto et al., 2021), emphasizing the relationship between an individual's experience and the surrounding environment. By linking the digital map experience to specific physical locations within the city, the prototype offers users a unique way to engage with their environment.

By functioning as a platform for citizen engagement, the map encourages users to actively contribute their ideas and visions for their neighborhoods. Users can propose changes, envision new additions, or express concerns about specific areas. This transformative function elevates the map from a mere visual representation to a potentially powerful tool for fostering community engagement and dialogue.

3.7.2 Umeå Tomorrow



Figure 15. Screenshot of Umeå Tomorrow.

Design goal

Inspired by the format of an imaginative startup website as seen in the Designit Dualities Futures Generator, I wanted to alter a digital object with a conventional format into something that challenges users' everyday expectations. I found this format very well suited to offer a surprising way to immerse users in the prototype's content, which is the goal of SPIneyworld.

Prototype description

Umeå Tomorrow is a conceptual newspaper that challenges the reader's expectations. Each time a user visits the site, the AI generates a headline that incrementally diverges from our current reality. This gradual progression was designed to stretch the reader's understanding of what is possible and plausible, ultimately opening up a more expansive dialogue about social transformation.

Design considerations

One inherent limitation of AI is its constrained understanding of context, especially when it comes to maintaining continuity over lengthy conversations. To circumvent the 500-word recollection limit of ChatGPT, I implemented a way to archive previous headlines and topics in a condensed format by creating summaries of each article and storing them in an array. This enabled the AI to refer to past data, ensuring accurate and consistent generation of new

headlines in alignment with the unfolding narrative. Using this method, the prototype offered a more cohesive and engaging reading experience, resembling an ongoing narrative rather than disjointed entries.

The gradual divergence from our current reality was a deliberate decision to prevent overwhelming users with sudden, radical changes. Instead, the prototype aimed to guide readers through an evolving narrative that progressively reshaped their understanding of the future.

Reflection after design evaluation

Upon reflection, I identified some shortcomings in the prototype's execution. Firstly, the static format of the headlines limited user input and interaction. A newspaper format, while familiar, can also be passively consumed, which may limit engagement. Secondly, the stylization of the results, although visually appealing, proved to be somewhat challenging to read, which could potentially deter repeated use of the prototype.

Despite these limitations, I believe there is merit in the core concept of using a familiar medium, like a newspaper, to introduce alternate futures. I want to note that the prolonged use of the newspaper was not validated, as this was beyond the scope of this rapid iteration.

In summary, while this prototype did not entirely meet its intended goal, it has provided valuable insights that will inform future improvements. The intersection of familiarity, gradual narrative progression, and nuanced adjustments to the expected is a compelling combination that holds potential.

3.7.3 Diary Generator

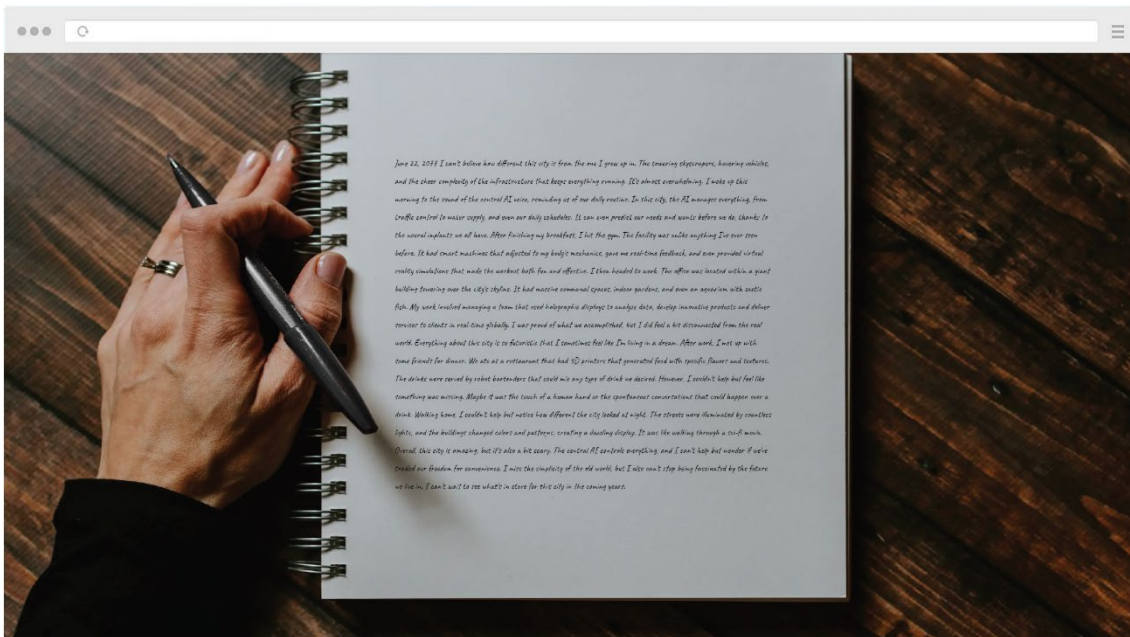


Figure 16. Screenshot of the Diary Generator.

Design goal

The design goal for this iteration was to explore the medium of fictional stories for engaging users' imagination and creativity. By incorporating storytelling into the prototype, the aim was to invite users to envision worlds and characters beyond the status quo, sparking their creativity and imagination. The aim of this prototype was not just to merely generate text, but to tell captivating stories, weaving together a coherent narrative that immerses the reader in the protagonist's fictional life, where the domains of the SPI are the main topic.

Prototype description

The Diary Generator is a tool that embraces the power of storytelling to immerse users in the daily life of a fictional character. Upon opening the webpage, users are presented with diary entries from the future. These entries provide a glimpse into what the future could look like, offering a familiar yet fundamentally different perspective as users navigate the protagonist's future life.

Design considerations

Incorporating immersive storytelling was a fundamental design consideration for the Diary Generator. The AI-driven prompts were calibrated to generate diary entries that went beyond descriptive text, aiming to create emotionally captivating narratives. The objective was to go

beyond futures generation and create a deeply personal and relatable experience where readers would feel directly connected to and invested in the protagonist's life and experiences.

Another design consideration was the delicate balance between realism and futurism within the stories. The aim was to make the narratives credible and relatable, akin to genuine diary entries, while positioning them in a future setting, thereby adding an unpredictable and thrilling dimension. This delicate interplay of the familiar and the novel was pivotal in creating narratives that felt real yet were filled with a projection of the future that enhances the immersive quality of the stories.

Reflection after design evaluation

What I find particularly intriguing about the Diary Generator is its ability to take ordinary, everyday moments and transform them into a glimpse of the future setting. This was a challenging task to accomplish using AI-driven prompts to generate city visions. However, by presenting the future visions as stories within the diary entries, this implicit depiction of the future emerged more naturally. The format of storytelling adds depth and nuance to the narrative, creating a more immersive experience for the reader that was not found in my other text-based prototypes.

In reflecting on the Diary Generator and its approach, I appreciate how it captures slices of life and augments them to subtly unveil the future setting. By leveraging the power of storytelling, this prototype taps into the human fascination with narratives and emotional engagement, allowing us to envision and experience the future in a compelling and meaningful way.

I did, however, observe a recurring issue in my prototypes: the absence of interactive elements. This was particularly evident in Diary Generator and Umeå Tomorrow, but also in other prototypes, with the exception of the Umeå Map Experience. While the prototypes so far successfully generated thought-provoking futures, it lacked opportunities for meaningful user engagement and interaction.

One explanation for this oversight is the prioritization of generating and presenting future scenarios. In my focus on creating thought-provoking narratives and showcasing the potential of AI-driven futures, I have overlooked the importance of active user involvement. The prototypes, though successful in stimulating discussions and prompting reflection, missed the mark in terms of providing users with a sense of agency and the ability to actively shape the outcomes. Recognizing the importance of interactivity in facilitating user engagement and co-creation, I

aim to address this limitation in future iterations. Having users write stories instead of reading them could be a more interactive way to envision the SPI in a situated setting.

3.8 Design evaluation

To evaluate my work so far, a design evaluation session was organized together with Jeroen Peeters and several other master students who were working on the topic of SPIsneyworld. In this session my latest three prototypes were first presented, while the earlier made iterations were also evaluated.

3.8.1 Method

The participants were master students in Industrial Design, in the age group between 20-30 years old. To aid the conversation and gather insights, printed stencils were employed to exhibit the prototypes, which can be found in Appendix K. These stencils functioned as visual guides, enabling participants to methodically map the strengths and weaknesses of each prototype and connect the stencils to mark connections between them.

3.8.2 Procedure

The session kicked off with individual participants navigating the prototypes, to get a firsthand experience with my designs. This hand-on interaction set the stage for a subsequent group dialogue, in which the qualities and connections between the prototypes were collectively examined.

During the session, participants would write their pros, cons, and ideas for changes on notes which were put on the respective categories on the provided templates. After this, the connections between the prototypes were discussed in a group setting.

3.8.3 Results

A key takeaway from the session was the crucial role of the presentation format in conveying future scenarios. It was reaffirmed that the format played a crucial role in the effectiveness of the prototypes. Notably, the Umeå Map Experience elicited participant engagement, whereas prototypes such as Umeå Tomorrow and the Diary Generator were deemed 'wordy.'

Even though the other prototypes did not garner the same recognition as the Umeå Map Experience, certain elements in each prototype were singled out as intriguing aspects that might potentially be developed. I listed these below:

- The employment of lenses aids in understanding and contextualizing future scenarios.
- The comparison overview utilized by the Duality Futures Generator is beneficial for exploring desired future outcomes.
- The emphasis on an individual's future experience is a potent feature of the Diary Generator.

To further analyze these prototypes, I chose to undertake a more comprehensive analysis of my designs to this point, which is discussed in the designspace analysis in the following section.

3.9 Scope change

At this stage of the project, I made the decision to shift the project's geographical focus from Umeå to Eindhoven. I encountered difficulties in the Umeå context due to my lack of local knowledge and unfamiliarity with the urban governance arrangements there. This made it challenging to evaluate my designs in the earlier stages of the project.

Additionally, I recognized the importance of situatedness in designing for reinterpreting the domains of the SPI. Achieving situatedness proved difficult without being physically present in Umeå. Therefore, a change in scope to Eindhoven seemed more appropriate. This shift offered the opportunity for a more nuanced and comprehensive evaluation.

Together with Jeroen Peeters, I concluded that a change in scope would benefit the project. However, it was important to ensure a certain degree of transferability to the Umeå context in the final design, and I prioritized this aspect accordingly.

3.10 Designspace analysis

Motivated by this change in scope, I decided to reanalyze how the prototypes I had developed thus far could support citizens as a new target audience, and if any adaptation to the new scope was necessary. To do so, I conducted a designspace analysis, which can be found in Appendix L.

The term designspace refers to the multidimensional range of possibilities, variables, and constraints that designers consider and explore when creating a solution or product. With an analysis of the designspace, I wanted to systematically explore and map the potential design possibilities within the specific context. By delving into the dimensions, constraints, and opportunities that define the designspace of my project, I sought to gain insights into the broader landscape of possibilities for my next iteration given the change of scope and user audience.

Engaging in a designspace analysis also serves multiple other benefits. Firstly, it facilitates the identification of recurring patterns, trends, or themes that emerge across different iterations of the design. By analyzing the variations and commonalities within the design space, I aimed to extract meaningful insights and understand the evolution of my work over time.

Moreover, the designspace analysis allowed for the explicit identification and documentation of the unique qualities and characteristics present in the collective body of designs. By mapping out the design space, I aimed to visually represent the diverse range of design iterations and their respective attributes.

Additionally, the designspace analysis served as a tool to uncover unexplored directions or opportunities within the design space by systematically examining different regions of the design landscape.

Upon analysis of the designspace, certain strengths and weaknesses surfaced, which in part were already discussed in the reflective section corresponding to each prototype. Therefore, in this segment, the primary focus is to understand the interrelationships amongst the prototypes, highlighting common features and recognizing areas of improvement or potential.

I discerned two dimensions from the design evaluation session in which we can evaluate the prototypes: the prototypes' ability to evoke an experience and how their interaction affordances could engage users. Evaluating all prototypes through this lens revealed interesting combinations. For instance, the Diary Generator thrived in stirring an emotional response, albeit lacking in interactivity. On the other hand, the Dualities Futures Generator, despite struggling to invoke a profound experience, displayed intriguing interactive elements. One prototype notably rose above the rest, namely the Umeå Map Experience.

