



**ONCE UPON  
A TIME WE  
DECIDED  
TO CHANGE  
THE WORLD**

**DIGITAL SOCIETY SCHOOL  
FALL 2019**

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*Once Upon A Time We Decided To Change The World.* ©

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## EDITOR'S NOTE

Dear reader, if you are interested in sustainable development, innovation, digital transformation, design thinking, inclusive practises, progressive education methods, or any intersection of the above — then you picked up the right book! Welcome. This publication is an informal account of the Fall 2019 semester of projects conducted at the Digital Society School (DSS) in Amsterdam. The content creation, design, and production of this book has been completed collaboratively — as is the usual practise within DSS. As such, this book provides a snapshot of the diverse views, personalities, professions, and backgrounds of the contributors.

The aim of this book is to provide an insight into alternative methods of working. As we are well aware, our rapidly changing global environmental and social climates require us to develop more effective means of intervening, communicating, inquiring, developing, and disseminating. So, what happens when you collect young, passionate, individuals, provide them with innovative design thinking tools, and present them with a challenge of global importance? Each one of the nine teams involved in the Fall 2019 Semester (who comprise the content of this book) approached their design challenge, team dynamics, research and prototyping methods completely differently. As such, it was really only our passion for working towards a more sustainable world which united us. Yet, as we hope to show

throughout this book, **it truly is our diversity which gives us strength.** Working in diverse teams was the main learning curve of the semester; it was not without challenges, but it also stimulated creativity, resourcefulness, and compassion among our members.

It is not, however, our intention to provide academically sound research outputs within this book. That is the task of our track associates/owners, who have provided introductions for each track section, and who oversee the work of multiple teams throughout the track's two-year research project. Having said that, we have endeavoured to provide context and references for our work. If you would like more information, or to take a look at our data sets, literature reviews, and so forth, please do not hesitate to contact the DSS staff through the website.

Instead, you may view each chapter as an opinion piece, coming straight from the experiences of the trainees who worked upon each design challenge. All of our chapter authors are (of course) unique, and therefore they have each chosen to share different insights with you. Some have provided a step-by-step account of their research process. Others have chosen to focus on their final prototypes, or to discuss how it felt to work within such a heterogeneous team. Each author has a different native language, professional background, and level of writing experience — so we have embraced these differences, and attempted to let the voice

of each author shine through unhindered. As such, the following is an eclectic mix of stories, presented to you with the intent of peaking your curiosity and inspiring you to critically question your own methodologies and practises.

Maybe you too can reap the benefits of working collaboratively, adaptively, and iteratively within your chosen field.

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As mentioned, this book is one of the results from the DSS's Fall 2019 semester. We worked full-time from September 2019 — January 2020 on nine projects which were divided between three 'Tracks' namely; Digital to Physical, Data-Driven Transformation, and Systems for Sharing. In order to contextualise our work, we have initially provided some introductions to the DSS's overall structure and guiding principles. Following this preliminary section, the Track prefaces provide the vision and the themes which connect the three projects that compose each respective Track. We have then included the project-specific chapters, which have each been written by a trainee from their team — these chapters comprise the majority of this book and explain each project in detail, from research to realisation.

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The collaborative creation of this book has been a self-directed project, as proposed by our book's curator Natalia Agafonova. It has been a labour of love, under time constraints, and completed during the COVID-19 isolation period, where many of our contributors have returned to their home countries (scattered across the world). Therefore, this book is not perfect.

**But we are not interested in perfection.**

What we are interested in is sustainable development; personally, locally, and globally. We tried to push boundaries, work adaptively, and create innovations — and these processes tend to go pear-shaped from time to time. As long as we are learning from our mistakes, supporting each other, and consistently striving to improve, then our (at times tumultuous) journeys were worth it. We hope you too can learn from our mistakes and triumphs throughout this book, and we encourage you to experiment, research, challenge, and create within your own lives as much as possible.

Ellen McCarthy,  
Sustainable & Innovation  
Designer and Researcher.  
Learner in DSS's Fall 2019 Semester.



**DEAR  
FUTURE,  
I'M  
READY!**

# AN INTRODUCTION TO THE DIGITAL SOCIETY SCHOOL

By Marco van Hout,  
Co-founder and Creative Director of DSS

The book you are holding is a physical, enduring glance into our knowledge at the time of writing. When you take care of it, hold it dear and pass it along, it might even live beyond you. But, you might wonder, why would a Digital Society School publish its work in a physical form? The answer is pretty straightforward; because in a liveable digital society, not everything should or will be digital. A liveable and sustainable society is not dependent on technology nor will its transformation be guided by technology alone.

The ever growing omni-presence of digitisation in the world has recently been heating up discussions among policy-makers, economists and industry leaders about its societal impact. As digital transformation is disrupting society more profoundly, concerns are growing about its effects on matters such as jobs, inequality, health/well-being, economic prosperity, and security/safety.

However real these effects are at times, the digital transformation and its accompanying technologies in themselves are neutral. Therefore we should not forget that we (as a society) are responsible for the 'design' of the digital transformation that we need and want. We have the opportunity to create shared values that can lead to increased benefits for all actors taking part in digital transformation — especially in light of the goal of achieving the Sustainable Development Goals (SDG's) by the year 2030. The World Economic Forum recently called for a comprehensive set of regulatory standards, physical infrastructure, and digital systems, to capture the benefits of the digital revolution for the SDG's.

In order to design the digital transformation aimed at a truly sustainable society, we need to organise ourselves differently, change our mindset and train ourselves with the right competencies to become 'Digital Transformation Designers', a new breed of leaders in a digital world.

This book will show you a rich collection of projects that were successfully implemented in the Digital Transformation Design Intensive traineeship, in close collaboration with external organisations and industry. Get a glimpse into the approach and methods that can help you set Digital Transformation Design in motion in your own work or that of your organisation.

## INTEGRATION UNLOCKS THE POTENTIAL OF NEW TECHNOLOGIES

We are all curious. We are all creative. Today's digital society is hungry for everything that is new and disruptive. We also get caught up in the rat race. We need to build solutions for the complex challenges we currently face. We need to innovate, fast!

But do we? Really? Instead of a focus on innovation and developing new technologies, should we not prioritise the integration of technology? According to leading thinkers, designing useful applications and moving away from the idea of growth are the things that really matter today —

and we agree 100 percent. We value meaningful integration of technology.

That is why Digital Society School's heartfelt goal is to train people so that they can help to make our society a better place to live, work and learn — and ensure a sustainable future for all.

Technology can help us, but only if we know how to apply it. To come up with new applications, we continuously need to learn how today's society and technologies change and work. We need people who can keep learning. We need lifelong trainees who aim for a sustainable and responsible digital future. The future needs you, dear reader.

Digital Society School helps young students, young professionals, seasoned professionals, and scholars, to become lifelong and responsible trainees; people who are able to keep learning in a (digital) society that constantly changes. People who have the creative skills to envision and design new meaningful ways to integrate technology.

Besides these skills, Digital Society School trainees have a natural drive to help solve the most urgent global issues, because they care about the world. They start local and dare to challenge and shape their own environment, organisations and neighbourhoods. Trainees involve everyone in this transformation process — from government representatives and businesses leaders to researchers and educators.

Shaping society starts locally, but to have an impact on the world we have to work together globally. Everything we create must have a positive

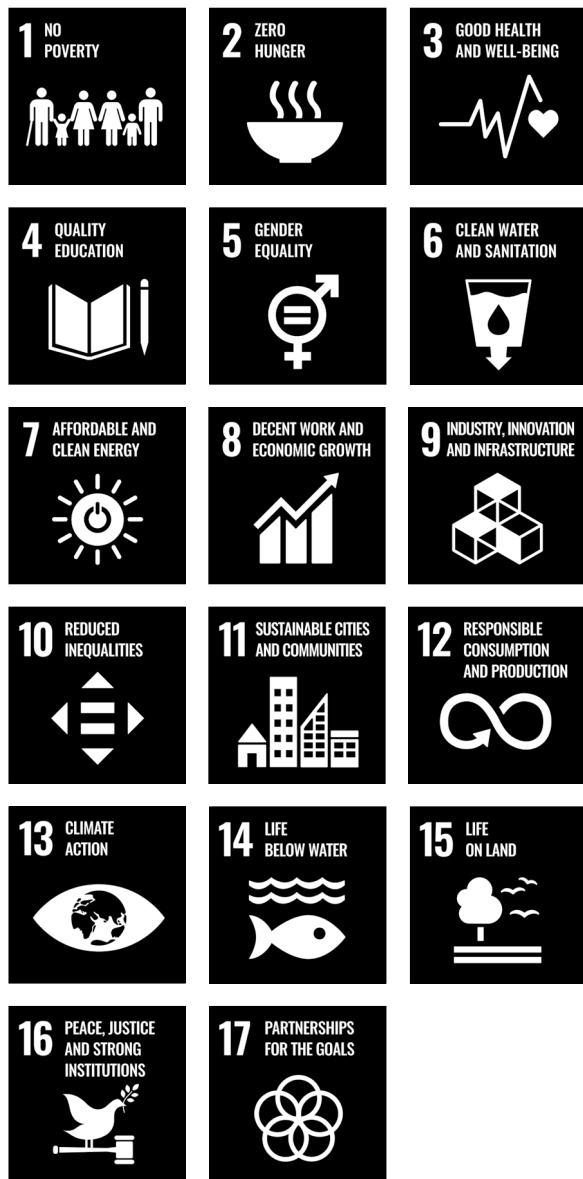
ripple effect around the world. That is why a selection of our trainees wished to share their insights through this book.

## A GLOBAL LEARNING COMMUNITY, THAT STARTS LOCALLY

We believe that global change starts locally. Digital Society School trainees acquire the skills to unlock the potential of new technologies and work together to create a sustainable environment, not just in their own neighbourhoods and organisations but also around the world.

Everyone involved in our programmes is part of their own local community and — at the same time — a global learning community. As a learner you think about how your own business, organisation, or neighbourhood can integrate technologies and designs to help build a sustainable future. You can become the leader and accelerate the change.

We also connect with our own local communities. This means that the City of Amsterdam's open, inclusive and citizen-focused approach is present in all the Digital Society School's activities. Furthermore, because global change starts locally, the city is our test-site for developing sustainable metropolitan solutions that can be implemented worldwide.