The Umeå Map Experience is both interactive and provides an interesting experience of the future with its ability to combine the result of citizen narrative with a visually engaging map. I especially appreciate it as an engaging platform for participatory urban planning, fostering a sense of community and co-ownership among users, even though the prototype was not designed for this. The feature of allowing users to propose future structures induces thought-provoking scenarios of what Umeå could look like in years to come, opens doors to a democratic interpretation of the future.

Another interesting element was found in the Diary Generator, which excelled in establishing an emotional connection with the users by offering a personal and introspective experience. It enables users to engage with the notion of the future not as a distant, abstract concept, but as a

lived experience, fueling users' imagination and inviting a wide spectrum of interpretations about the future.

Recognizing these unique strengths, I envisage a fusion of these qualities in my final demonstrator, hoping to create an experience that is both interactive and evokes an experience, tying in with the SPIneyworld project's goal of engaging people with the future of their city.

3.11 Demonstrator pre-demoday & evaluation

As a strategy for my final demonstrator, I adopted a two-pronged approach prioritizing storytelling in the initial stages and later implementing these narratives in a map-based format. My first objective was to develop a storytelling-focused prototype to present during the preliminary demoday event of the Transforming Practices (TP) squad. During this event, I presented my preliminary demonstrator to several groups of staff and students, receiving feedback in the process. I aim to detail the utilized demonstrator and the design choices made during its creation. Moreover, I intend to reflect on the prototype based on the feedback collected during the session.

Design goals

My goal for the pre-demoday was to explore the use of animated images. Additionally, I aimed to investigate a potential path that emerged from the designspace analysis, assessing the use of storytelling and specifically, the quality of the stories produced.

Prototype description

For this design, I established a separate website where individuals could enter their name and select a facet of the future they wished to explore. Based on this information, the AI would generate a narrative set in future Eindhoven. The narrative is created in three sections, and between each section, users have the option to select one of two options presented to them to guide the narrative in various directions.

Next to the story, an image is displayed that will animate while reading the story, offering an immersive experience of the story's environment.

Design considerations

For this prototype, my objective was to make storytelling, akin to the diary generator, more interactive and engaging, thereby developing a platform capable of truly capturing people's interest. I also aimed to enable users to understand how their choices could shape the future and provide them with the freedom to navigate the story environment to a certain extent.

A distinct feature of this prototype is the animated images, which were incorporated to enhance immersion. I intended to incorporate this feature into the final design as well, but due to technical incompatibilities and a shorter preferred generation time for the final demonstrator, the feature did not make it. Since I invested a significant amount of time in making this work, I will take this opportunity to explain a bit more about how it functions in Appendix M.

Reflection

Although I put a lot of effort in making this iteration, I found the result to be underwhelming due to it being unreliable and slow in its interaction. One limitation I found with regards to AI, was its ability to reliably generate the right type of choices and doing so in such a way that the story could progress naturally. Despite trying out a multitude of prompts to further increase its reliability, the overall quality of the story and the story's progression did not significantly improve. Due to these limitations, I decided not to pursue the interactive story aspect, and instead focus on other qualities found in this prototype.

The most prominent of these qualities to me was the 3D images that were generated. People I showed these images of were captivated by them, and I believe they are a great example of the almost magic-like things that can be expected from AI in the future. As such, my aim was to implement these images in my final demonstrator, even though they were not present in the final design.

3.12 Envisioning Eindhoven

In this section, I want to share my vision on my ideas about what thinking about the future should be like, and what role I envision this prototype to have. This vision is a result of the experiences I had using my previous prototypes and the feedback I received on them, the research of literature concerning the several ideas and domain integrated in the prototypes, and my own opinion that was shaped through discussions with citizens of Eindhoven and experts in the domains of design and governance.

In line with contemporary futurist thought (We ontwerpen de toekomst, 2021), I think it is vital that we look at the future in a normative way, and to an extent the SPI also acknowledges this fact by presenting a value-based framework for developing towards the future. To look at the domains of the SPI in a new way, I think it is necessary to revisit its shortcomings as I identified in the design context section of this paper. Looking at these shortcomings, we see a need for local perspectives, qualitative insights and a context-specific view on the domains presented. It is my aim for this final prototype to implement these shortcomings while highlighting the need for a normative approach.

Next to these main goals, I see several other opportunities in the explorations I have done so far. One of these has to do with how the SPI is framed. I do not see this as a real shortcoming, but the overall presentation of the index and other frameworks and legislative interventions does have a limiting effect on society's capacity to create better futures. In the way the index is framed as presented, it becomes clear for whom the index is meant, namely policymakers and experts, which is inherently problematic from a democratic viewpoint (Stengers, 2015). It suggests hereby implicitly that thinking about how we could build better futures is something only experts and policy makers can and should do, and I think this is a mistake.

This limited role of citizens in determining the future is also the key point of my next argument. As I mentioned in the introduction, the aim of the SPIsneyworld project is to create a sense of enthusiasm and excitement when thinking of the future. Due to big societal challenges, the future increasingly seems to be very dark. Climate change causes sea levels to rise, resulting in coastal erosion, flooding, and displacement of populations. Additionally, instances like Russia's invasion of Ukraine, lead to geopolitical tensions, territorial conflicts, and humanitarian crises. Issues like these make it very hard, if not impossible, to maintain a positive outlook on the future. On the other hand, we can see developments to counter many of these issues slowly gaining momentum. On a political level as well as on a commercial level we can see efforts to reduce CO₂ emission through investment in green energy, and legislation and international collaboration to raise the world's social progress and overall well-being. For this momentum to further rise and for the overall emotional wellbeing of our generation, it is essential that, next to a healthy dose of worry and fear, we regain our sense of optimism and enthusiasm about the future (Rutger Bregman, 2023). The aim of this prototype is to do so by giving people a feeling they can imagine and steer the future, and that the collaborative efforts of citizens to shape the future together does really matter.

This touches upon a necessary feature for the platform, which is its need for it to be a low-threshold way to participate. Participatory processes are known to often only reach a group of citizens that is often already active in other domains, and with a higher education. This problem is called participation bias (Wikipedia, 2022) and is hard to break using traditional participatory approaches. By making the experience of the platform fun and engaging, I hope to inspire a more diverse group of people to write stories and share their ideas. The digital format is known to speak to a different audience (Bimber et al., 2014), for example to the younger generation, or possibly people who are more prone to staying inside or that do not feel comfortable sharing their ideas in a more formal or group setting. By using this format, I hope to spread the message that the future really is something that belongs to us all.

Much as this prototype is about participating, it is also about collaboration. The aim of the platform is to involve citizens, but also to connect citizens over issues in their direct surroundings. This has a social benefit but is also beneficial for a democratic future. In today's time, protest is a degraded medium, partially due to the often-negative response of governance organs to this type of critique (Stephan, 2020). This is a shame in my opinion, as protest has also brought us many benefits, such as our bicycle infrastructure and cycle culture (Verkade & Brömmelstroet, 2020) – now famous around the world – and more recently, some universities finally breaking ties with the fossil industry (Advalvas, 2023). To create a culture where people dare to stand up for the things they collectively think need to change, a way to connect over the future and discuss systems that could be improved is vital. I aim with this prototype to have such a role.

This also ties in with this prototype's function as a way to allow people to explore how they see the world and what they want for the future. I hope the platform can become a place where people can come together over a shared love for stories, and an excitement for the future.

This section has explained some of my most important considerations for the final design direction. Within this direction, the following demonstrator was made, which will be explained and discussed in the section below.

3.12.1 Demoday demonstrator

Design goal

My objective was to incorporate the identified qualities of my prototypes from the design space analysis into a demonstrator. This involved integrating two things: On the one hand, the storytelling of the Diary Generator for its ability to create an immersive way to connect people over future thinking and explore their ideas of the future. On the other hand, map-based exploration, creating a situated participation platform that is engaging to use. These features were integrated on a digital platform, aimed at providing a low-threshold way for participation about the future.

Prototype description

To create the 'Envisioning Eindhoven' web platform, which can be found in Appendix N, I focused on developing its core features and functionalities. The platform includes a map of the city with marked locations representing speculative stories about the future of those areas. These stories are contributed by citizens and can be accessed through the platform's web app, which sends notifications to users when they are in proximity to relevant story locations.

The platform's primary feature allows users to write stories with the assistance of AI, making it easy and engaging to share their ideas about the future. Users can select a location and determine the level of AI assistance they desire. Once a story is initiated or generated, the user can utilize various AI-enabled tools to aid in the writing process. These tools include options to lengthen or shorten sections, automatically add new sections, or rewrite the text from a different lens.

Upon completing their stories, users can generate a cover image that will serve as the visual identifier for their story on the map. They have the flexibility to regenerate the cover image as many times as needed until it aligns perfectly with their story.

Although the functionality for leaving comments and rating stories is not fully operational in the prototype, it is displayed on the platform as an intended feature. This could allow users to engage with published stories by providing feedback and evaluating their quality.

Design considerations

To effectively implement the elements inspired by the earlier prototypes, careful consideration was given to the use of the map and the functionality of the AI.

It utilizes a modified version of the Google Maps satellite view, offering a tilted perspective that adds an immersive element to the experience. This approach allows users to navigate Eindhoven with relative ease, relying more on visual cues than precise geographical knowledge to identify locations.

Furthermore, the platform showcases the potential for usage beyond Eindhoven by adapting the 'Envisioning Eindhoven' text on the map. As users pan to different locations, the text dynamically changes to reflect the specific area being explored. This highlights the platform's versatility and the possibility for users to engage with it in various locations, which is also a key element in the transferability of the prototype to the Umeå context.

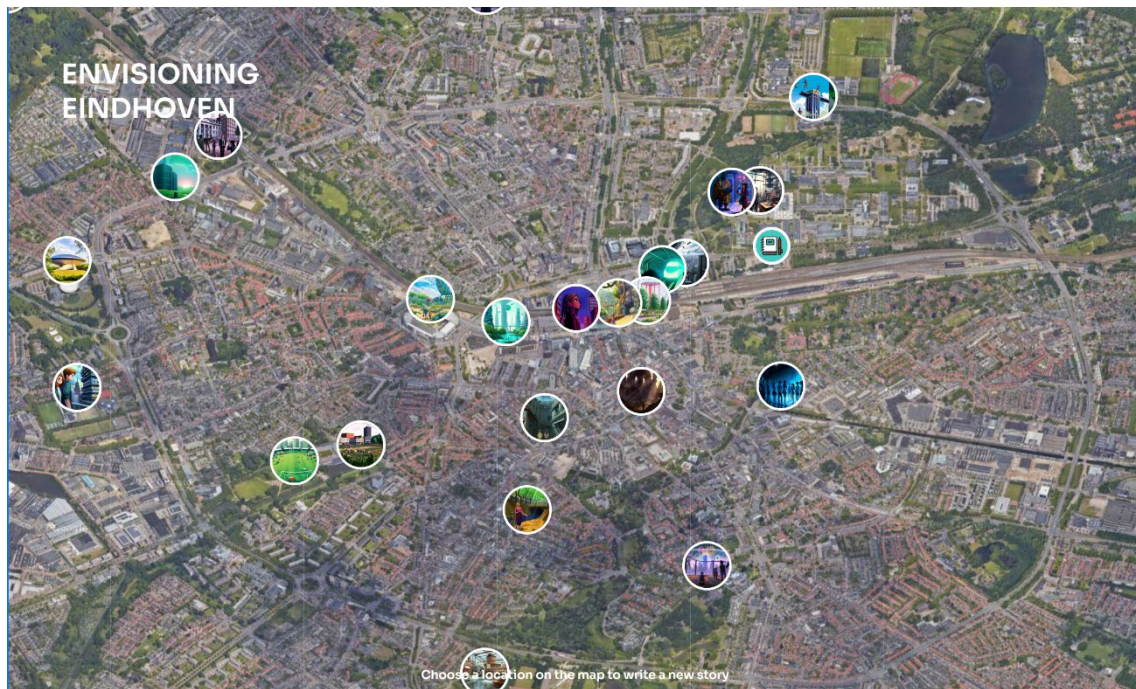


Figure 17. The map view of the app.