*The United Nations' Sustainable Development Goals (SDGs)  
as taken from [sustainabledevelopment.un.org](https://sustainabledevelopment.un.org)*

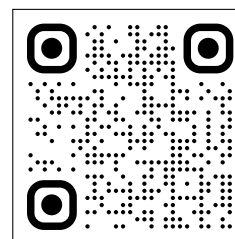
## IMPACT ON THE UN SUSTAINABLE DEVELOPMENT GOALS

The seventeen Sustainable Development Goals (SDG's) provide everyone around the world with the blueprint to achieve a better and more sustainable future for all. They concern our human rights and our primary necessities of life, such as water, health and safety, employment and security, but also the need for a well-functioning public

administration. The goals are part of the 2030 agenda for Sustainable Development, which was adopted by more than 150 world leaders at the United Nations Sustainable Development Summit in 2015.

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*Scan the QR code below  
to learn more about  
the UN Sustainable  
Development Goals:*



If we want to achieve these goals it is vital that science, technology, policy and social agendas align. That way we can be sure that we all work towards the same goals from the outset. What follows is a process of learning how to create a sustainable future. Throughout this process, sharing new insights is vital if we want to achieve the Sustainable Development Goals. Right now, around the world valuable knowledge is lost because it is not shared, or not found.

To ensure that the Digital Society School's knowledge and insights spread around the world, all our programmes align with the Sustainable

Development Goals. In addition, we collaborate with the United Nations Development Programme and work closely with the World Design Organization. By working with these international communities, our knowledge is available to everyone around the world.

**“THE CHALLENGES BEFORE US ARE SO COMPLEX THAT NO SINGLE DISCIPLINE, MINDSET, OR EXPERTISE WILL BE ABLE TO SOLVE THEM. TO ADDRESS SOCIAL CHALLENGES GLOBALLY, WE NEED TO COLLABORATE AND LEARN FROM LOCAL IDEAS AND SOLUTIONS THAT ARE BEING DEVELOPED ACROSS THE GLOBE.”**

— Vision Global Goals Jam. [www.globalgoalsjam.org](http://www.globalgoalsjam.org)

The complexity of global challenges, such as climate change, migration, and the most recent global pandemic, is one of the reasons why, at Digital Society School, we chose to use the UN Sustainable Development Goals as a common ground within our projects and programmes. It is why we believe in multidisciplinary, multicultural, multi-generational teams. It is why building an inclusive digital society is at the heart of our

vision, not only from the perspective of people, but also from the perspective of the planet. To create a safe and just space for humanity within our planetary boundaries, not because it is a possibility, but because it is essential.

On the one hand, the current reality we live in and the world we experience around us calls for action from individuals, professionals, designers; on the other hand we have also seen development from the inside out, when looking at the design community.

## OUR PURPOSE, QUESTIONS, AND PRINCIPLES

Everything I have talked about so far is summed up in our purpose statement and five fundamental questions. These are at the center of the work we do at the Digital Society School and supported by the learning principles we live by.

### OUR PURPOSE

We provide all generations with the skills and knowledge to create an inclusive digital society. To do this, we build and foster a diverse community of trainees that integrates digital technology into society, using human-centered design approaches. We think big, but start locally, and share our knowledge for the world to use.

## OUR FUNDAMENTAL QUESTIONS

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**How** can societies, cities, organisations and — above all — people, benefit most from advancements in digital technology?

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**How** can companies respond most effectively (and responsibly) to the digital transformation of society and ensure that their products and services benefit people, the planet and their profit?

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**What** are the best methods to teach students and professionals to integrate digital technology in society and organisations — even if they are not specialised in designing or creating digital technology applications themselves?

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**How** can a school not only educate people but also play a guiding role in the creation of solutions for greater societal challenges, such as the SDGs?

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**How** can we equip all trainees with the right mindset, skills, and knowledge, so that they can use technology, design, and social innovation methods to develop useful applications that will help us to achieve the SDGs — and cause a positive ripple effect around the world?

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## OUR PRINCIPLES

All of the programmes at Digital Society School help to envision or design new applications and ways to

integrate digital technology into one's life and work. It is all about improving your own work, and the work of the people around you. Together, we can make the organisations we work for or the neighbourhoods we live in more sustainable. Our education model and approach support this goal.

Because the Digital Society School works at the forefront of developments in technology and society, everyone at the school lives by a set of learning principles to ensure creative, open mindset:

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**Uncertainty** is the only thing we are certain about.

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**Embrace failure.** Dare to experiment, reflect on — and learn from — your failures.

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**Multiple perspectives** lead to better solutions.

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**Something** cannot come from nothing. That is why we actively seek input.

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**Everything is 'figure-out-able'.** We may not know the way but we will find it.

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**Our first idea** is unlikely to be the best. And even if it is, how do we know?

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**Show, do not tell.** Making things tangible helps us think and communicate.

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**If it is about them,** do not do it (or design it) without them.

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**Offer** what you can, ask for what you need.

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# OUR MODEL: FROM TRENDS TO TRACKS

The Digital Society School is a neutral training ground. It is a place where we can all experiment freely, and invest our equal share of time and responsibility. We activate the mindset and skills to thrive in the field of design, technology and social innovation, while embracing an explicitly international and open source approach. In short, we are building a learning community that can lead and guide the digital transformation of society in a responsible and inclusive way.

To do so, our organisation and educational model are different from what you might know from traditional institutions. We need to be agile and ride the waves of the latest trends in technology and society. Therefore we have created the concept of tracks. Tracks are initiated by us, and developed together with multidisciplinary groups of designers, developers, and researchers who work at the forefront of a development in technology or society.

Tracks allow us to gather cutting-edge knowledge, while simultaneously educating students, professionals and ourselves. The combination of trend-watching, research, education, and the connection to practice is what sets the tracks apart from existing educational programmes. Tracks ensure that we educate professionals that can guide the digital

transformation of society and help us to achieve the SDGs. Tracks, in short, are our organisation's beacons.

The work that is done by everyone in the tracks results in valuable knowledge and insights that we use for new education materials. Companies, societal organisations, and educational institutions around the world can reuse the results and lessons we have learned.

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**Identify** a key development in technology or society.

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**Create** a track with leading creators and thinkers.

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**Educate** by working on real-life challenges with stakeholders.

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**Distill** new knowledge from the tracks and share with the world.

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I am very proud to be able to introduce you to our Digital Society School and, in this book particularly, to our approach and the beautiful, relevant work that our talented trainees, our team, and our partners created in our Fall 2019 semester. I would like to invite you, dear reader, to follow our track topics closely. But most of all; consider our ideas and talented graduates as the right match for your organisation to step into the new decade, the decade of 'Digital Transformation Design'. It is now that we should take the lead in 'designing' the digital transformation that our society and planet deserves.

**DEAR FUTURE, WE ARE READY.**

# DIGITAL SOCIETY SCHOOL AS A LEARNING COMMUNITY

By Zlatina Tsvetkova,  
Learning Experience Designer

The following section is dedicated to the core catalyst of innovation and transformation at the Digital Society School — our diverse learning community. Throughout the following pages we will explore the elements of this community that make it an effective innovation ground and provide some insights into why the projects you will read about in the next chapters are extraordinary.

## THE STRUCTURE OF THE DSS LEARNING COMMUNITY

The DSS learning community is inclusive and diverse — we make it a point to build a community of students and professionals, from interdisciplinary and cultural backgrounds, as well as people who are working with different levels of engagement and scope. This creates an opportunity for the people participating in the traineeship to not only meet each other and get to know all the different projects they work on but also to interact with our wider network of professionals, industry partners, and training courses. The community is dynamic — people come in and out and bring in models, tools, practices, and perspectives from diverse industries and fields.

Diversity is crucial for creativity and innovation and our shared space to interact with each other creates opportunity for exchanging ideas across projects. In a way, each project receives contributions from about forty people

each semester, not just from the three-five people in the project team.

The Digital Transformation Design Traineeship is centred around project-based experiential and participatory learning processes. Theory is grounded in experiences offered to the trainees on different levels. It is unravelled through projects and challenges that invite trainees to ask different questions and reveal the theory that is most relevant for their learning and project needs. Trainees are invited to deliver high quality insights, concepts, and prototypes as they discover new ways of approaching a complex problem and delivering better outputs in every step of the process.

The traineeship begins with two weeks of intensive training boot-camp where trainees form a learning community together and explore the basics of human centred design, innovation process, and the potentials of technology. The purpose of those two weeks is to establish connections, context and a shared toolkit for the trainees to be able to collaborate together even after they start working on separate projects.

Every three weeks the project teams and their skills are boosted by a 'Jam' that includes a few days of workshops that provide further training, translate sessions with industry experts, community building, and reflection time on the team process and individual learning. Most of these activities aim to provide a taste of what is possible and to encourage trainees to expand their range of approaches and tools they can use,

rather than build a deeper expertise in the fields they are already familiar with. They also provide a playground to experiment, learn across projects, receive feedback, and external perspectives on their ideas so far.

## **CORE LEARNING COMPETENCIES**

In DSS we aim to develop competencies that we believe will be most essential for the professionals of the future — those who will withstand the rapid development of technology, rising complexity, and uncertainty. This is why we focus on general attitudes and ways of thinking over specific tools or technologies — there are plenty of those in the projects but they are not the main skills we would like to develop through our traineeship.

**We mainly want to build capacity in people to create transformation processes on a systemic level towards a more sustainable society.** We have defined that capacity in the following six competencies:

### **1. Applying Sustainable Mindset**

It is essential to bring sustainability to the core of every profession if we want to address the environmental and social challenges we are currently facing.

Our projects always tackle some of the seventeen SDGs, and the trainees learn to reflect on the long-term impact of their solution. They make design choices that prioritise

sustainability, and engage stakeholders in conversations about social and environmental issues. They also learn to tell the story of their project to engage the community with the topic.

### **2. Adaptive Learning**

Technologies, tools, context, and systems are changing fast, and to lead digital transformation means to stay ahead of the wave.

At DSS the trainees work with the fast-changing needs of partners, team mates, and contexts. They work on challenges and tasks outside of their comfort zone and experiment with new methods and tools in order to practice their adaptability. They explore and integrate a variety of perspectives and learn to reflect on their process to identify opportunities for improvement.

### **3. Interdisciplinary Systems Thinking**

Complex challenges, especially inclusivity, require being able to look at situations from a variety of perspectives. We need to both think and work with people from very different backgrounds in order to develop effective solutions.

The DSS project teams are always interdisciplinary and multicultural. The trainees participate in a diverse learning community where they encounter different perspectives outside of their project. They get to consider the whole ecosystem that their project impacts and make design choices based on that. They engage with

the needs and values of multiple stakeholders, the systems and contexts they work with, and build strategies to transform them.

#### **4. Applying Transformation Design**

If we want to address the complex challenges we are facing on a global level, we need to create transformative processes on the systemic level. This requires understanding of transformation as a process, and using technology as a tool that can scale and facilitate transformation.