During the implementation process, I iterated on various approaches to incorporate AI assistance for writing stories. To ensure the creation of compelling and engaging narratives, it was crucial to consider user engagement and their sense of ownership over the stories. Striking the right balance meant making the process of story creation accessible while still encouraging users to fully appropriate their work. To achieve this, I developed an interface that allows users to customize the level of AI assistance according to their needs and preferences.

The interface comprises two distinct parts. In the first part, users have the option to choose a topic for their story independently, seek AI assistance to develop their ideas further, or let the AI select a topic based on the SPI domains. In the second part of the interface, users can decide whether they want to write the story entirely on their own, have the AI provide a starting point to build upon, or let the AI take charge of writing the story. My aim is that this adaptive approach allows users to determine their desired level of collaboration with the AI, ensuring that they feel in control of their creative input while still benefiting from the AI's capabilities.

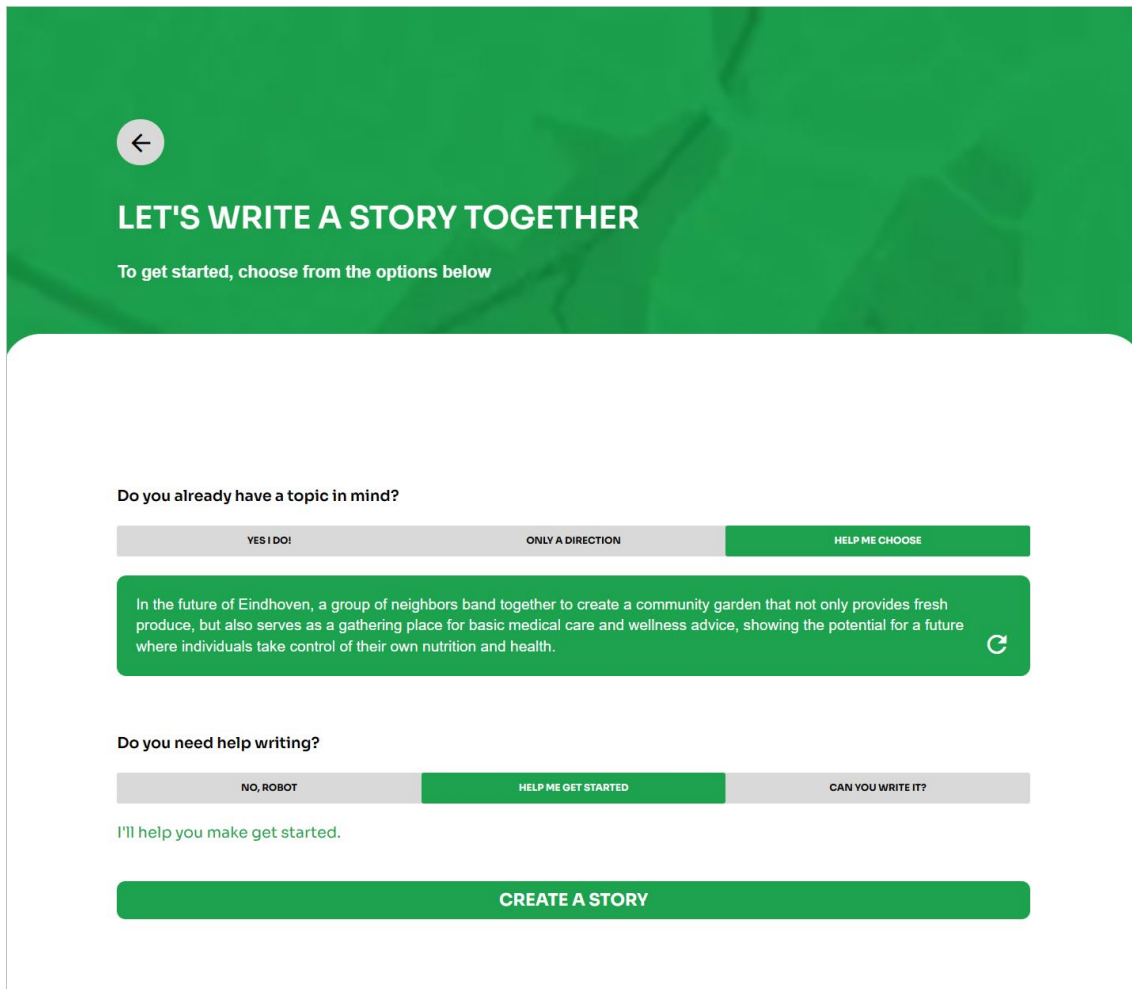


Figure 18. Screenshot of the AI assistance in the app.

Another way in which AI is implemented was in the editing interface of the story. Many market-leading editing tools such as Microsoft Word, Notion and Grammarly already recognize the use of AI for this purpose. AI editing in the specific context of this prototype can help to make it easier for users to progress the story, or finetune the specific genre they want to write in. In the editor that I provided, the users have the following options:

- Adding a paragraph: Sometimes, users may find it challenging to continue their story, and this feature allows them to effortlessly add a new paragraph. This can provide the inspiration and momentum needed to move the narrative forward.
- Regenerating the story with a new lens: In previous iterations, the importance of choosing the right lens to convey the intended message was seen. By incorporating this feature, users can change the tone of their text, similar to the

lens functionality in earlier prototypes. It allows users to explore different perspectives and adjust the storytelling approach accordingly.

Additionally, users can select sentences and use the provided writing tools to lengthen or shorten them. This function offers flexibility in crafting the narrative, enabling users to expand an entire story from a single sentence or condense a complex storyline into a concise form.

Although the implementation of dynamic 3D image generation was intended, time constraints and compatibility issues between Next.js image handling and the libgif image component prevented its inclusion in this version. Nevertheless, users can still generate visually distinct cover images that maintain a consistent visual style, contributing to the overall aesthetic appeal and catching the attention of viewers on the map.

Another important functionality for the platform is the ability to comment on and rate stories. These features are essential for fostering a democratic platform where users can engage in discussions and share ideas. While these functionalities are crucial for the platform's independent functioning, they require a social setting with enough users to initiate these discussions. Therefore, for the demonstrator, I omitted this functionality. Instead, I included static mock-up reviews under each story to emulate the effect and showcase the potential for user interaction.

To further refine the design decisions and create a more defined format, I developed a series of mockups for the final demonstrator. These mockups served as templates to explore and iterate the user experience of the web app, enabling rapid testing of various designs. Initially, I incorporated the red and white colors of the Eindhoven brand to maintain consistency with the platform's name, 'Envisioning Eindhoven.' However, upon reflection, I reconsidered this choice. The red and white colors are typically associated with the municipality or organizational aspects of the city, rather than representing the community itself. Therefore, I made the decision to introduce green as an accent color throughout the user interface. Green symbolizes renewal, regrowth, sustainability, and environmental conservation—issues closely tied to envisioning a livable future.

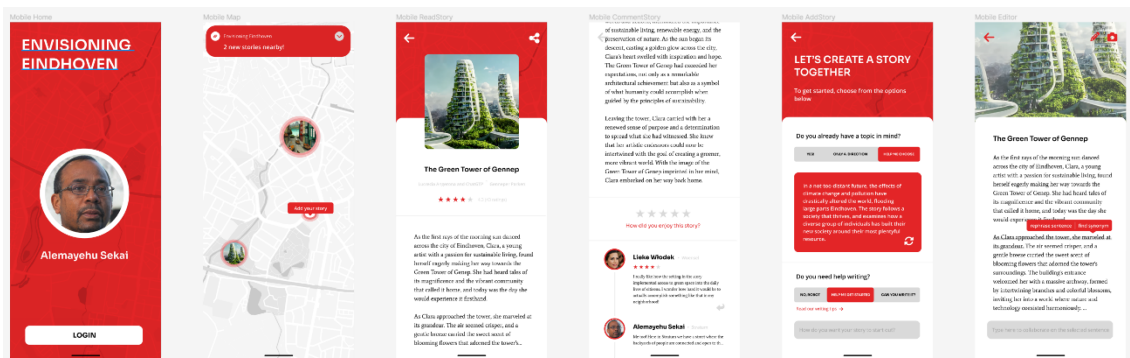


Figure 19. Mockups with the initial app design.

3.13 Story analysis

In this section, my goal is to analyze a selection of the short stories that have been created on the online platform. These stories are a testament to the creativity and imagination of the users who have contributed to the platform. By examining and evaluating these narratives, we can gain insights into the themes, ideas, and perspectives that emerge from the collective storytelling experience, and the degree to which the SPI themes are reinterpreted in the narratives.

3.13.1 Method

To conduct the analysis, a quantitative content analysis approach was employed, focusing on several factors. The following elements were investigated:

- **SPI Domains:** The presence of SPI domains in the stories was examined to determine the extent to which the narratives can be linked back to these domains. This analysis provides insights into the connection between the stories and the strategic program for innovation.
- **Sentiment Analysis:** The sentiment of the authors towards the future was evaluated. This analysis aimed to discern the overall attitude conveyed by the authors in their storytelling, whether it be optimistic or pessimistic.
- **Values and Themes:** The values and themes embedded in the stories were explored to understand the aspirations for the future expressed by the authors. This analysis uncovers the authors' vision for social progression and sheds light on the underlying motivations and ideals present in their narratives.

For the evaluation, a total of 28 stories published on the platform at the time of the analysis were considered. The coding and annotation process was conducted using Atlas.ti, a software tool for qualitative and mixed-methods data analysis. Due to the storytelling platform's anonymous nature, the exact target audience is challenging to determine. However, by focusing on stories situated in Eindhoven, it can be assumed that the original authors were likely citizens.

3.13.2 Results

The value and theme-based analysis revealed three primary areas of interest for people. Sustainability/environmentalism/nature emerged as one, with 21 mentions, while the role of technology and innovation in society was another, with 20 mentions. A third prevailing theme involved the transformation of community dynamics and social relationships, referenced 18 times.

In addition to the analysis conducted, a sentiment analysis was performed to gauge the sentiment expressed by individuals towards the future. The SPIsneyworld project's vision emphasizes the importance of maintaining a positive and enthusiastic attitude when contemplating the future, as it is deemed more constructive and desirable. The sentiment analysis aimed to assess the alignment of the stories on the platform with this optimistic perspective. Based on the analysis, it was discovered that 72 positive or optimistic elements were present in the stories, while only 19 negative elements were identified.

In the domain-based analysis, which analyzed the presence of the SPI domains in the stories, we see the domains of Environmental Quality and Nutrition and Basic Medical Care to be dominant with respective mentions of 10 and 9 times. Following this, other domains from the 'Basic Human Needs' pillar of the index were most often mentioned.

3.13.3 Reflection

The themes identified in the value- and theme-based analysis seem to focus on environmental justice, social cohesion, and the role of technology in society. As such, they appear to be an accurate reflection of our current times, where rapid technological development is both an asset and a challenge, contributing to environmental problems on the one hand and causing a sense of social isolation on the other. This analysis, in a broader perspective, unveils people's priorities and the areas they place significant emphasis on when visualizing the future.

This sentiment analysis indicates that many of the stories conveyed hope for the future, which aligns well with the goals of the SPIsneyworld project. However, it is important to note that this

finding does not allow us to conclude to what extent this reflects the authors who submitted their stories, the platform's design, or a potential bias in the AI. While the sentiment analysis highlights the predominance of positive elements in the stories, further investigation is required to understand the underlying factors that contribute to this sentiment.

The domain-based analysis yielded intriguing insights about the way people envision the future. It became evident that, predominantly, people's attention gravitates towards their rudimentary needs, such as nutrition and shelter. The most frequently mentioned domains belonged to the 'basic human needs' category of the Social Progress Index (SPI), indicating that these fundamental needs serve as a cornerstone for future speculation. This suggests that, despite advances in technology and society, the core human needs remain a central focus when contemplating the future. However, amidst these primarily basic human needs-based domains, there emerges an outlier in environmental quality. This finding is not entirely unexpected, considering the increasingly vital role that environmental issues play in our current socio-political discourse and media representation. The importance given to environmental quality reflects growing societal concern about our planet's health and our role in safeguarding it for future generations.

4. DISCUSSION

This project embodies an exploration at the intersection of design, artificial intelligence, citizen participation, storytelling, and urban governance. The overarching goal was to reinterpret the Social Progress Index (SPI) in a captivating manner and reignite people's enthusiasm about the future. By implementing an AI tool to facilitate citizen co-creation in storytelling, the project created a platform to democratize futurist thought and amplify citizen voices in the realm of urban governance, shedding a positive light on our collective future.

It is, however, vital to acknowledge the constraints of the developed tool and the design processes employed in creating it. In the following section, I will delve into various perspectives regarding these limitations.

4.1 The platform and context

The storytelling platform developed for this project holds significant potential for fostering citizen engagement, participatory decision-making, and democratically envisioning the future of a city. By providing a digital space where citizens can share their ideas, aspirations, and concerns, the platform enables the emergence of collective narratives, giving voice to diverse perspectives and encouraging a sense of ownership in the urban governance process. In doing

so, the project successfully aligns with and adds value to the SPIneyworld project. This is also reiterated by Jeroen Peeters, whose feedback on my project can be found in Appendix O.

The storytelling platform contains many well-designed elements. For instance, its digital nature allows for easy distribution, accessibility, and adaptation to different contexts, making it easier to implement the tool in other places, such as Umeå, which is beneficial for the SPIneyworld project. The use of a digital medium is also a notable strength of the platform's accessibility. By leveraging digital technologies, users can access and contribute to the platform from anywhere, enabling widespread participation and a diverse range of perspectives. The digital medium also allows for a low threshold to participate, interactive features, multimedia integration, and real-time updates, enhancing the engagement and impact of the platform.

Another benefit is that due to its API routes, the platform could also interact with IoT objects in the city. In this fashion, it could communicate with objects such as the 'City Beacons' that are placed throughout Eindhoven. This integration could create a more immersive and situated experience for users, bridging the digital and physical realms. By providing additional touchpoints for engagement and storytelling, the platform can extend its reach and make a more tangible impact on the urban environment.

It is also important, however, to acknowledge some of the limitations of the tool. For instance, the platform's word limit may impact the narratives that are generated. This could potentially inhibit the depth, complexity, and detail of the stories, although it could also serve as a means for making people less reliant on AI-assistance as well as making the stories more comprehensible and more attuned to the – arguably limited – attention span of the average internet user.

Since one of the main aims of this project is to empower *all* citizens to engage in dialogues on the future of their city, accessibility is a key point of attention. It is important to address that non-English speakers are likely to face challenges using the platform. Furthermore, the platform might be inaccessible to less tech-savvy citizens, and stories might be difficult to read or understand for some citizens. Therefore, future iterations based on this project design should prioritize fostering a more inclusive experience, by incorporating additional visual and audio elements, alternative communication channels, and user assistance features.

Moreover, the translation of these narratives into actionable policy and positive change remains a challenge. The platform aims to be a catalyst in the coming together of citizen's over common hopes for the future. It aims to bring about active engagement with possible futures, helping

citizens regain a sense of agency over these futures. This also means that policymakers need to be equipped with the appropriate skills to interpret and act on narratives about the future. Thus, an essential component of this process is educating policymakers about the potential of these tools and the value that citizen participation brings to policy development.

4.2 AI

From the beginning, AI was implemented under the educated assumption it would boost the creativity of users and lower the threshold to participate on the platform. Furthermore, the platform can be seen as an accessible way for citizens to experience the strengths and limitations of AI through their own experimental stories.

However, it must be noted that the use of AI does pose inherent limitations too. For once, bias is a significant concern, as AI systems trained on data can perpetuate biases and reinforce specific narratives while excluding others, negatively impacting representation.

Another risk is the AI's potential lack of contextual understanding, which may result in narratives that are detached from the local context, limiting their situatedness and relevance. Achieving a balance between human and AI collaboration is crucial to address this limitation.

Furthermore, although aimed at *boosting* human creativity, stories in which human input is limited risk lacking creativity, imagination, and emotional depth. This underscores the importance of maintaining the balance between human input and AI assistance. On the one hand, stories that lean towards the AI-generated side may risk feeling formulaic, generic, or lacking a personal touch, on the other hand, users might find writing their own story time consuming and daunting. The design of the storytelling platform itself holds significance in this context. By avoiding an overreliance on AI-generated content through the platform, it becomes possible to maintain active citizen participation and preserve their creative agency. This approach prevents the potential scenario of a future dominated by AI imagination. Striking the right balance between AI and human involvement is therefore crucial for the platform's successful development.

Another often overlooked limitation is the environmental impact of AI. The computational resources required for training and running AI models contribute to a significant environmental footprint (Van Wynsberghe, 2021). Exploring approaches that limit AI usage and encourage authors to write more of their own content can help mitigate this impact.

4.3 Design process

The design process was a rich learning experience, evolving from an initial tool for policymakers to a platform facilitating citizen co-creation. This evolution underscores the iterative nature of design, where initial concepts transform as they interact with real-world constraints and opportunities. However, due to the scope change from Eindhoven to Umeå, and technical constraints around the prototype, most prototypes in the design process were not tested with citizens. Future iterations of this project should prioritize this, as it could provide vital insights into the tool's usability and impact.

5. CONCLUSION

In conclusion, this project represents a significant exploration at the intersection of design, artificial intelligence, citizen participation, storytelling, and urban governance. The developed storytelling platform holds significant potential for fostering citizen engagement, participatory decision-making, and democratically envisioning the future of cities. By providing a digital space for citizens to share their ideas and narratives, the platform enables the emergence of collective stories, amplifying diverse perspectives and fostering a sense of ownership in the urban governance process. In doing so, the platform aligns itself with the aim of SPIsneyworld to reinterpret the domains of the SPI, and spark enthusiasm in people when contemplating the future.

Based on the iterative design process and the developed platform, several limitations and opportunities were identified. The limitations include the word limit, potential accessibility challenges for non-English speakers and less tech-savvy citizens, and the need to address bias and contextual understanding in AI-generated narratives. However, the platform also presents opportunities such as easy distribution and adaptation, integration with IoT objects for immersive experiences, and the potential to boost creativity and lower participation barriers through AI assistance. By addressing the limitations and capitalizing on the opportunities, future iterations can enhance the platform's effectiveness, accessibility, and sustainability.

Overall, the project seeks to inspire further exploration and advancement in the intersection of design, AI, and participatory approaches to shaping our collective future in a that promotes inclusive and community-driven urban development, and an enthusiasm for the future.

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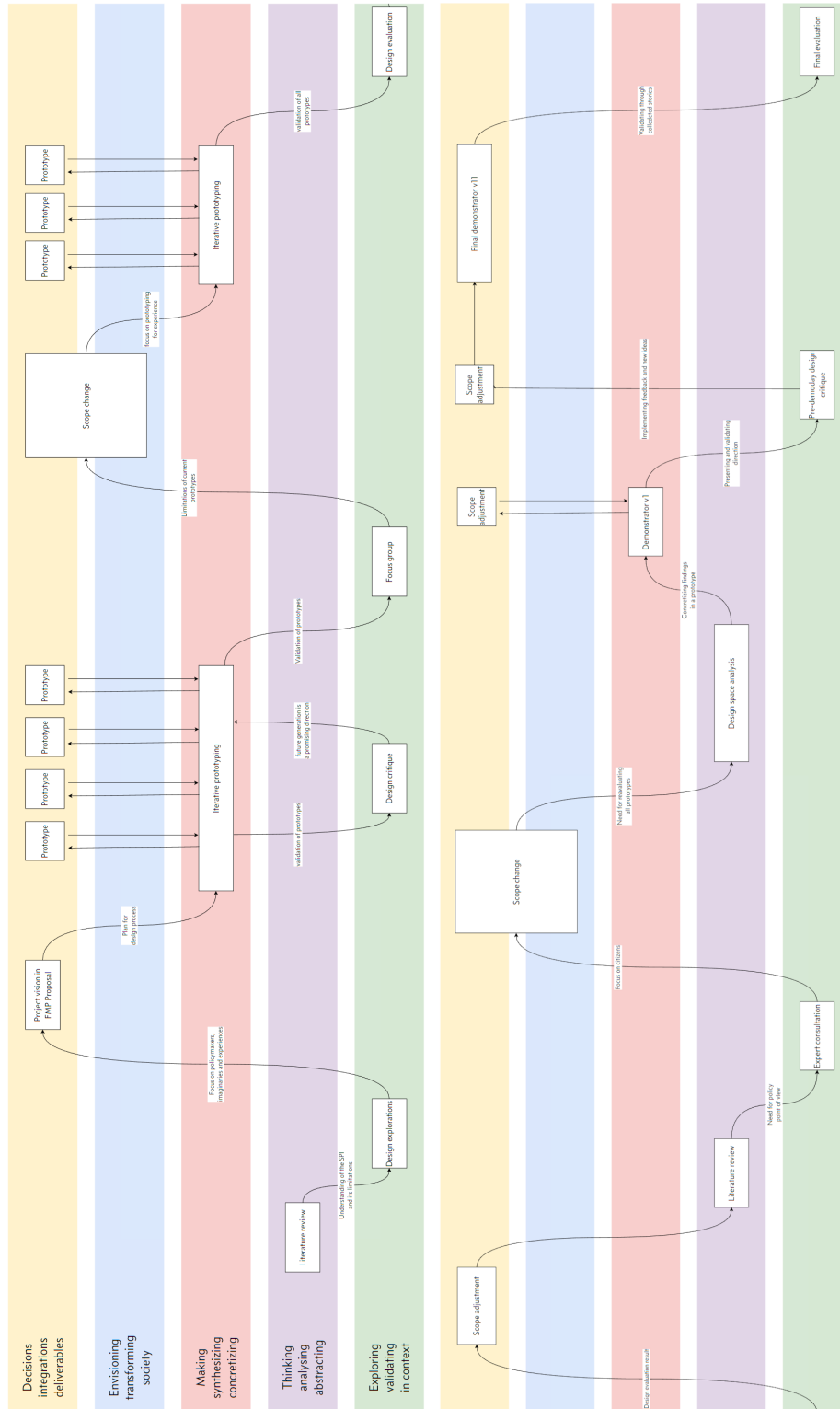
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APPENDICES

Appendix A. Design process



Appendix B. Digital Sandbox

Source code: <https://github.com/jorritvanderheide/imaginary-generator>

Appendix C: Umeå Futures Generator

Source code: <https://github.com/jorritvanderheide/imaginary-generator/tree/main/app/futures-generator>

```
`Generate a provocative and immersive vision for a possible future of the city of Umeå regarding the domain of {{domain}} as seen through the lens of {{lens}}. Make it probable but frame it so that it can be implicitly interpreted as both utopian as well as dystopian. Also make it logical and specific to the domain, and situated to the context of Umeå, Sweden. Use about 250 words.`
```

Input prompt for ChatGPT in the Umeå Futures Generator.

```
`In the future, the city of Umeå is a true paradise for environmental purists. The once-polluted waterways are now crystal-clear thanks to a comprehensive clean-up effort that has restored the natural ecosystem. The city provides free bottles for locals to fill up with pure, filtered water from outdoor fountains, and the streets are lined with plants that thrive thanks to the advanced irrigation system that uses recycled water. However, this has also brought a new type of gentrification, where those who ignore environmental initiatives are pushed out towards the outskirts of the city; photograph.`
```

An example prompt for DALL·E in the Umeå Futures Generator.