The DSS projects aim to design solutions that transform the industry as a whole using a variety of design thinking and systems thinking methods. Our trainees learn to deal with uncertainty and continuously changing circumstances, to challenge the norms, and to experiment with new ideas and alternatives.

#### **5. Collaboration And Co-Creation**

To transform a system you need to transform the way people work. Collaboration and co-creation are essential elements of that transformation.

Our trainees practice a variety of collaboration methods and regularly work with users, stakeholders, partners etc. They learn to embrace difference as an essential characteristic of creativity and use the strengths and passion of stakeholders to innovate. They develop effective and empathic communication skills, and learn how to define a shared purpose and collaborate with others towards achieving it.

#### **6. Integrating Technology**

Technology can be crucial for positive transformation of society. We can shape it in a way that serves the social and environmental needs of the world only if we understand it enough and are able to creatively and intentionally integrate it into our solutions.

Depending on their track, trainees apply, experiment with, and re-imagine relevant technologies and tools to their solutions. They learn to reflect on the implications of using certain technologies for society and envision their future developments. They learn to make things tangible — to iterate and improve in every step of the way.

## **THE LEARNING PROCESS**

Throughout the semester, our trainees can pick which competencies to prioritise developing, and choose activities that respond to their learning needs. They can either deepen their expertise and learn how to apply it in different contexts, or broaden and diversify their skills towards more general functions than their original role.

Learning in DSS happens on four levels — individual, team, track, and community. At each level there are different ways to develop skills and competencies and they all complement each other to create a rich and unique learning experience.

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**Individual learning** happens through a professional development plan for further career steps, individual research on methods, technologies and track topics, and self-reflection.

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**Within the team** — practice and working together is where most of the learning at DSS happens, through sharing skills across team members, working on challenging assignments, and high-quality team reflection opportunities offered by our coaches.

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**On the track level**, teams learn about the technology they are using and how it interacts with other disciplines. This learning is systemic and helps to situate the impact of their project in academia, business, and society.

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**At the community level** we explore how we collectively (as DSS) have a lasting impact on society and learn from the expertise of all other trainees, beyond projects and tracks. This is also one of the most unique aspects of the learning experience in DSS and this is why we will discuss it further in the next section.

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## THE SECRETS OF A STRONG COMMUNITY

On the surface it seems like the recipe for a transformative learning community is simple: bring together a group of 40 enthusiastic, skilled and incredibly diverse people together, mix them well; give them purposeful projects to work on; give them the methods, resources, and tools they need to work it out; let it cook under pressure for 20 weeks and occasionally stir.

The reality is different, there is a lot of maintenance and work needs to be done behind the scenes to make sure that this colourful combination of personalities does not fracture.



*The DSS Showcase, 22nd January 2020. Photo credits: Bibi Veth.*

The building of a community like this one has a few elements:

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**Building strong relationships** that encourage trust, support and openness for people to appreciate each other's skills and approach others for advice and help.

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**Powerful purpose** that creates meaning and importance to the work we do. When things get difficult, the shared purpose is one key thing that keeps people going and motivated to overcome challenges instead of avoiding them. Clear boundaries, agreements, and continuous feedback shape the playground of the community. They create a shared understanding of what is acceptable and what is not — where do we have freedom to experiment and what is off limits? The collective agreements and strong feedback culture distribute the responsibility from leadership to each individual — everyone is empowered to refer to the agreements and offer constructive feedback.

---

**Creating curiosity** and offering passion is a way to direct the attention and energy of trainees without making things compulsory. We offer a 'buffet' of opportunities for them to taste what is possible. We encourage them to share and explore their curiosities and passions together and dive deeper into what makes them most inspired.

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Our projects always sit within the realm of complexity. Complex challenges change too fast to benefit from thorough analysis and deep research. Complexity requires fast experiments, prototyping, sensing the whole system from diverse perspectives, and quick adaptation. This is why our main principle for trainees is to prototype fast, fail, learn, and iterate as much as possible.

This section has just brushed the surface of how we shape the learning community of DSS to create a rich ground for innovation, collaboration, and learning. It is complex, this is why our traineeship is always in a beta version — we learn as we go, every group of trainees is different and we adapt as much as we can every semester with them.

In the next chapters you will see how the richness of one semester played out in the projects and the outcomes they have created. The inspiration and insights that all the trainees gained from each other, contributed to the unique solutions that they would never have discovered if they were working in isolation, on in complete immersion within their chosen industry. Can you discover the threads of connection and inspiration across the projects?

# INTRODUCTION TO THE TRACKS

As mentioned in the chapters so far, DSS is structured on a few different levels. Having now introduced the overarching purpose, principles, and development of its diverse learning community, we will dive deeper into the Tracks and Projects themselves.

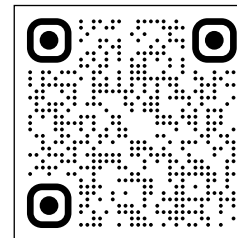
To reiterate, the projects you will read about have multiple purposes. They aim to contribute to the Track's growing body of research, which takes place over a two-year period.

However, the other vital purpose for the projects is to present each trainee with new methodologies, skills, and mind-sets for working towards a sustainable world. As such, the process of researching, brainstorming, and prototyping within the project's group can be the most valuable learning experience. Many of us had to rapidly develop skills from scratch to enable us to

complete the vision of our prototypes, or refine our research and presentation skills so we could communicate effectively with our stakeholders. Therefore, each team's journey was different, which is why we present the accounts of these projects in no particular order.

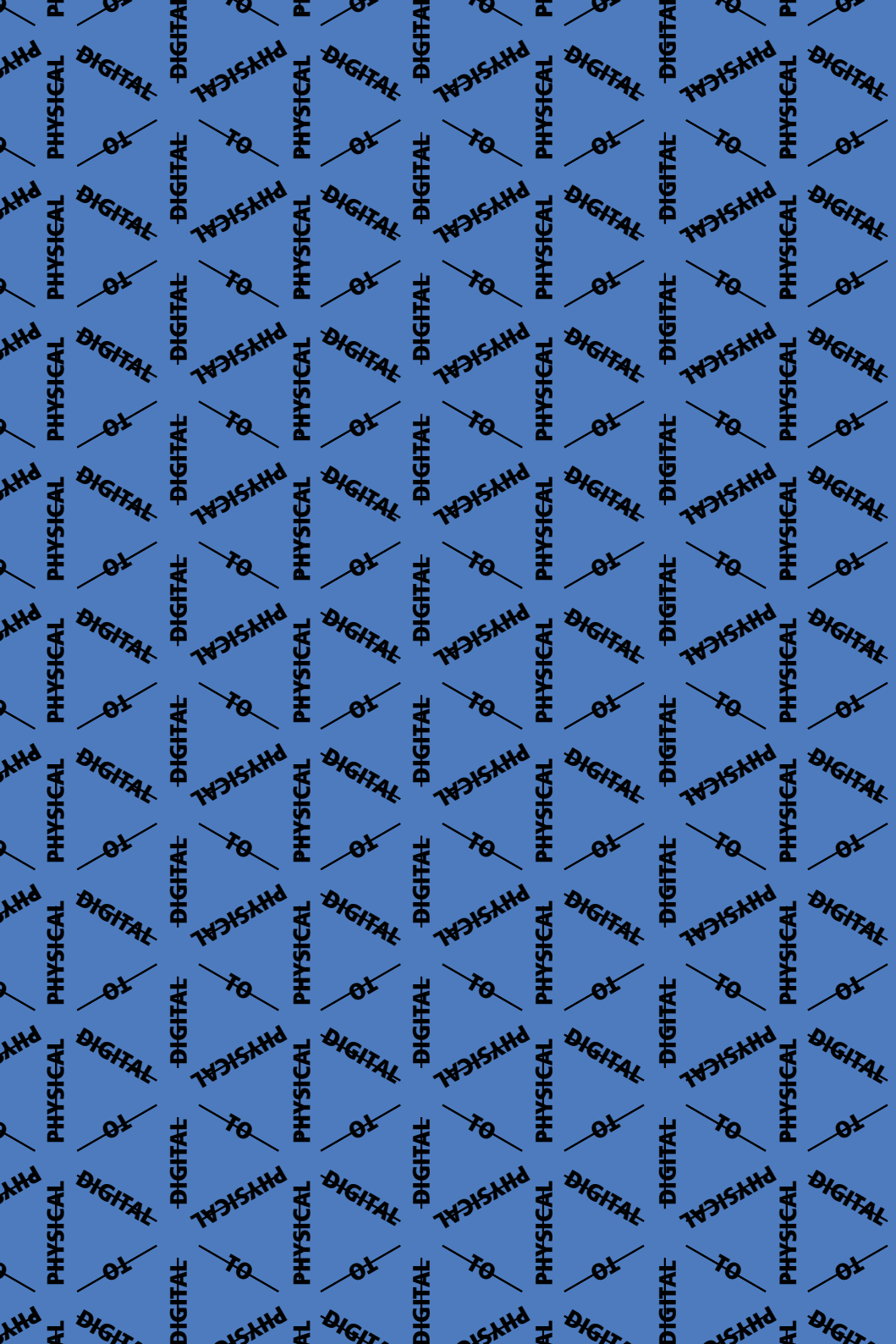
If you would like an overview of our output, you can view our showcase video. Otherwise, please enjoy the following collection of stories, insights, and experiments.

*If you would like  
an overview of our output,  
you can view our showcase  
video by scanning  
the QR code below.*



# DIGITAL TO PHYSICAL





## DIGITAL-PHYSICAL LOOPS

Generally speaking, digital information that represents aspects of the physical world can be collected (e.g. through smartphones or sensors embedded in the environment). Thus, our physical actions, such as where we drive or walk, have an effect on the digital world where such actions get recorded, aggregated, and interpreted. Conversely, this digital information can then be fed back to users and can influence our actions in the physical world. A digital-physical loop is created. Our road behaviour gathered through smartphones enables live traffic, and rerouting suggestions. This, in turn, influences our actual behaviour (see also Macfarlane, 2019; Weckert, 2020).

Navigation apps are one clear example of how our digital and physical worlds are interconnected. The popular augmented reality game Pokemon Go, where players are tasked with finding virtual monsters who's location is tied to real-world places, is another example of how our behaviour in the 'real world' can be influenced by the digital realm. Since the widespread adoption of the Internet, and in particular the onset of mobile Internet, we have seen an increasingly strong merger of our digital and physical worlds. Nowadays, one has to make an effort to find products that do not in some way connect to the Internet. There are 'smart' doorbells and diapers, 'smart' ovens, blenders, shoes, jackets, rings, there are even 'smart' dumbbells. When we collectively buy into the 'smart' trend,

digital-physical loops become ever more integrated parts of our daily lives. The digital, rather than the physical world is often our primary source of information. Surely you have checked the current weather on your mobile device, rather than looking out the window?