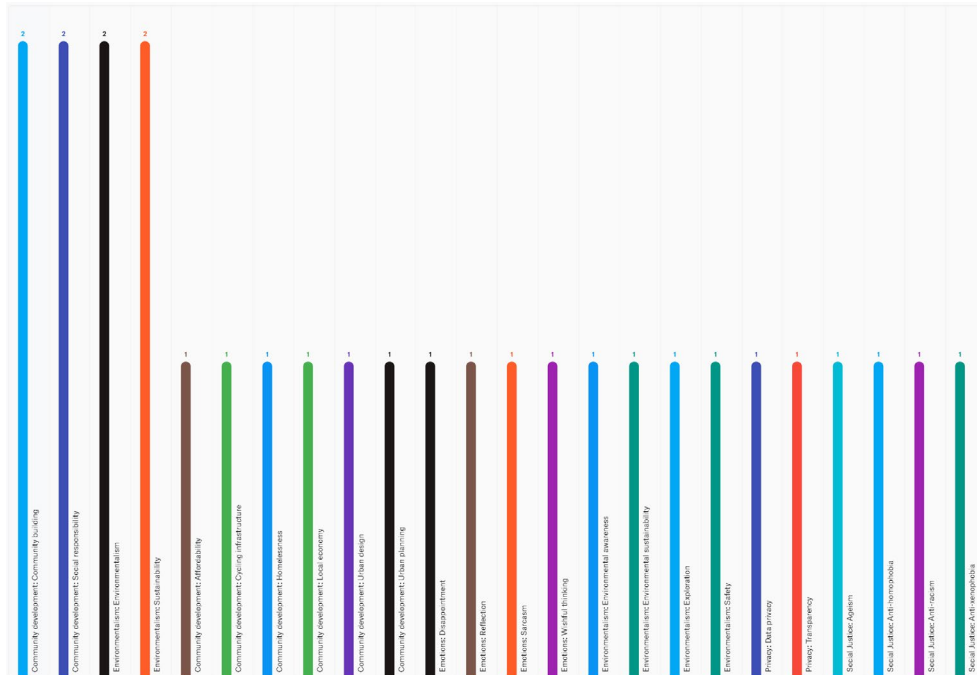
Appendix D: SPI Futures Generator

Source code: <https://github.com/jorritvanderheide/imaginary-generator/tree/main/app/spi-futures-generator>

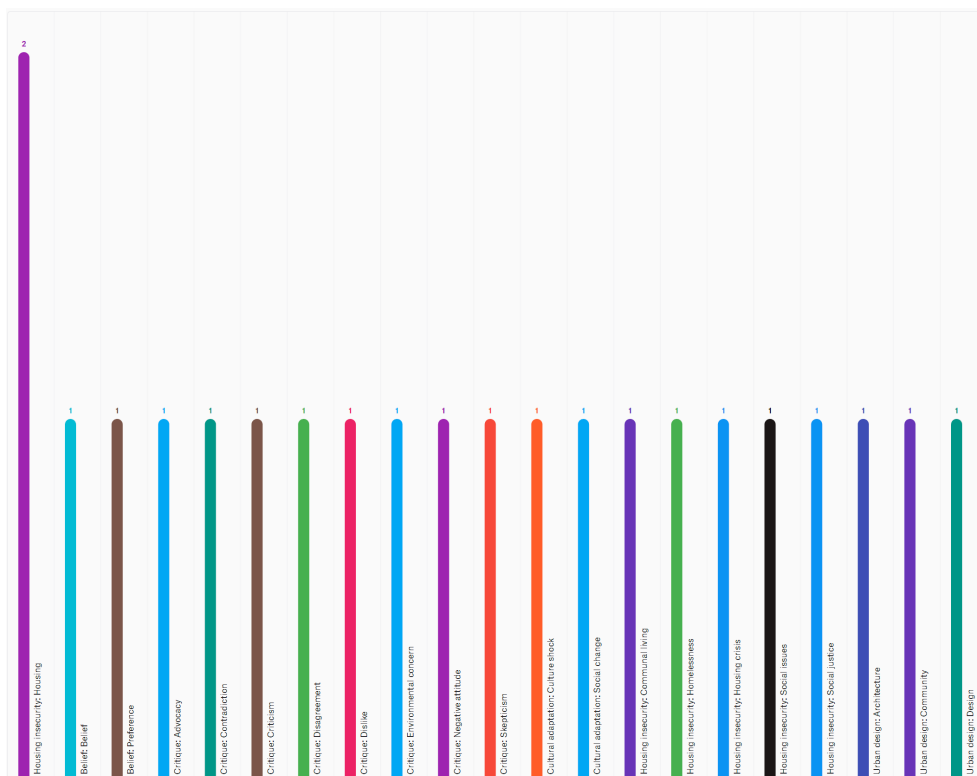
```
`Generate a vision for the future of the city of Umeå according to these instructions:  
It should be about the domain of {{domain}} as seen through the lense of {{lense}}.  
Write it in an engaging and immersive style.  
Make it probable, logical and specific to the context of Umeå, Sweden.  
Use about 250 words.`
```

Reworked prompt for ChatGPT.

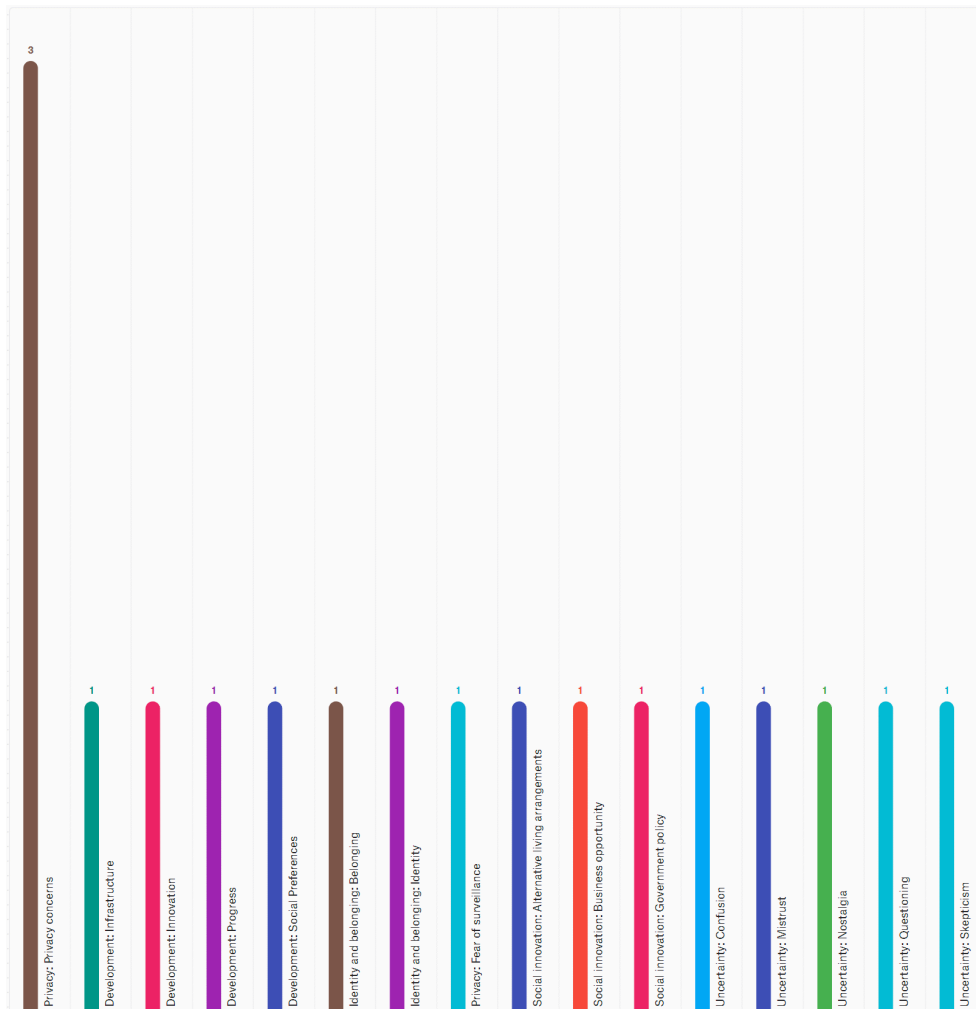
Appendix E: Focus group evaluation



Overview of the themes identified in the first round.



Overview of the themes identified in the second round using the map and images.



Overview of the themes identified in the third round using the prototype.

Appendix F: Dualities Futures Generator

Source code: <https://github.com/jorritvanderheide/imaginary-generator/tree/main/app/dualities-futures-generator>

Appendix G: Mini Cities Generator

Source code: <https://github.com/jorritvanderheide/imaginary-generator/tree/main/app/mini-cities-generator>

The image blending was achieved partially using CSS mix-blend-mode property, forcing foreground elements to adopt the appearance of background layers, resulting in a visually seamless output. I also used a custom prompt for generating the images, situating them on a

white background. These techniques together led to a slightly unreliable yet satisfactory final format.

Appendix H: Umeå Map Experience

Source code: <https://github.com/jorritvanderheide/imaginary-generator/tree/main/app/future-map-experience>

```
`${query}, cartoonish illustration centered on a white background.`
```

Prompt for the Umeå Map Experience.

Appendix I: Umeå Tomorrow

Source code: <https://github.com/jorritvanderheide/imaginary-generator/tree/main/app/tomorrows-paper>

```
`Write a newspaper article according to these parameter:  
Write it without a title  
Make it be about the city of Umeå ${year} years from now  
Make it follow up on the last article, which was ${lastArticle}  
Make it about 250 words.`
```

Prompt for Umeå Tomorrow.

Appendix J: Diary Generator

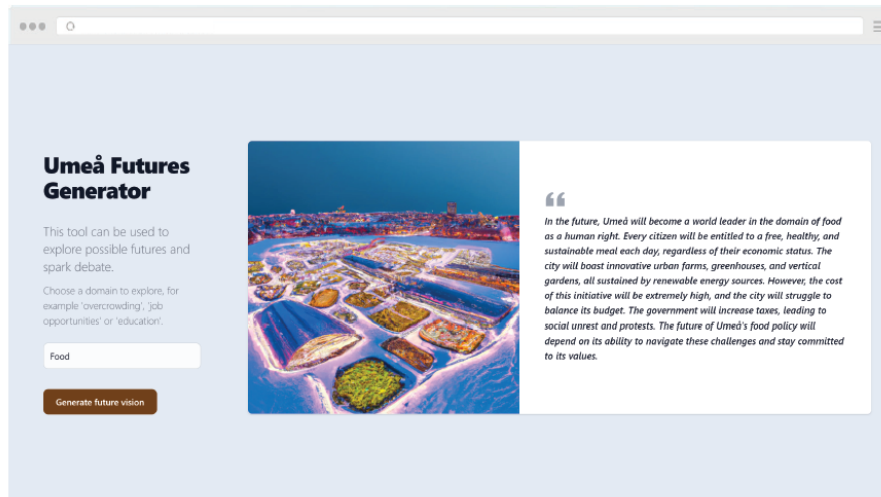
Source code: <https://github.com/jorritvanderheide/imaginary-generator/tree/main/app/diary-generator>

```
`Write an immersive diary entry for a fictional person according to these  
notes:  
Situate it in the city of Umeå  
Make the setting radically different with regards to ${domain} than Umeå  
now  
Make it is about 250 words.`
```

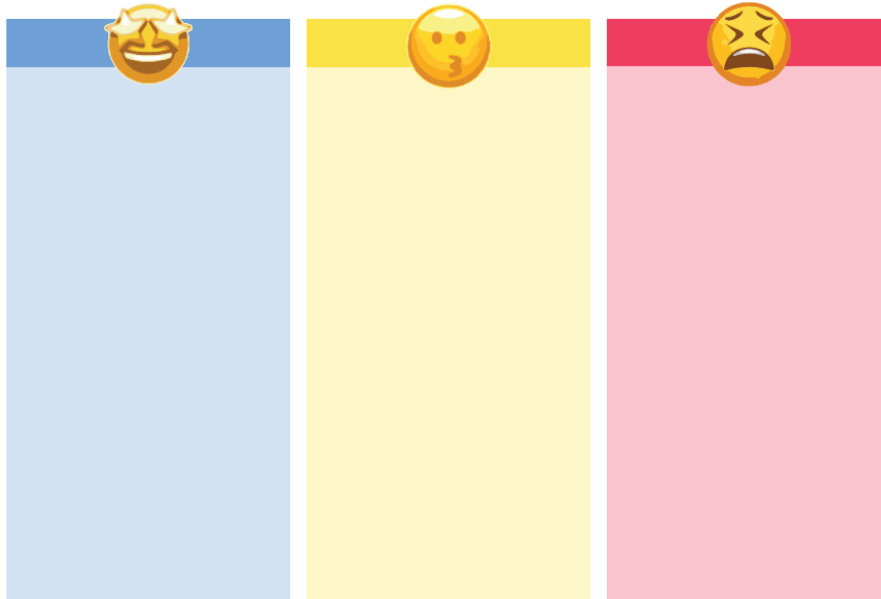
Prompt for the Diary Generator.

Appendix K: Design critique session

UMEÅ FUTURES GENERATOR



Generating a possible alternative future for Umeå related to a specific domain



SPI FUTURES GENERATOR

SPI Futures Generator

This tool can be used to explore possible futures related to the SPI.

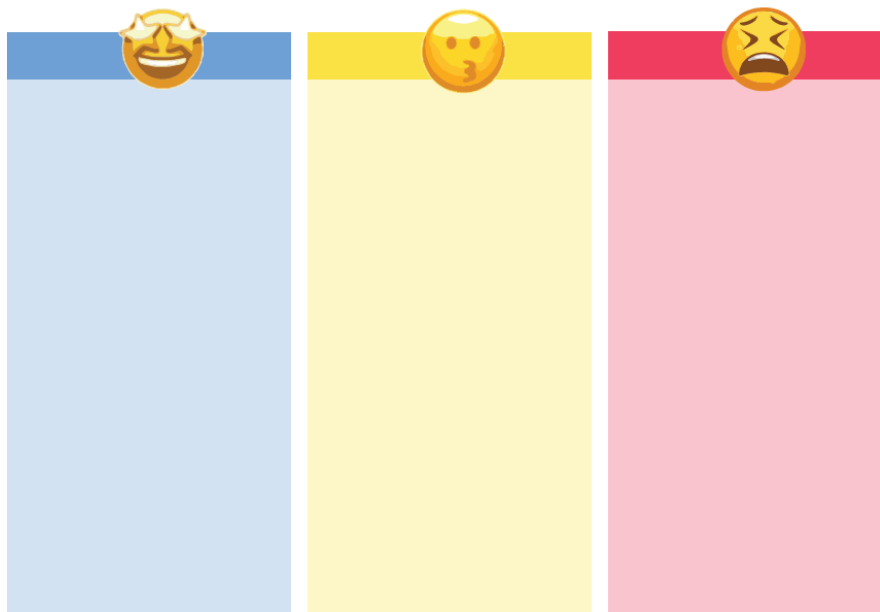
Pick a domain by clicking on the SPI table.

BASIC HUMAN NEEDS	FOUNDATIONS OF WELLBEING	OPPORTUNITY
Nutrition and Basic Medical Care	Access to Basic Knowledge	Personal Rights
Water and Sanitation	Access to Information and Communications	Personal Freedom and Choice
Shelter	Health and Wellbeing	Tolerance and Inclusion
Personal Security	Environmental Quality	Access to Advanced Education and Lifelong Learning

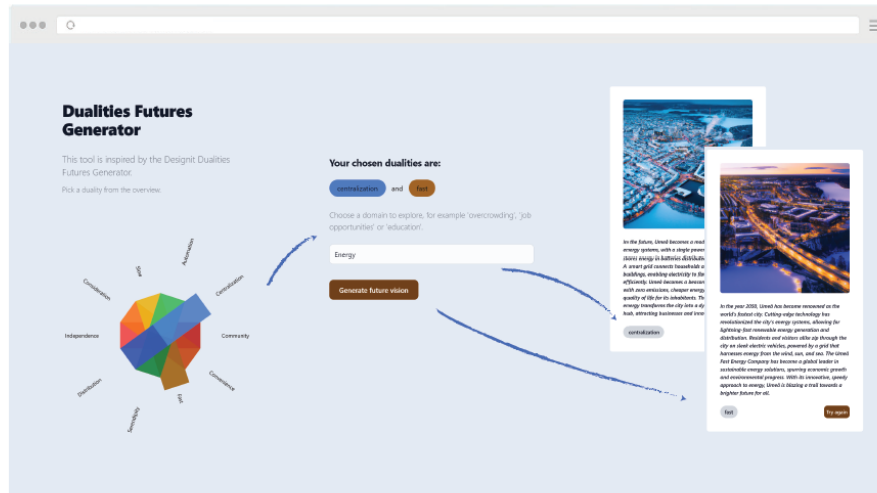
“
In the year 2040, Umeå has become a beacon of collaborative economy in the realm of shelter. Every residence has been transformed into a hyper-efficient living space, shared amongst its inhabitants. Rooms are assigned based on individual needs and preferences, coordinated through a central AI system. Each unit is equipped with state-of-the-art technologies that promote sustainable living, from hydroponic gardens to energy-saving appliances. The city is thriving, but some lament the loss of privacy and ownership, fearing that future generations will never know the joy of truly calling a place home.
”

Shelter Collaborative Economy [Try again](#)

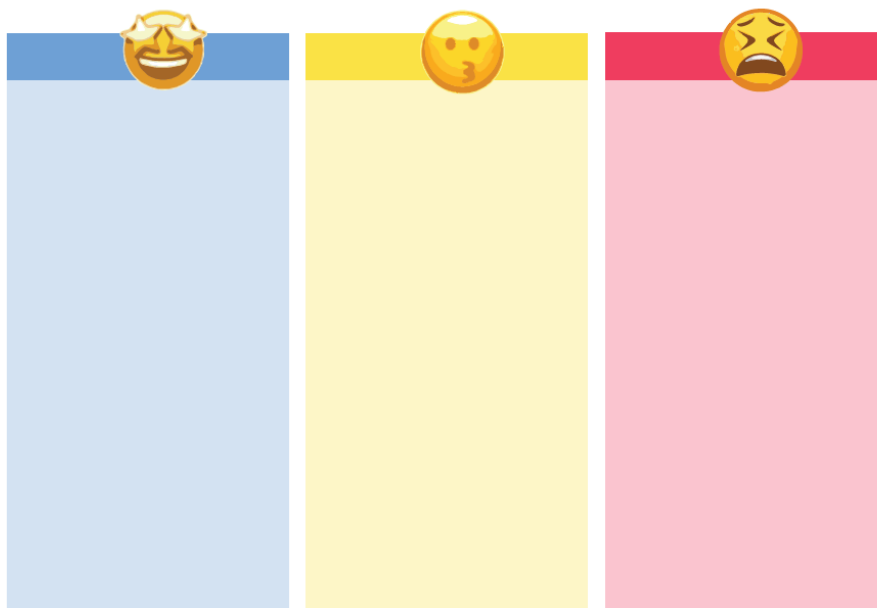
Generating a possible alternative future for Umeå related to a specific SPI domain



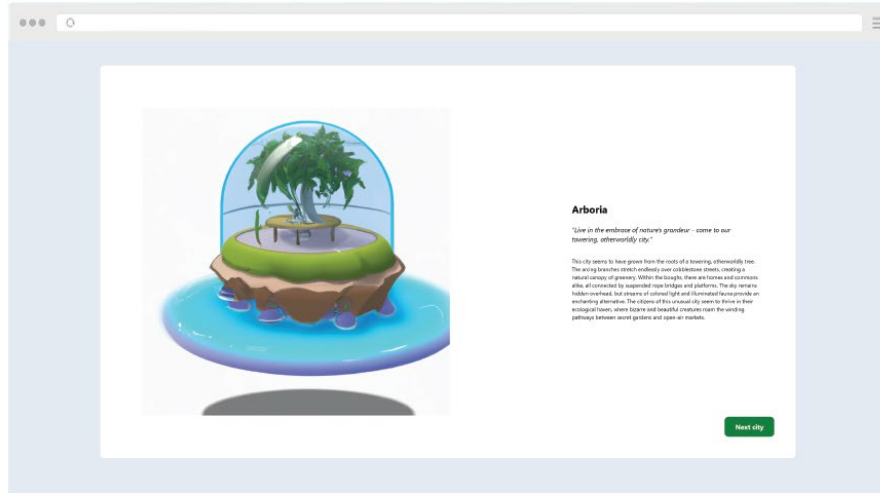
DUALITIES FUTURES GENERATOR



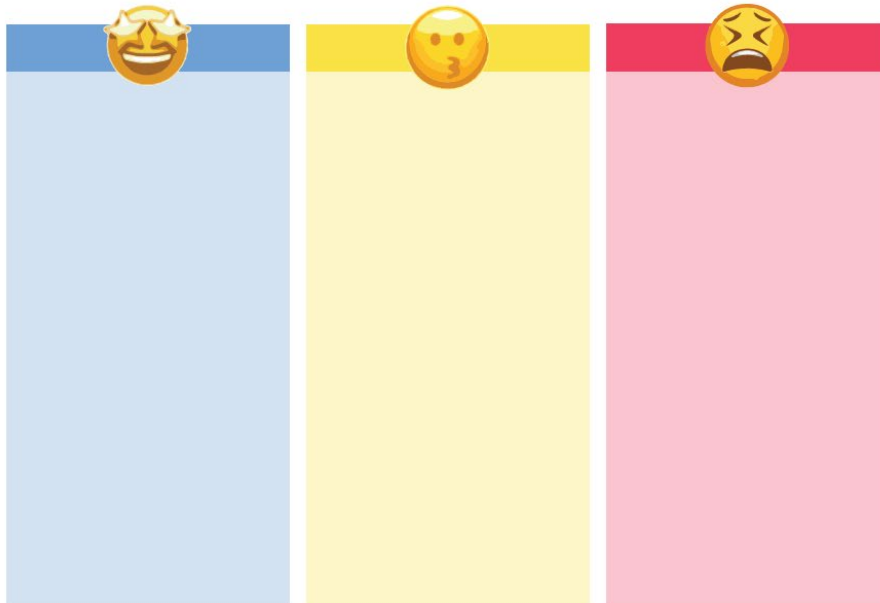
Generating a set of future scenario's related to domain an a duality



MINI CITIES GENERATOR



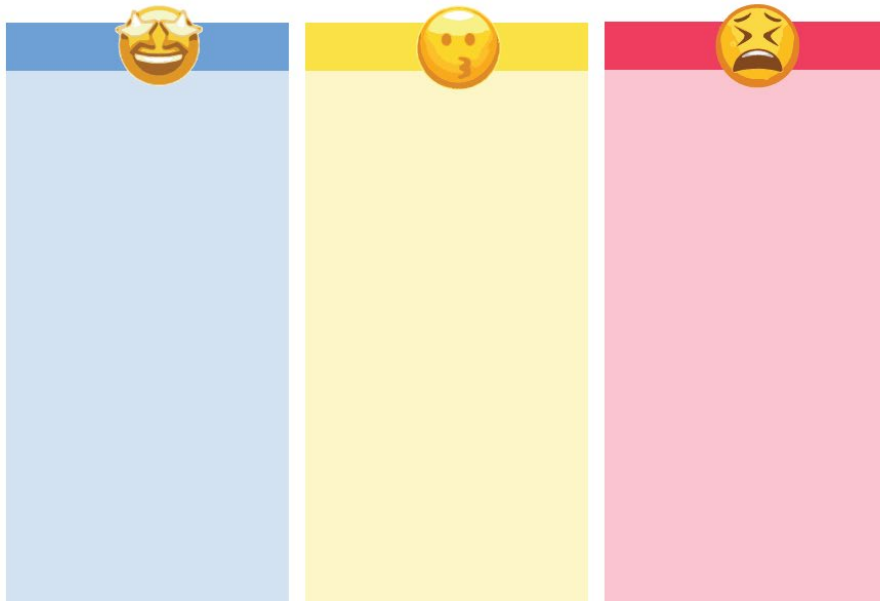
Generating fictional floating city islands with a alternative reality



UMEÅ FUTURE MAP EXPERIENCE



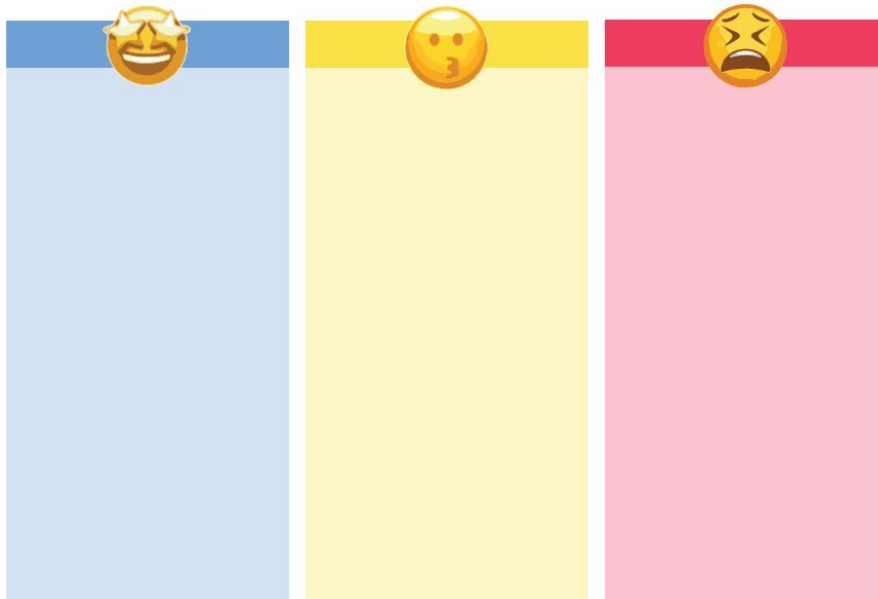
Generating landmarks on an interactive map of Umeå