While not all of these examples of digital-physical loops have an equally strong impact — though, note that their impact is not always immediately obvious — we are seeing a trend towards an ever more digitally integrated physical world. And this creates some serious challenges.

## MARKERS ON THE YELLOW BRICK ROAD

When we follow to yellow brick road of technological innovation it is all too easy to be placated by flashy apps and the ostensibly limited possibilities of the digital. However, when we pull back the curtain it is revealed that the ephemeral realm of the digital is in fact made possible by a vast physical infrastructure of ocean-spanning cables, cell towers, data centers, and devices. Not to mention a vast mining industry delving for rare earth minerals that put the 'silicon' in The Valley.

The complexity that emerges when digital and physical merge provides serious challenges for designers, businesses, policy makers, and society at large. Solutions to problems that may seem simple on the surface, are anything but simple. Take the humble book, for example. The pages in books are made of trees and cutting down trees is

generally a bad thing, everyone would agree. Lo and behold the eReader. Treeless, pageless, inkless and thus a 'sustainable' solution. Or so it would seem. From the silicon in the device to the servers necessary to make digital copies of books available, eReaders and eBooks too, have an impact on our environment. Responsible innovation in printing and consumption of books thus requires careful consideration, rigorous research, and creative solutions.

Our social environment, too, is subject to being influenced by the merging of digital and physical. Since the introduction of the personal computer the digital divide has been a topic of research and debate. The notion that those with no, or only limited, access to digital information are now at risk of being excluded from important parts of society is all too real. Now, with smartphones, social media apps, and online government services, the question of who has access to what is all the more important. A pressing question to designers, then, is how to ensure that, if a digital technology is considered as a solution, it does not exclude certain groups of people. This question is all the more salient in environments and with populations that pose specific challenges. Forensic mental healthcare, where staff and therapists work tirelessly with patients with serious mental conditions, is just such an environment. In forensic mental healthcare offenders are treated with the aim of having them be reintroduced into society eventually. Yet our digital society moves at breakneck speed and it is difficult for forensic mental healthcare clinics to keep up with the speed

of technological innovation. Inclusive innovation thus becomes a relevant topic of investigation.

Digital technology can also contribute to solutions that may not always seem obvious. At times a more-than-human design perspective, where not just humans are considered the benefactors of a design can be eye-opening. Consider this: we humans share our cities not just with each other but with a large variety of animal and plant life as well. Animal and plant life that, in some cases, is vital to our existence. Pollinating animals, such as bees, provide an important function in that they help pollinate crops on which we depend for food security. Due to the use of pesticides rural areas are in fact more hostile to pollinators than urban environments are. Thus, there is an opportunity to create designs that help pollinators thrive in urban environments. When carefully designed in collaboration with relevant stakeholders, such as owners of rooftop gardens, digital technology can be part of these designed solutions.

Taken together, the merging of digital and physical is present in our products, social institutions, and in the cities we live in. It is important to be aware of digital-physical loops that can impact our behaviour, of the hidden infrastructure of digital technology, and of how such technology can impact not just humans. The projects presented here clearly showcase not just this awareness, but how to act upon it, too. See these projects, if you will, as road markers along the way to responsible digital-physical innovation.

Gijs Huisman,  
Digital to Physical Senior Track Associate

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# MINDSET SHIFTING AS AN INNOVATION PROCESS

By Natalia Agafonova

Project	Augmented Printing
Coach	Mick Jongeling, Digital Transformation Designer
Team	Batuhan Köksal, UI Designer Leonardo Almeida, UI Designer Minatsu Homma, IT Consultant Natalia Agafonova, Graphic Designer
Partner	A&O Grafimedia Fonds
Topic	Introducing adaptive mindset to the printing industry by connecting the stakeholders and providing facilitation methodologies

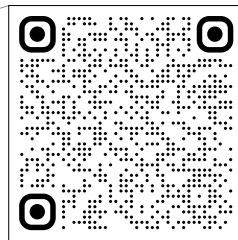
'Local to Global' is the beloved approach of Digital Transformation Designers. We try to make a local change that will impact the global situation. In practice it means solving tangible issues to contribute to the United Nations' Sustainable Development Goals step by step. To make those steps quickly we need to learn from each other and our past projects so as not to reinvent the wheel every time, but to question whether the wheel is really the best solution to the particular design challenge.

In partnership with A&O Grafimediafonds (Work and Education fund for the printing industry of the Netherlands) our team worked on the 'Augmented Printing' project. In this chapter we shall share the lessons we have learned from the Dutch Printing Industry, moving from the challenges that traditional industries face, to our digital transformation solutions (which do not always have to be digital).

## MEANINGFUL DIGITAL TRANSFORMATION.

To design responsibly is to design efficiently. Only necessary objects, services, and online platforms should be created to minimize waste and resource usage. Digital technologies can greatly contribute to pollution since they cannot operate without servers, which require energy resources. Therefore, as digital transformation designers, we must

*To learn more about digital emissions follow the QR code to read the 'Is It Really Sustainable?' report, written by Mick Jongeling, Ilaria Zonda, and Anneke van Woerden from DSS.*



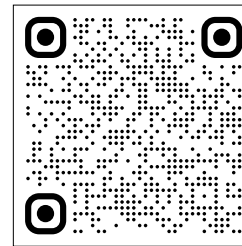
consider the environment before potentially designing a superfluous product or service. Throughout our project, we questioned whether a digital solution was really necessary in order to tackle our design challenge.

To avoid waste our team began the project by questioning the assumption stated in the brief as follows;

*How could we combine the strengths of print and digital media to contribute to a better sustainable industry and more meaningful storytelling?*

To test the brief's assumption we interviewed a variety of stakeholders across the graphic industry to gain insight into the inner struggles of the printing business from both the client and the suppliers' perspectives. We presented our prototypes of the potential digital to physical technologies to these stakeholders to analyse the reaction of the industry on such technology.

*To learn more about currently available digital to physical technology, read our team's report by scanning the QR code.*



Printers, paper suppliers, designers, and innovation specialists interviewed by us, came to the conclusion that the market is not ready for such technology, and the issues they experience have very little to do with digital to physical transition.

To gain a full understanding of the scope of the problem, we created a map of the global and local influences on the Dutch Printing Industry (see figure 1). We saw many specific issues which are particularly hard

to influence, such as EU regulations, industrial features of various printing techniques, and so forth. However, we identified a point for potentially large impact within the issues many traditional industries were known to struggle with. Namely, communication and the 'traditional mindset', defined by a desire to learn once within a life-time, rather than a life-long learning mentality. Both problems could be tackled without inventing a new printing method or changing EU regulations. Improving communications would allow printing companies to better listen to their clients and suppliers, offer more suitable advice for their customers, and promote themselves and the sustainability of their printing more effectively.

Shifting the mindset of the field from traditional to innovative would allow businesses to;

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**Improve** the inter-team interaction

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**Overcome** enterprise obstacles quickly and independently

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**Experiment** more

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**Obtain** a reputation as a future-driven industry which is promising for younger employees.

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With this newly acquired knowledge we moved on to redefining the problem statement. Focusing on our two identified points of most impact we shifted our direction from augmenting the printing products to enhancing the communication

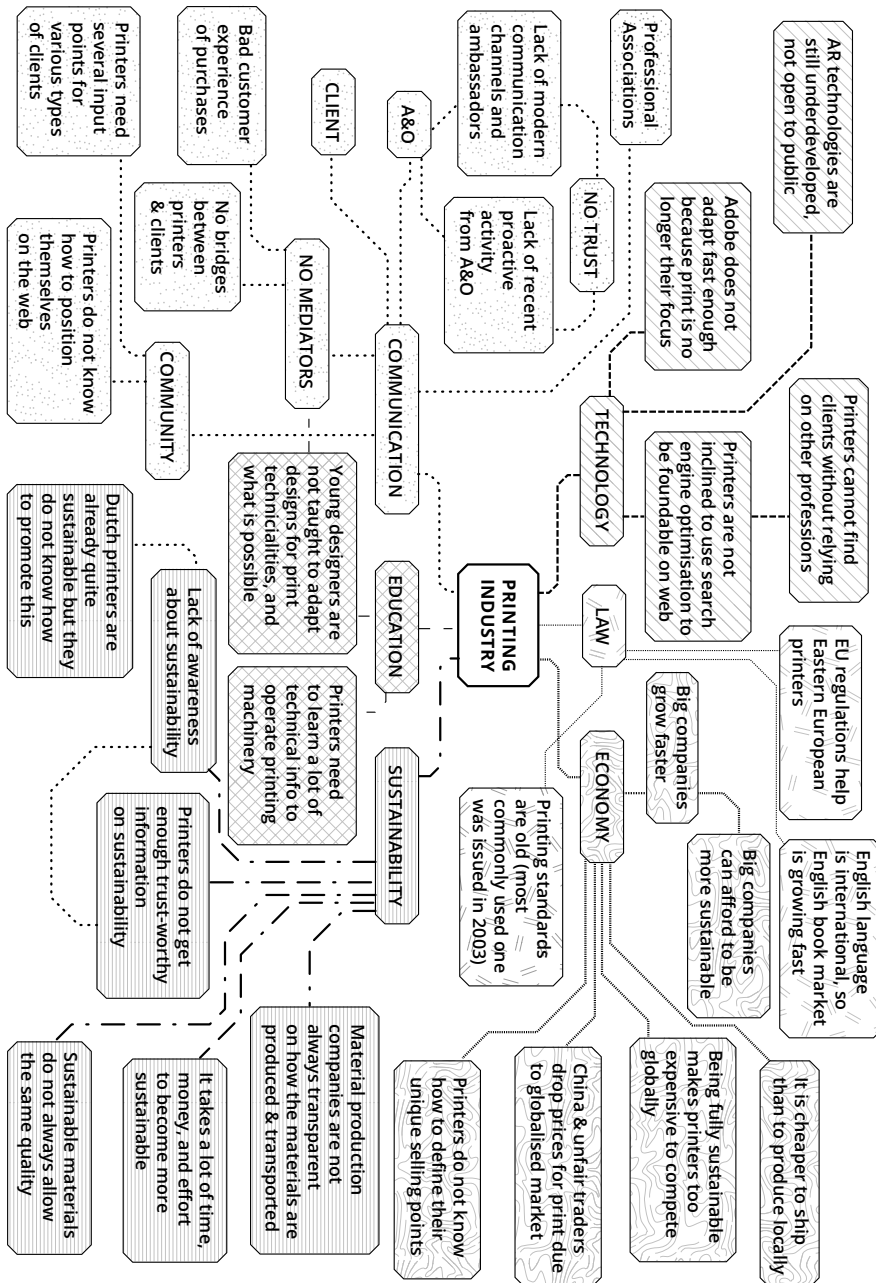


Figure 1: A map of global influences on the Dutch Printing Industry

between graphic media industry stakeholders, and shifting the mindsets of the professionals involved in this traditional business.

The majority of quick information exchange within the printing industry happens online, and printing companies have admitted to struggling with their online presence and relations. Therefore, to understand both sides of the communication process, we interviewed the designers and the business owners actively engaged in printed media to gather the most common difficulties they were facing while making a printed product order. The results of our research showed three main issues reported by all of the interviewed professionals. The first problem was a lack of effective marketing and information transparency, caused by the difficulty for clients to find printing companies and to understand what these companies have to offer in terms of technologies, paper, sustainability certification, speed, and so forth. The second complication was a misunderstanding between the stakeholders, since most of the designers found it difficult to express their wishes about the final product to the printers. The designers and the printers seemed to agree that they spoke different languages and thus were in need of mediation. Finally, there was a problem with inefficiency of communication, as the speed of correspondence from printers left most of the designers dissatisfied. To mitigate these communication issues we proposed an online mobile application to act as a hub, uniting paper suppliers, printers, and designers/clients.

See the full prototype of the hub app by scanning the QR code:

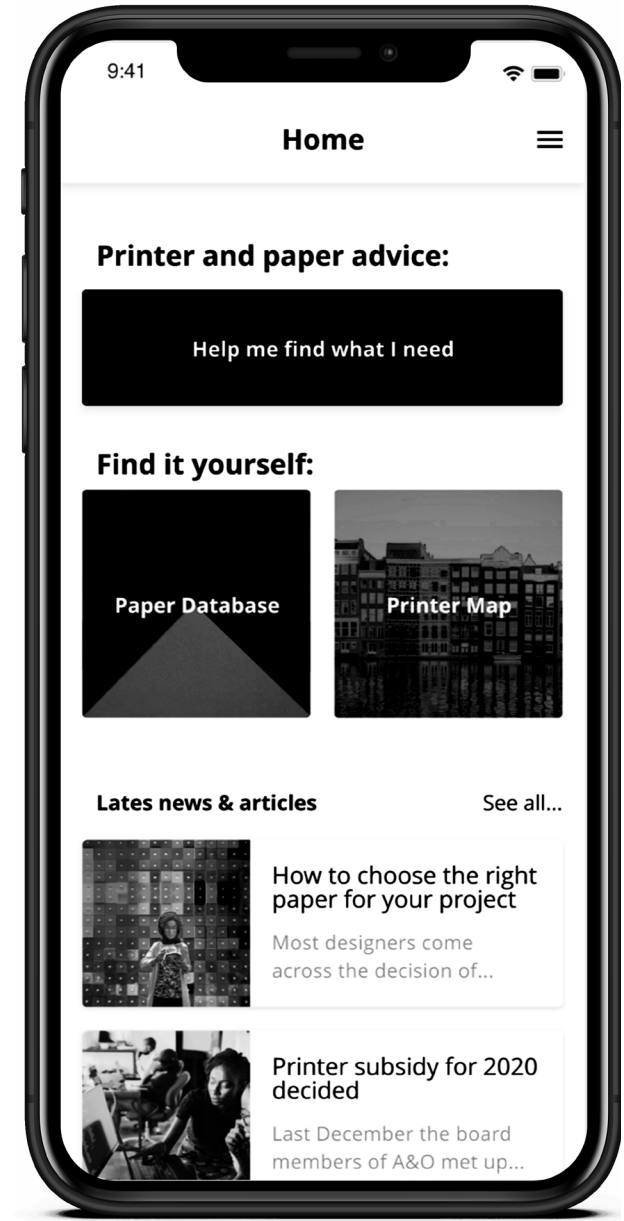
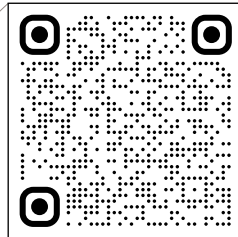


Figure 2: Hub-app concept. Home page

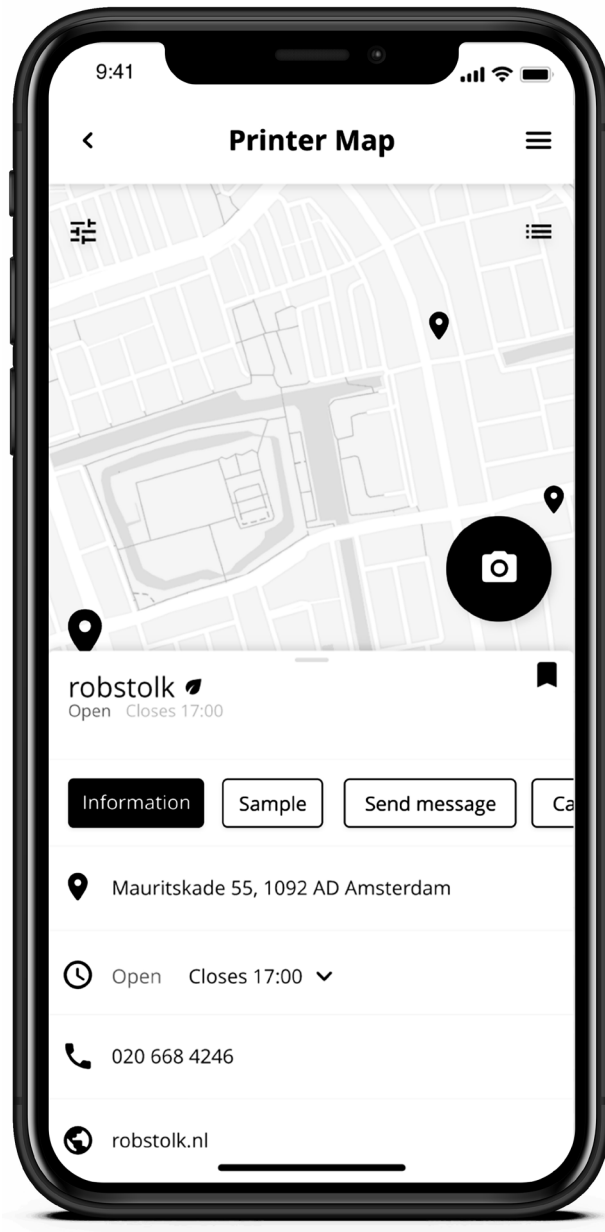


Figure 3: Hub-app concept. Printing company on the map

To illustrate how our app (*figures 2–3*) aids with the above-mentioned problems, let us go through a user journey of the app we proposed. Imagine you are a graphic designer who wants to order a book. You want to print it locally so you can visit the printer by bike, you care about your environmental impact, and a quick turnaround is important for you. You can open our app and filter the printing companies according to these requirements. You can see the results as a list or on the map. You've printed with one of the companies before, so it is starred on your list as a favourite. You can tap a chosen printer to go to their profile and get detailed information about their opening times, paper suppliers, their machinery, and more. Or you can go straight to the chat with the chosen printer, where you can easily converse and exchange files. You have just found a fitting printer for yourself within minutes instead of hours of searching and repeating your questions.

But what if you do not know what paper you would like your book to have? Then you could use the apps filters to pick paper specifications, including paperweight and approximate colour on the colour wheel, so you are shown all the suitable papers that are supplied to the Netherlands. Every paper type has a profile that shows more information about the stock including sustainability certificates, photos of the paper, products executed with it, where it was produced, and which wood types were used in its production. In case you do not know what paper to pick, you can also use the paper wizard, where after



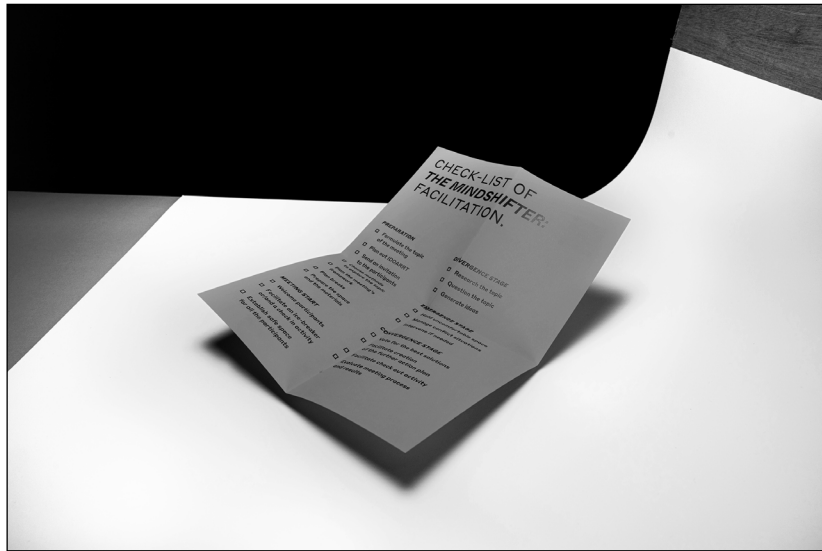


Figure 4: A check-list from the MINDSETSHIFTER Toolkit.



Figure 5: Method cards from the MINDSETSHIFTER Toolkit.

answering several simple questions you'll get a selection of the most fitting papers for your job.

Once you have picked several papers you can fill in your Chamber of Commerce identification number and order physical samples of the chosen papers. Only authorized professionals are allowed to order paper samples, and they are limited in the amount of sheets per month to avoid people ordering paper without real need for it.

We believe that this app would increase the speed and quality of the inter-stakeholder interactions by solving all three above-mentioned communication issues; the app will ease data filling for the printers, and information searching for the customers.

As a printing company, you could benefit from the app by decreasing your volume of client communication as all the basic information about your business is already presented on your profile. You can focus on your unique selling point and attract clients for whom it will be relevant, without having to constantly update your website and social networks. By easily finding clients who match your business philosophy you will be able to satisfy their needs better and thus have a higher customer return rate.

Shifting the focus of the digital transformation from enhancing the printing products to improving communication between stakeholders through a hub app could significantly improve the life of the printing industry. However, as digital transformation designers we aim to maximize our impact and minimize design waste. Therefore, we extracted the lessons from our research and began imagining how we could apply them on a larger scale.