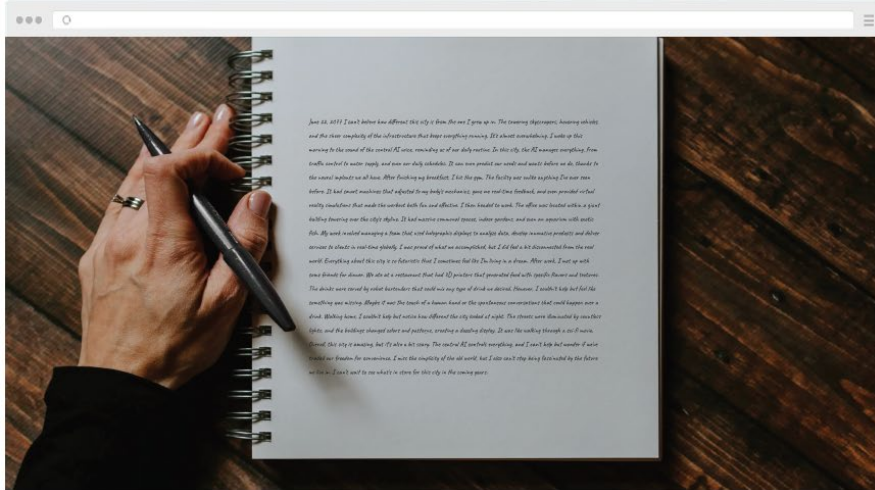
TOMORROW'S PAPER



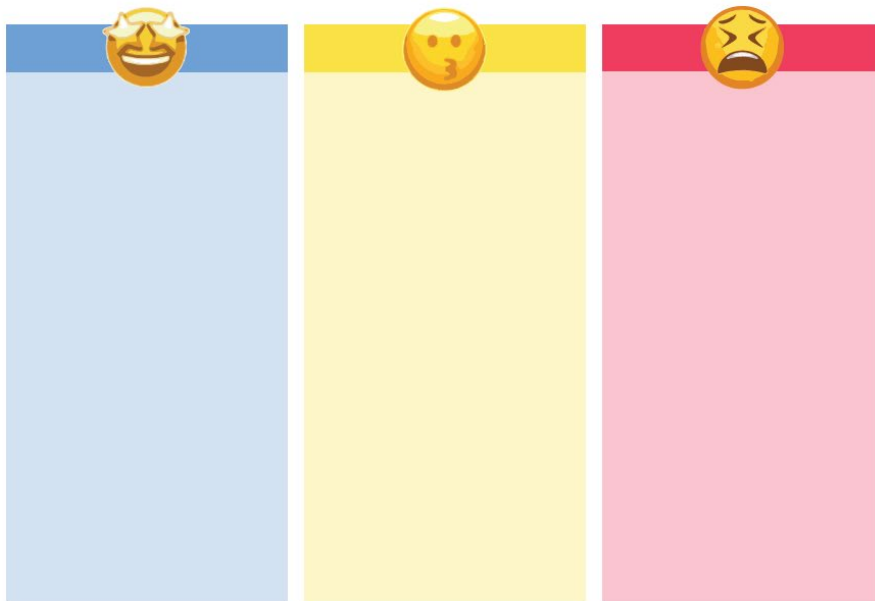
Generating tomorrow's paper with news on the state of the city



DIARY GENERATOR

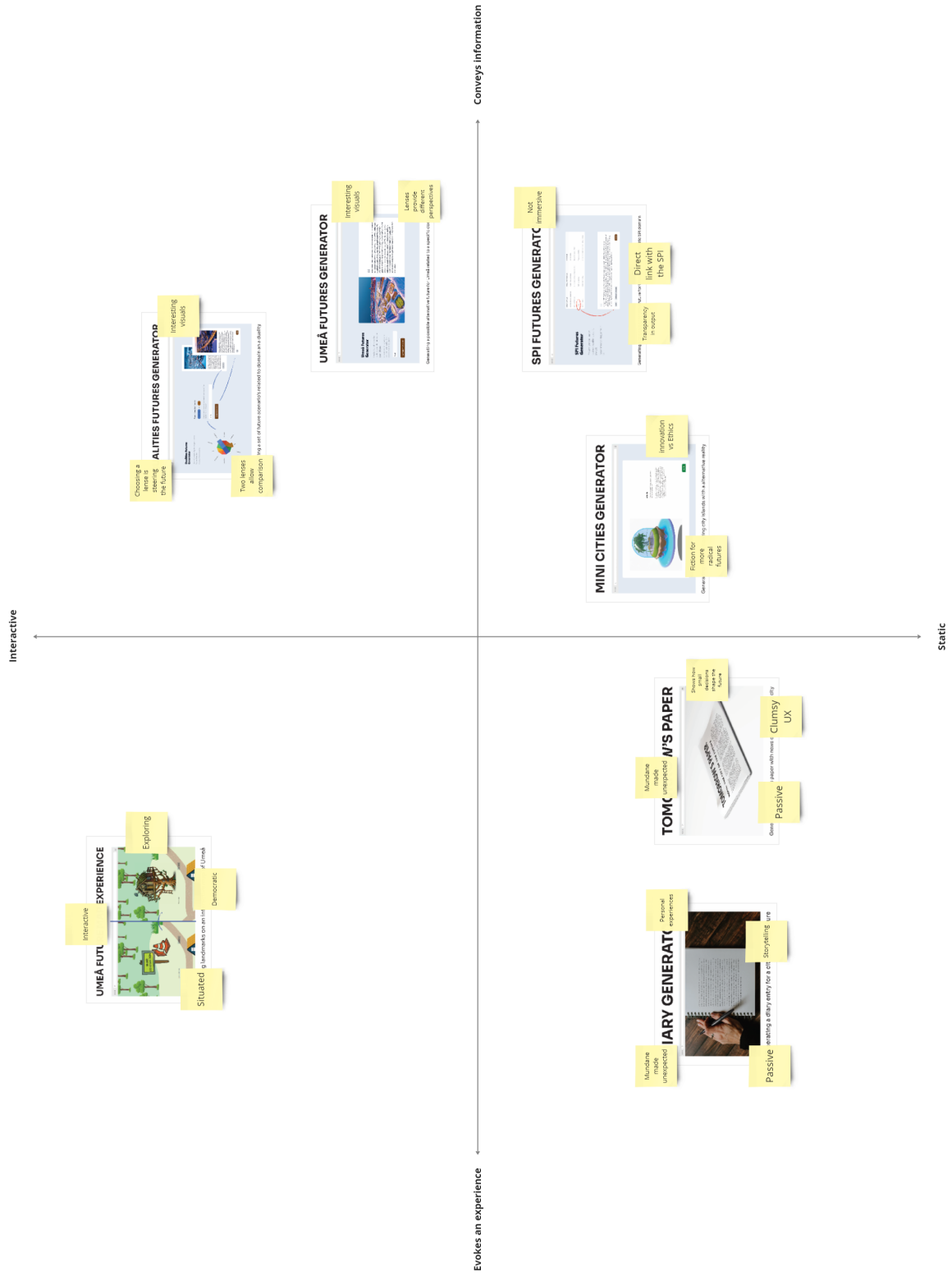


Generating a diary entry for a citizen of the future



Stencils used in the design evaluation session.

Appendix L: Designspace analysis

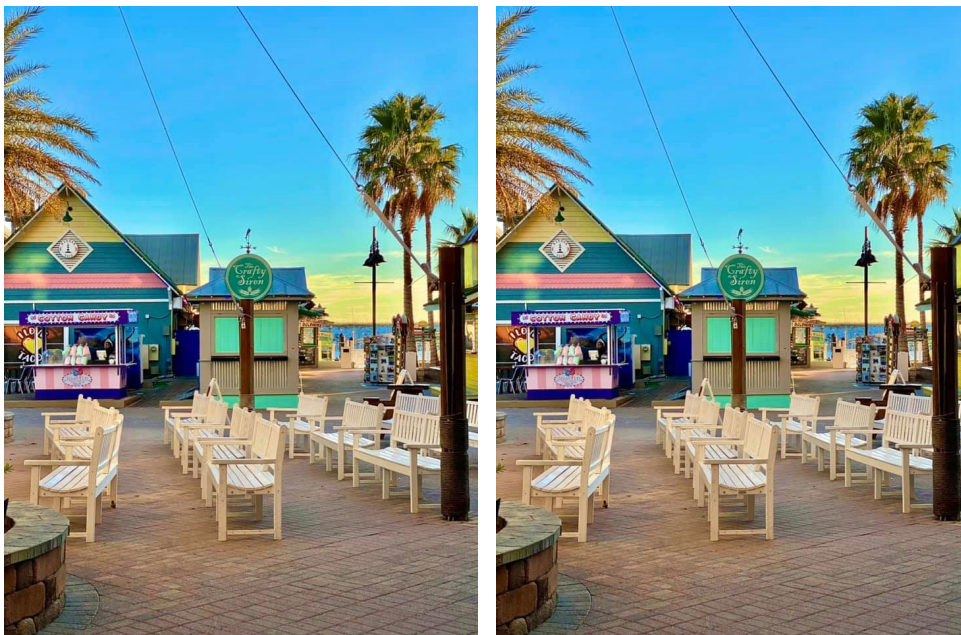


Visual representation of the designspace analysis.

Appendix M: Pre-demoday demonstrator

Source code: <https://github.com/jorritvanderheide/pre-demoday>

Initially, Dall-E generates an image compatible with the story's setting. Subsequently, an algorithm, developed by researchers from Portland State University and Adobe (Niklaus et al., 2019) is employed to create a depth map from this static image. The algorithm utilizes an AI trained on a combination of images and depth-map data to approximate a depth map for the given image. This is then converted into a video animation that zooms in and out of the image, a technique commonly known as the Ken Burns effect (Wikipedia, 2023), but in 3D. Next, a client-based file conversion library, FFmpeg (FFmpeg, n.d.), is used to convert this video into a GIF, which can then be uploaded to the website. I employed a library for animating GIF images on a frame-by-frame basis, called Libgif (Buzzfeed, n.d.), to program a setup where scrolling through the story would animate the GIF frames, creating a sense of depth in the image in an attempt to immerse the user.



These images look the same, but if you click on them, you'll be redirected to a page where the difference becomes visible.

Another significant feature is the manner in which the AI is structured to generate a progressing story that incorporates multiple user inputs for narrative advancement. This is achieved through a combination of methodologies. Firstly, the story is generated in three parts, allowing users the option to influence the narrative direction between chapters. For generating these separate chapters, the following prompt is used, with minor modifications for the first and last chapter:

```
^I am writing an interactive, speculative fiction story consisting of multiple fragments. It is situated in the city of Eindhoven, and in between the fragments, the reader has to choose what area of the city they want to visit next. Write a 250-words fragment in the style of #{style}, that takes place in a specific part of the city. The fragment is meant to explore how we could shape our society differently with regards to #{spiDomain}.  
Use the notes below to write the story:  
In the previous fragment, this happened: #{summary}.  
In this fragment #{protagonistName} is going to #{decision}  
Describe the scenes and locations in the story in a way in which it would be easy to imagine them.  
The story should focus on how #{spiDomain} has shaped the city and the life of #{protagonistName}.  
The story should end with #{protagonistName} contemplating which location out of two options to visit next.^
```

Prompt used for chapter generation.

Subsequently, a summary is created from the data of the previous chapter(s) for the newly generated chapter. This summary is then utilized to extract two different progression options that populate the buttons displayed beneath each story. Initially, the choices are arranged in a format where the AI's returned text prints one choice per line. The choices are then extracted by splitting the output data at every newline. Based on this methodology, users can click either button to select their preference, after which the story proceeds to generate a new chapter.

Appendix N: Final demonstrator

Source code: <https://github.com/jorritvanderheide/demoday-demonstrator>

Website: <https://envisioning-eindhoven.netlify.app>

I decided to make the platform not merely a demonstrator but a real application that people can actually use. In this section, I want to present the ways in which I accomplished this, and the tools used in doing so. There are two main features I want to discuss: the AI programming for the story generation and for the editing, and the integration of the login and database functionality.

First, let us focus on how the AI story generation. To generate the story, I configured several API endpoints, which each handle a different aspect of the story generation that is triggered accordingly based on the settings the user chooses.

`/api/idea`; This endpoint handles the generation of a story idea if the user leaves the choice to the AI but has already an idea of a direction. The prompt used for this endpoint is the following, where 'direction' is the input by the user.:

```
Write a one-sentence idea to for a short story based on these criteria:  
It should be speculative fiction, but not too futuristic.
```



```
It should be about the future of a specific location in the city of Eindhoven.  
It should be about direction.  
It is meant to be a fun way to discuss the possible future of the city in the social domain.`
```

Prompt used for story ideas with a direction provided.

What we can see here is that we provide the AI with some concrete keywords to approach the right format, such as 'speculative fiction' and the last sentence describing the use case of the output. Additionally, I found that ChatGPT has a bias for creating technology-centered and futuristic futures, hence I attempted to reduce this bias by asking for a not too futuristic story. The final interesting sentence is to situate the story by asking the AI to place the story in Eindhoven. Although ChatGPT is not trained on the ideal dataset for interpreting this, I found it does attempt to make the context specific to Eindhoven, and sometimes successfully does so.

Another prompt that can be found on the same API endpoint is submitted when the desired direction is not defined, which is the case when the user leaves the choice to the AI. The prompt for this can be seen below:

```
`Write a one-sentence idea to for a short story based on these criteria:  
Speculative fiction, but not too futuristic.  
About the future of a specific location in the city of Eindhoven.  
One of the following topics: Nutrition and Basic Medical Care, Water and Sanitation, Shelter, Personal Security, Access to Basic Knowledge, Access to Information and Communication, Health and Wellness, Environmental Quality, Personal Rights, Personal Freedom and Choice, Tolerance and Inclusion, Access to Advanced Education.  
Don't mention these domains specifically but situate the story in an everyday context in one of them.  
It is meant to be a fun way to discuss the possible future of the city in the social domain.`
```

Prompt used for story ideas without a direction provided.

What we can see here is that in addition to the sentences discussed above, the AI is asked to use a domain from the SPI. Because the chosen domain would often be explicitly mentioned in the story, leading to a less immersive experience, the AI is prompted to situate the story in these domains without explicitly saying so.

When users have picked a direction, either through their own input or using the AI assistance, they have two ways to start the story using the AI, which each way situated on its own endpoint:

`/api/start`; This endpoint is used when the API should only start off the story

```
Write the first section of a story based on these criteria:  
It should be engaging and immersive.  
Make it about a possible future of the city of Eindhoven.  
The story should be about ${storyDirection}.  
Make it probable, and not too futuristic.  
Make it situated to the context of Eindhoven, the Netherlands.  
Make it open ended.  
Use about 250 words.
```

Prompt used for starting a story.

I left out some of the previously used prompts, as these are already implicitly incorporated, and I found the results generated without repeating these instructions more interesting.

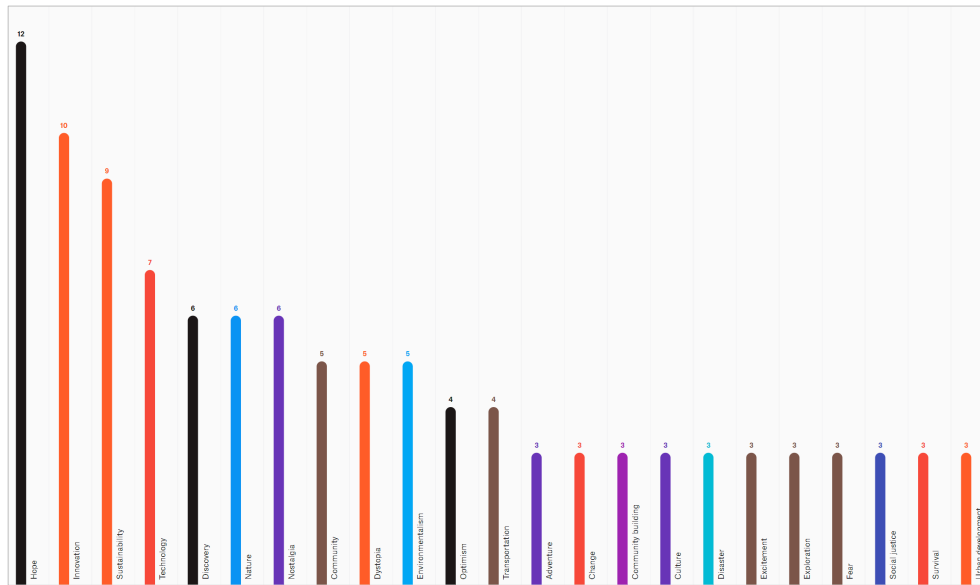
Additionally, the AI is asked for a probable scenario. Using this parameter in this part of the story generation resulted in stories with a better sense of realism, while still being creative.

Finally, I asked for an open-ended story, so users could continue where the AI stopped, creating the dynamic I envisioned for this type of generation.

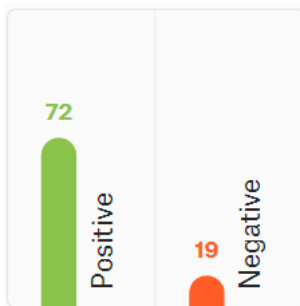
`/api/story`; This endpoint is used when the AI is tasked with writing the whole story. The prompt for writing the full story is similar to the previous one, with the exception of the wording of the first sentence about it being a section and the word limit, which is 500 for the full story. The limit is, as discussed before, set for several reasons including as an attempt to limit computational power needed, and the time limit for the API endpoint resolve. If users really need the AI functionality to progress though, they can make use of the built-in editing tools.

Finally, to create a functional app, I implemented a database using Supabase (Supabase, n.d.) for the stories and images to be stored and a login using OAuth (OAuth Community, n.d.), allowing users to login using one of several existing account types (Google, GitHub), so without needing to create a separate account. I also want to note that the database is encrypted, making it impossible even for me to view its contents, guaranteeing user anonymity.

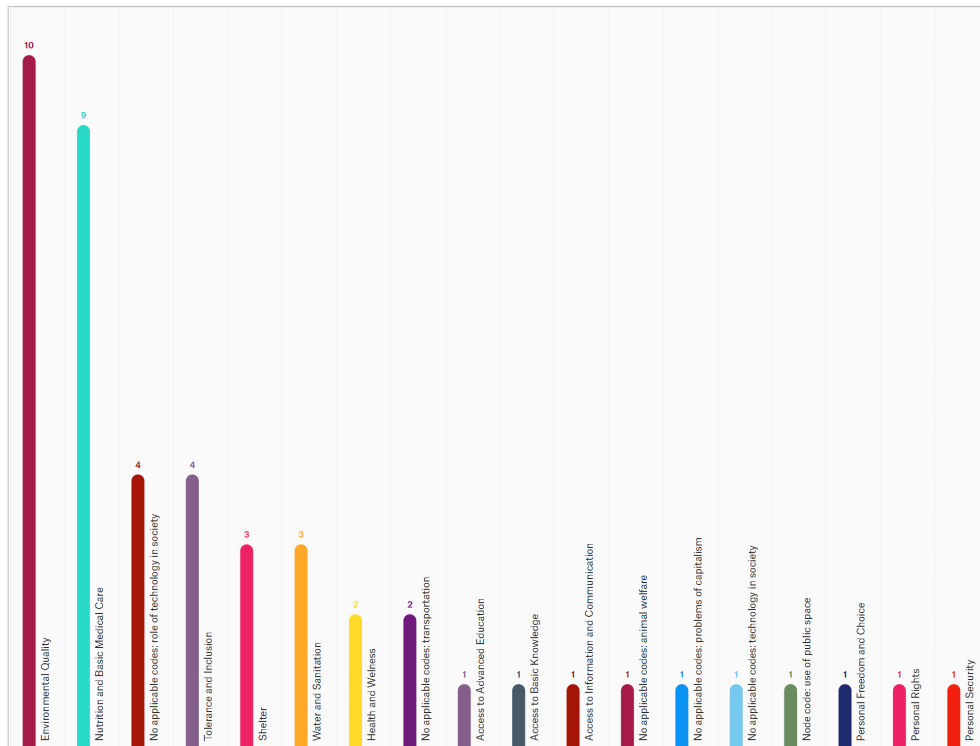
Appendix O: Story evaluation



Results of the value- and theme-based analysis.



Result of the sentiment analysis.



Results of the domain-based analysis.

Appendix P: Stories

These are two examples of short stories that were written in collaboration with the AI and shared on the platform, to give an example of the type of content on the platform:

The Transformation of the PSV stadium

In the year 2035, the city of Eindhoven had transformed in ways that the retired soccer player, Johan, never could have imagined. Accompanied by his two young grandchildren, he made his way to the newly transformed botanical park that used to be the stadium where he won his first national championship.

As they strolled through the lush greenery, Johan could not help but reminisce about his soccer-playing days and the raucous cheers of the crowd that once filled the concrete stadium. Now, the rusted metal beams had been replaced with winding pathways lined with trees and flowers, and the air was filled with the sweet scent of blooming plants.

As they sat on a bench, surrounded by swaying flowers, Johan could not help but feel hopeful for the future of his city and the world.

Over the Highway

The asphalt cracks in many places, bubbles rising from the opening chasms. The A2 is now home to water birds rustling through the reeds, ribbiting erupts from lily pads as mosquitoes disappear in hungry mouths. A boat sometimes passes them all leisurely, since we have agreed to keep their influence limited to necessary cargo transports.

We tried to hold it off at first, but many of us left when it got too wet beneath their feet, this turned out to make the following changes easier. It has been a while since cars crawled underneath our feet. The many pedestrian crossings, bicycle bridges, and hanging ecoducts sought to recreate the connections that were severed by these monster tracks. When the water came they doubled as the primary means of locomotion as the lower levels flooded. Insofar as it was doable, we slowly adapted to life in the swamp.

Why leave a perfectly good city, now that we finally get to share it?

Appendix Q: Feedback Jeroen Peeters

As a design researcher at RISE, I work with applying design research for societal transformation to practical cases that often involve multiple (types of) stakeholders. One example is the SPIS (Social Progress Innovation Sweden) project between the City of Umeå and different divisions of RISE (e.g., unit Societal Transformation, my unit, and Urban Development). The project investigates how the public sector can become more innovative based on the metrics (and values) put forward in the Social Progress Index. I lead the design work package, where my interest is in using design as a language, tool or catalyst towards the innovation processes the city undertakes. The overall interest is to stop transformation feeling like “going to the dentist” and more like positive excitement, humor, and openness. This is where the conceptual idea of SPISneyworld: a future Umeå where we prototype how such driving values may catalyze urban development projects.

Jorrit’s work and our discussions have been very valuable for me in the SPIS project and to further convey the SPISneyworld concept. I see value both in terms of the process he has gone through, and the end result. With regards to the process, I value the extensive design explorations that investigated how to develop a tool that provides creativity and expression to those places or people that do not always feel empowered to use them. The time for design explorations within the SPIS project at RISE is limited, and Jorrit’s prototypes show several directions forward that can be explored. With regards to the final concept and prototype, I see particular value in the way the prototype bridges several processes within the City of Umeå administration. An often-discussed problem within the context of the SPIS project was the link

between citizen dialogue processes, with abstracted questionnaires and bi-yearly processes and the continued development of the urban planning strategy. The concept developed and prototyped by Jorrit shows a potential way forward to align both processes as continuous, free, and adaptive. I also appreciate how it retains complexity and ambiguity: stories may be changed, generated, added on or subtracted – the aim seems less to develop a ‘final’ image of what should be done, but rather to facilitate the creation of a culture of experimentation. This is in line with the overall vision for SPIneyworld, and I am confident that Jorrit’s work will exemplify the potential of this approach more concretely for the stakeholders in the SPIS project that lack design knowledge.