## LOCAL TO GLOBAL: LEARNING LESSONS FROM THE PRINTING INDUSTRY

Educators, business coaches, and scientists claim adaptivity to be a necessary skill for every business and individual to thrive in the 21st century. To adapt means to react promptly to the changes in the world, to adopt an agile and innovative way of thinking and working. To be able to do so one needs to overcome their traditional mindset, defined by the habitual thought paradigm of an archaic set of values in which education is seen as a once in a lifetime practice performed before the start of a professional career. Such a mentality can be a severe obstacle on the path towards adaptivity. Having encountered a strong resistance to change among printing professionals — due to presumed complexity of the new methodologies and their unfamiliarity with the available resources — we decided to create a resource capable of introducing any willing beginner to more adaptive, agile, innovative, fruitful, and enjoyable working processes.

Among all the possible outcomes suitable for self-education, we chose to make a toolkit because it suited both beginners and intermediate users. The toolkit was attractive as a medium because of its modular structure, allowing users to pick which methods to learn and at which pace. Even when familiar with all the methods, users can re-use the toolkit as a reminder or as a teaching material to train others. A user could easily bring a method card to a client meeting, or pin a check-list to a project board both digitally and physically.

A potential disadvantage of the toolkit would be its structural complexity, leading to the reluctance of a new user to engage with it. This drawback, however, could be eliminated with clear instructions and structure simplification. Therefore, we found the toolkit to have the most suitable form with which to approach our project goals.

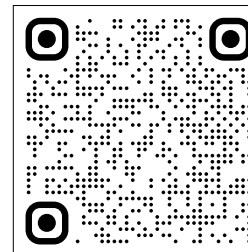
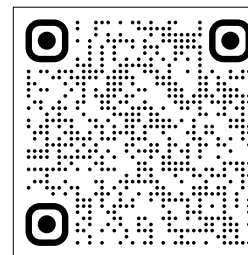
We created a MINDSET SHIFT Toolkit (figures 4–5) which is a beginner-friendly instrument designed to aid a professional or a business to take the first steps towards an innovative, adaptive working process. Our toolkit includes a selection of the best methods available for teams and individuals to improve the inner-company communication, project-

management, and meeting facilitation.

The toolkit is structured in two sections: there are two check-lists, each with a selection of methods mentioned in the check-lists. The sections are 'Facilitation' and 'Team & Project Management'. One can simply follow the check-list to innovate their way of thinking about their business. A set of cards explains every method used in the suggested steps of the congruent check-list. Within several hours, a combination of the check-lists and the cards creates a system of methods that prepare a team or an individual for an innovative and agile way of working.

At Digital Society School we believe that innovation is impossible without a dialogue and that varying

Scan the QR codes below  
to download  
the 'Facilitation' and 'Team  
& Project Management'  
check-lists:



perspectives are needed to invent a ground-breaking product. Therefore, we focused our beginner-essential methodologies on the design and facilitation of activities and spaces for people to discuss, co-create, reflect, and give feedback. The toolkit includes methodologies of Hyper Island, Digital Society School, 'The Art of Hosting Conversations that Matter' community, and SCRUM methodologies adapted for creative iterative processes. To stimulate further self-development and credit the authors of the methodologies, the cards include references to the globally recognised resources, with more information on the topic of the particular method.

By enabling the printing professionals to adopt the new adaptive mindset in combination with design methodologies we hope to help businesses promptly respond to rapidly changing circumstances in the global situation, enjoy a more efficient workflow with a minimal time waste, and build stronger relationships between the team members.

## SHIFTING MINDSETS

As designers our team hopes to change the world with our work in the future and as such, we saw research and design processes as the only way to get there. Thus our team was pleasantly surprised to hear our project partners say that their mindsets had been shifted even before our final project outcome was presented. Throughout the project they had been actively engaged in the design process through co-creation sessions

and collaborative workshops, which we had designed and facilitated for them. They observed our working approach and work ethics, learned together with us, and transformed throughout the process. We discovered the value of active participation in an innovation-driven design process for a client.

Here are some of the comments our project partners have made:

**“GREAT ACHIEVEMENT AND PROUD TO BE PART OF THIS GROUP OF YOUNG PEOPLE AND HAPPY TO WORK AGAIN WITH THE DIGITAL SOCIETY SCHOOL.”**

— Jeroen van Dreunen

**“TONIGHT I VISITED DIGITAL SOCIETY SCHOOL. IN COLLABORATION WITH A&O THEY HAVE LOOKED AT GRAPHIC INDUSTRY IN A DIFFERENT WAY. VERY INTERESTING TO SEE HOW THE TRAINEES LOOK AT 'US'.”**

— Remko Schouten

**"THE PROJECT DONE WITH THE STUDENTS OF HVA BROUGHT US A LOT OF NEW INSIGHTS. EDUCATIONAL AND MOTIVATIONAL! INNOVATION MUST HAPPEN...THERE IS NO WAY BACK."**

— Richard Leloux

## LESSONS YOU CAN TAKE AWAY FROM OUR PROCESS

**Products** should be designed only when there is a need for it to keep human and planet resources from being wasted.

**Testing the assumptions** stated in the design brief provides the chance to redefine a brief when there is no proven problem to solve. This approach gives the opportunity to maximise the potential impact of the project.

**Communication efficiency** is very important in the service-driven economy. We should seek ways to help businesses increase the quality of their customer and inter-stakeholder interaction.

**Adaptive innovation-driven mindsets** allow for faster responses to rapidly changing factors, and more efficient time, team, and project management.

**Involving clients** in the design process allows them to benefit from the project more by expanding their perception.

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# JUSTICE IN THE DIGITAL SOCIETY

By Andrea Nesta

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Project	Justice in the Digital Society
Coach	Dan Xu, Digital Transformation Designer
Team	Andrea Nesta, Systemic Designer Francisco Palavecino, Business Developer Gideon Asamoah, UX Design Student Line Sandborgh, Product Designer
Partner	The Dutch Ministry of Justice and Security
Topic	A design-driven exploration of the digital transformation opportunities for the forensic care sector of the Netherlands

# HOW DID THE PROJECT COME TO BE?

The Dutch Ministry of Justice and Security is responsible for stimulating innovation in the practice of justice in the Netherlands. The Ministry thus partnered with the Digital Society School (DSS) to carry out this 20-week long research project in collaboration with the Oostvaarderskliniek (OVK), a forensic mental healthcare clinic where all the on-field research was carried out. These OVK facilities take care of the rehabilitation process for ex-convicts who suffer from mental disorders, ensuring their safe reintroduction into society.

The initial brief was co-written by DSS and the stakeholders from the Ministry and the OVK clinic. This document presented the team with some broad research questions regarding the relationship between caregivers, technology, and the need for change and innovation within the project scenario. Central to these questions was an understanding of the mindset of the caregivers, their needs and their wishes in terms of technological innovation in the clinic.

In order to better understand the users of this project and get familiar with the complex context of forensic mental healthcare, the team employed a diversified and participatory design approach to empathize with, and involve the caregivers directly in the project development.

The project developed in these 20 weeks took the shape of a guide to innovation for the stakeholders, which looks at the near and distant future of the clinic and how digital

transformation could create positive impact in both time frames.

The first part of this guide illustrates insights and analysis from the team's initial research. This research was carried out at the OVK using various design methods such as interviewing, cultural probing and co-creating (which will be described more in the further pages). It depicts the current state of the clinic with regards to its potential for transformation and their near future opportunities with available technological developments.

The second part discusses which future technologies and trends the field of forensic care can expect to see. A speculative design approach informs the reader of how various probable scenarios can affect the clinic in the future, and aims to inspire a mindset for positive and meaningful innovation.

## THE PRESENT

### THE FIRST CONTACT WITH THE CLINIC

When first coming into contact with the project brief and scenario, the team had to get to know a professional and cultural environment that none of the members had direct professional experience with before. The forensic mental healthcare system — known as "terbeschikkingstelling" or TBS in the Netherlands (TBS Nederland, 2019) — is a rehabilitation process for ex-convicts which happens as part of their sentence, usually after

serving time in prison. This practice is carried out through several facilities in the country, with the patient's disorder(s) and expected rehabilitation time ranging vastly. Many of these patients also committed serious abuses and violent crimes, thus they may have been living within the prison system for decades without external societal contact.

From a design research perspective, the first approach to this environment was therefore very cautious, as it was fundamental to establish the medical needs, the security requirements, and the ethical implications of any intervention in this complex project scenario. For this purpose, alongside building the initial necessary knowledge through desk research, the team made it a priority to create as many opportunities as possible to have direct interactions with the clinic, the caregivers, and the stakeholders of the project.

## **UNDERSTANDING THE SCENARIO**

The team conducted a first session of interviews with five caregivers of the OVK, ranging in occupation from social workers to teachers, who volunteered to take part in the project. This first contact was essential to get to know how their daily life inside the clinic, their back-story, and some of the stress points from their work routine.

While it would have been ideal to conduct observations of the caregivers while they were in the field, the specific safety regulations required in the clinic made this impossible. To achieve a similar 'insider' perspective on the daily life

of caregivers the team designed a kit of cultural probes (Gaver, 1999).

Seven participants, some of whom had been part of the interview round, were asked to use the kit at their own convenience for a period of ten days so we could gather more insights about them. The kit was customized to the users and what we wished to learn about their roles. We decided to include three different methods in the kit; a journal, a sketching kit, and a map of the clinic. The kit also included markers, pens, stickers, a set of instructions and a DSS tote-bag as a thank you. We aimed at developing a kit with a crafty and playful design so the participants would feel at ease about the tasks and inspired to complete the kit. At the same time, we wanted to keep a level of professionalism and encourage the users to take the task seriously. The result was a kit consisting of varying colours with minimalistic design attributes. The fonts were kept simple, and instructions were open and short so the users would feel free to interpret the questions in their own way.

The outcome of this approach was mixed. Of the seven participants, only four had completed all of the activities included in the kit. However, the completed kits proved to be of particular research interest to the team. They provided an intimate insight into how the respondents perceived their work environment, colleagues, daily challenges, and private life, to a degree which would have been difficult to achieve with a face-to-face interview or a survey.

# PARTICIPATORY DESIGN

## CO-CREATION SESSION I

In parallel to the cultural probes which had already been handed out, we decided to employ a participatory design approach with the caregivers at the clinic. This decision was supported by two main aspects; we wanted to test the mindset of the caregivers towards technology in a more practical way, and we wanted to encourage the caregivers to be an active part of the innovation process. Hence, we designed two co-creation sessions which were held directly in the facility with two groups of caregivers.

The first co-creation session was designed to critically assess the users' level of understanding and familiarity with current technological tools and solutions available in similar facilities around the world. The group consisted of a teacher, a senior and a junior drama teacher, two psychologists, and a member of the innovation office. Initially, the participants had been asked to describe what technologies they already employed in their daily tasks at the clinic, and what they expected to change in five years from the present. Although the caregivers had few opportunities to interact with innovative technologies inside the clinic to date, they were aware of all the technologies presented to them ((Virtual Reality (VR), Artificial Intelligence (AI), Robots, Smart Environments, Body Implants) and claimed to feel at least knowledgeable with most of them.

For the second part of this session, we divided the group into pairs, and asked them to imagine suggestions for future technology that they would like to have implemented in the clinic in the future. We encouraged them to create prototypes of technological solutions, using different materials such as paper, pens, markers, and LEGO pieces. These prototypes, besides denoting a positive attitude towards innovation and inventive solutions from the participants, uncovered some very different approaches to the treatment of patients between different caregivers. These approaches mainly differed between a control-oriented and trust-oriented relation between caregiver and patient.

## CO-CREATION SESSION II

**“A LOT OF MY MOTIVATION FOR WORK COMES FROM MY FEELINGS. [...] A ‘GUT FEELING’ IS ESSENTIAL TO DO MY JOB.”**

**“THERE IS A HUMAN URGE TO HELP ANOTHER PERSON. TECHNOLOGY, IN THIS CASE, MAKES IT ‘COLD’...”**

— Quotes from caregivers collected during the co-creation session II



For the design of the second session we used a different approach. Experimenting with an unusual method, we created a 'provotype' (see figure 1). In order to create this 'provotype' we embarked on an intense brainstorming session as a team. While many ideas were suggested, we ultimately decided to build a pair of "No-Filter Glasses."

This two hour co-creation session took place at the facility with four participants: a social therapist, a social culture worker, a member of the stakeholder board, and a representative from the administration team.

A 'provocative prototype' (see figure 1), or 'provotype', is a design artefact used to spark a discussion among users and stakeholders (Haverinen, 2018). It is designed to stir up feelings and push emotional reactions from the participants.

We presented caregivers with the following setting; hypothetically, the new device is going to be implemented in the facility in about two weeks as a pilot project, and the caregiver would be assigned as the tester. The mixed-reality visor would be worn by the caregiver at all times, accurately sensing health and behaviour information about the people in front of them in real-time. This information would be displayed privately to the eyes of the caregiver, augmenting their vision with the information overlay. We proposed four different scenarios where we tested the caregiver's reaction while they were wearing the 'No-Filter Glasses', acting in pairs in a sort of role play. We presented the caregiver who was wearing the glasses with a transparent overlay which showed statements like "the device says that your colleague is lying to you" or "the blood pressure



Figure 1: The Provotype

of the violent patient in front of you is rising dangerously". On purpose, in each scenario, we put participants in extreme, awkward or challenging situations combining the interaction of common daily events and the new device they would be using in that context. We asked the participants to immerse themselves in the fictional scenario and express their emotions, doubts and thoughts freely.

This role play exercise sparked an in-depth conversation about many topics such as privacy, useless data, equality, and transparency (see above quotes). Furthermore, it created the opportunity for the participants to interact with us about the device's future improvements, changes, and what it would look like in an ideal scenario.

## DESIGN FICTIONS

The insights we gathered from the co-creation sessions encouraged us to design a similar meeting with our stakeholders, in order to involve them

directly in the evaluation of our findings and allow them to elaborate in an interactive manner.

We made design fictions to generate insights through a speculative narrative of a possible future. The reason for this was to converge our insights from the co-creation workshops, the interviews, the cultural probes, and the desk research we had conducted. In this case, it was an effective tool to use because we discovered multiple points of innovation we could tackle.

We created small video prototypes for each of the three main themes we wanted to focus on. These themes were; control vs. trust for patients, communication between caregivers, and 24/7 treatment. We wanted to give an inspiring future vision of the clinic, creating three corresponding scenarios; total restriction for patients, AI for caregivers, and AI for patients.

We created three hypothetical extreme situations, testing the stakeholders' reactions during the vision of the videos and opening a discussion about the scenarios with their benefits, challenges and ethical implications for the clinic and society.

## THE FUTURE

### HOW AND WHY DID WE LOOK INTO THE FUTURE?

The Future Scope (see figure 2) is a methodology developed by the Extrapolation Factory to guide the process of future visioning. It consists of different phases which gradually transform

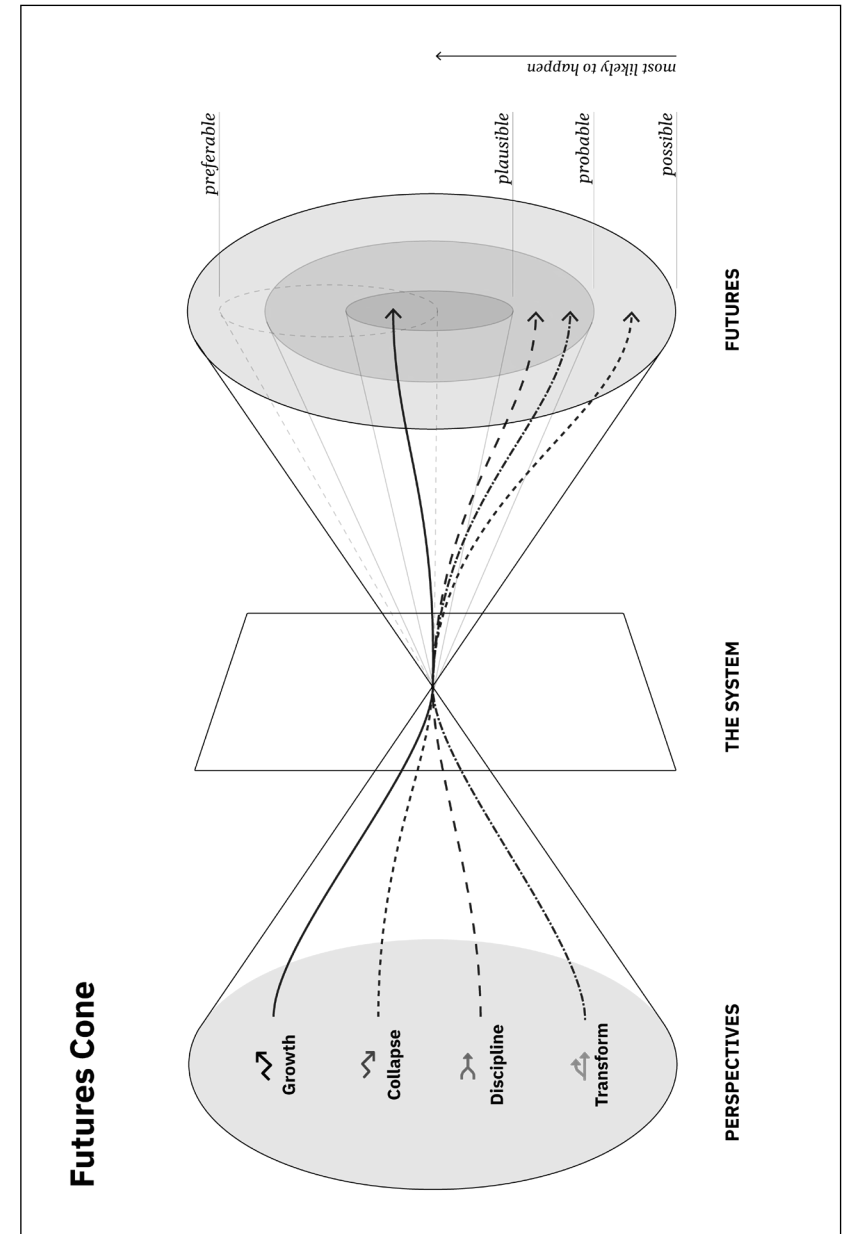


Figure 2: The Future Scope

an input from the present into a hypothetical future. The futures cone is a diagram that allows designers to visualize the likelihood of a course of events happening over time. At the centre is a context, which is interpreted through different perspectives. The result is a selection of the infinite conceivable futures, sorted by their likelihood; possible, plausible or probable. They can further be filtered subjectively as preferable or not, depending on individual values and wishes. These visions of the future go through a set of 'lenses' which allows better analysis and understand the impact of transformation in each scenario. By finding out the points of interaction in each lens, a more specific future narrative is constructed. At the end of the process the outputs are different hypothetical future visions.

To envision the future of our current scenario in different ways, we employed the 'four arcs' as a means to imagine separate and concrete developments:

- **Growth** — Crimes are fewer but still present in society. Rehabilitation of ex-convicts is almost flawless. Use of advanced technology in the treatment of patients. Technology supports and improves the current process.

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- Collapse** — There are almost no crimes happening. People are helped before they become a threat to others. All people are required to be constantly monitored. Justice is entrusted to a 'superior' artificial entity.

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- **Discipline** — Crimes increase due to unstable living conditions. It is impossible for ex-convicts to be dangerous anymore. A large decrease of the expenses due to less personnel. No direct contact between convicts and other humans.

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- Transform** — Crimes are fewer but still present in society. It is impossible for ex-convicts to be dangerous anymore. Patients only need to use a device, but it is possibly forever. Technology can control mind and body in favour of safety.

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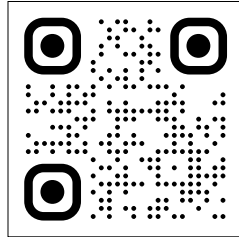
The scenarios we developed in the form of these four narratives were closely intertwined with the research we had done about upcoming technologies and disruptive trends for both justice and healthcare in the future. These four futures are designed to trigger strong emotions like approval or repulsion in different readers, depending on their own beliefs, values and desires. In this way, we hope these scenarios encourage decision makers to look outside the boundaries of their current perspective on the issues of forensic mental healthcare, shift their attention to the direction they want to go in the long term, and focus on the importance of a detailed innovation strategy to successfully arrive there.

# CONCLUSIONS

This project has shown how an alternative research methodology can be done within a forensic mental healthcare clinic. The collaborative sessions with the Oostvaarderskliniek were appreciated by the participants and showed that this type of research can contribute to meaningful insights about professional and personal struggles and prospects. Although more research on the clinic, caregivers, and patients is needed, the project did the groundwork for revealing what challenges and opportunities the clinic is and will be facing in the future. A deeper understanding of the core drivers for the caregivers on their job, the promotion of a more collaborative work environment between different professionals and transparent communication, and the adoption of new technologies in a more frequent but also more purposeful way, are some of the main insights we uncovered for a positive transformation in the clinic.

We wish for the final report we created to be used as a reference when future research and innovation projects are to be conducted within forensic mental healthcare or any similar field. As the report shows, the Oostvaarderskliniek is currently facing internal struggles and future technologies may enhance or diminish these. It is therefore important that the clinic prepares themselves for this and ensures that only the most proper and needed innovations are implemented in a correct manner. We recommend that the clinic

Scan the QR code to visit  
the Justice in the Digital  
Society website:



employs alternative research methods, such as cultural probes or co-creation sessions, to gain a deeper understanding of the caregivers' and patients' mindsets. An understanding of the end user is going to be the foundation for any successful innovation implementation process.

## SGDS THIS PROJECT TACKLED



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# URBAN ECOSYSTEMS — CITY BUZZ

By Aslı Erdem

Project	Urban Ecosystems
Coach	Ilaria Zonda, Sustainable Designer
Team	Vivika Ekman, Product Designer Aslı Erdem, Architect & Researcher Mudita Singh, Researcher Yiting Tang, Interaction Designer
Partner	Rooftop Revolution
Topic	Introducing an online, bee-friendly community to increase the number of pollinators in urban ecosystems

Ever wondered how big cities can play a significant role in pollinators' lives and conservation?

Pollinators such as birds, insects, and in particular bees, help agricultural plants to reproduce. In fact, nearly 75% of crops used for human consumption are dependent on pollinators (Food and Agriculture Organization of the United Nations, 2020). However, the number of bees is in serious decline all over the globe, according to the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services. In addition, in the Netherlands, over half of the 360 bee species are on the high-risk extinction list (Bed and Breakfast for Bees, 2018). This problem needs urgent attention since it affects our entire ecosystem and our means of food production.

Urban Ecosystems was a design research project developed by Vivika Ekman (Sweden), Asli Erdem (Turkey), Mudita Singh (India), and Yiting Tang (China). The team collaborated with industrial partner Rooftop Revolution who are “an independent foundation and act as an expert, advisor, process supervisor and intermediary in sustainable roof projects” (About Rooftop Revolution, 2020). The project focused on possibilities for citizens to be an active part in making the cities green and helping pollinators — especially bees since they are the most effective means of pollination — thrive in ‘urban ecosystems’. The aim was to identify what role technology plays in spreading the message of sustainability and measuring the impact of the team’s developed solution. As such, we worked

to create an online bee-friendly community dependent on citizens’ active participation.

Many people may think that urbanism and pollination are not compatible with human dominated cities. The popular opinion seems to be that bees belong to rural areas rather than big, crowded cities. However, with the right mindset, knowledge and tools, it is possible to integrate natural life to big cities’ urban texture.

According to the United Nations, by 2030, approximately 60% of people will be living in urban areas all around the world and one in every three people will live in cities with at least half a million residents (UN DESA, 2016). With this fact in mind, we believed it was essential to begin informing citizens about their responsibilities to urban biodiversity, and began developing high-tech tools to help citizens increase pollination in their area. This goal aligned with the rising global urban gardening trend, in which people use their outdoor spaces like gardens, balconies, and rooftops in the cities to grow plants (Simon et al., 2013). These outdoor areas are beginning to be used to create healthy, environmentally friendly, sustainable spaces rather than just for aesthetics or recreational purposes.

## RESEARCH

The team began by researching the size of the rooftops suitable for urban gardening and how citizens make use of these spaces in Amsterdam. The green roofs were analysed using the data from

the Municipality of Amsterdam (Green Roofs, 2020). From the map it was clear that many of the green roofs in Amsterdam are sedum roofs which consist of grasses, mosses, and succulents. However, these sedum style roofs contribute less biodiversity in comparison to other types of green roofs such as biodiverse nature roofs, rooftop farms, water retention roofs and so on (Rooftop Revolution, 2018). Due to this lack of biodiversity, the sedum roofs are not the best option to help the pollinators forage and survive. Moreover, in the data collected from the Municipality of Amsterdam, we could see that there are lots of potential empty spaces that could be used as green rooftops in Amsterdam. Leeuw states that the unused flat roof spaces were equivalent to 4000 soccer fields in the city of Amsterdam alone (van Schagen, 2014). Therefore, Amsterdam had a great potential to increase the pollination activity in the cities, as certain steps could be taken in order to build biodiverse green roofs instead of sedum ones.

## THE SEED CAMPAIGN

After analysing the context, we decided to test citizens' interest in building green outdoor spaces, helping the ecosystem and pollination. As such, we would see if it was possible to make citizens take action with the right information and tools. As part of this investigation, we started a bee-friendly seed campaign which invited people around the HvA Amstel campus to be a part of the change. Posters and little seed-packs were distributed at Kohnstamhuis, Theo Thijssenhuis and Studio HvA (see figures 1&2).



Figure 1: Seed Campaign Posters and Packages

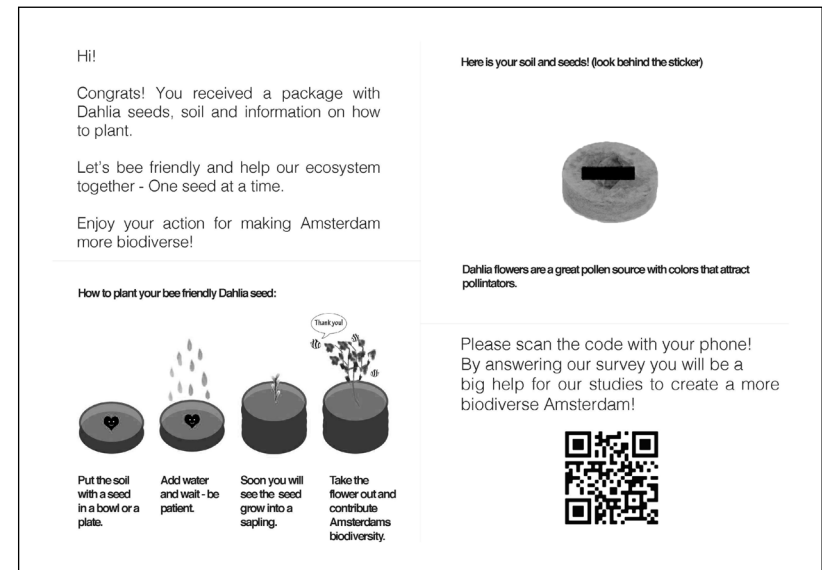


Figure 2: Seed Campaign Packages with Seasonal Seeds and Soil Tablets

As we aimed to reach a wide audience, the university was a great test-site because students and staff encompass diverse nationalities, ages, and backgrounds. Moreover, we thought it was important to inform the younger generations about the significance of planting biodiverse flowers and help the ecosystem now, since they will probably have their own outdoor spaces in the future. The packages, which were designed to attract attention using bright colours, contained a soil capsule and a seasonal seed (which was purposefully selected to attract pollinators) that people could plant anywhere by following the instructions in the package. In addition, there was a QR code that directed people to a survey which helped the team to understand people's interest in pollinators and biodiversity (see figure 2).

The participants who took the survey consisted of a small collection of both students and staff; ages ranged from 19 to 41. Of the people who completed the survey:

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**95%** of them said that they were interested in taking action to increase the biodiversity in Amsterdam.

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**They** also said that they would plant the seeds provided with the survey.

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**All of the participants** stated that they found the instructions helpful to plant the seeds.

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Additionally to the survey, a structured interview was conducted with volunteers. It was found out that:

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**About 50%** of the participants had independent houses which had the potential to have rooftop gardens now or in the future.

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**Most of them** had knowledge about the importance of pollinators in the ecosystem and wanted proper guidelines to maintain a garden.

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With the results from the interviews and surveys, we began developing a plan to encourage the citizens to build green rooftops and outdoor spaces which encourage biodiversity. To achieve this, it was necessary to test the citizens' knowledge and enthusiasm about helping pollination and biodiversity so we could come up with the best possible solution to encourage citizens. From the survey and interviews, we had found that providing seasonal seeds, soil and the guidelines to plant them, was a good method for supporting citizens to be part of the change in urban gardening and pollination.



## DEVELOPING THE DESIGN PROPOSAL

Due to the fact that there are many flat roofs remaining unused in Amsterdam, we decided to create a community that was aware of the declining number of bees and wanted to help increase pollination in urban areas. In order to see the effect on the ecosystem, a physical prototype was designed to attract the bees and collect data with machine learning technology. To spread the word among rooftop owners and citizens, we also designed a smart phone app which is connected to the physical prototype. Through this, we aimed to create a bee-friendly online community where the participants could learn about and contribute towards conservation of pollinators in the urban areas. Moreover, we came up with a game design for the app in order to add playfulness and friendly competition while helping the pollinators.

As such, our design solution consisted of two main elements:

1. A physical 'Artificial Flower' which can attract bees and count the approximate number of bees visiting citizens' gardens (*see figure 5*).
2. The City Buzz application which works together with the Artificial Flower to notify the users and build an online bee-friendly community while competing with each other by playing the game (*see figure 3*).

## CONCEPTUALISING THE ARTIFICIAL FLOWER

In order to attract the bees that inhabit urban areas, we focused on certain flowers which get bees' attention. The requirements of the physical prototype were identified through researching the most effective flowers for pollination. From the research, the team discovered that colour, symmetry, and pattern play a significant role in attracting bees. We used 'biomimicry', a design strategy which takes inspiration from nature in order to develop solutions to problems. This helped us to create the design of the Artificial Flower. We discovered that bees' sensitivity to the UV range of the colour spectrum is particularly significant for plant-pollinator interactions. Because of this, yellow UV colour was applied to the center part of our Artificial Flower. In addition, among the experiments conducted with bees, it is observed that they land more on radial patterns (Orbán and Plowright, 2014). The Artificial Flower was also designed keeping in mind that bees prefer symmetrical patterns, so the whole structure followed a symmetrical design approach (Orbán and Plowright, 2014). A daisy flower was used as inspiration for the radial pattern we developed for our flower. In order to build the model easily, DIY method was used and an instruction guide was prepared to achieve a low cost with sustainable production.

## TECHNOLOGY

We used Artificial Intelligence (AI) algorithm Teachable Machine — which is a web-based tool that can be trained to recognize images — for the recognition and counting of the bees (more info at [teachablemachine.withgoogle.com](http://teachablemachine.withgoogle.com)). The accuracy of the artificial flower was tested by showing the camera more than 300 different bee images. The City Buzz app was connected to the Raspberry Pi and Raspberry Pi camera, which works as a small-scaled computer. The Raspberry Pi camera acted as a bridge between the Artificial Flower and the app to send the data from the camera captured from the bees visiting the flower. This way, the app could show the bee visitors by notifying the users, creating an information flow between the Artificial flower and the citizens.

## THE CITY BUZZ APP: CONNECTING ROOFTOPS TO STREETS

While designing the physical Artificial Flower, we began to develop the concept of an online community that could work together with the physical element as well. As it is not possible to see the changes in the rooftops from the streets, we prioritised finding a way to connect the streets to the rooftops above. This way, it would be easier to create a strong communication between

Scan the QR code to visit  
the City Buzz app  
and explore more.

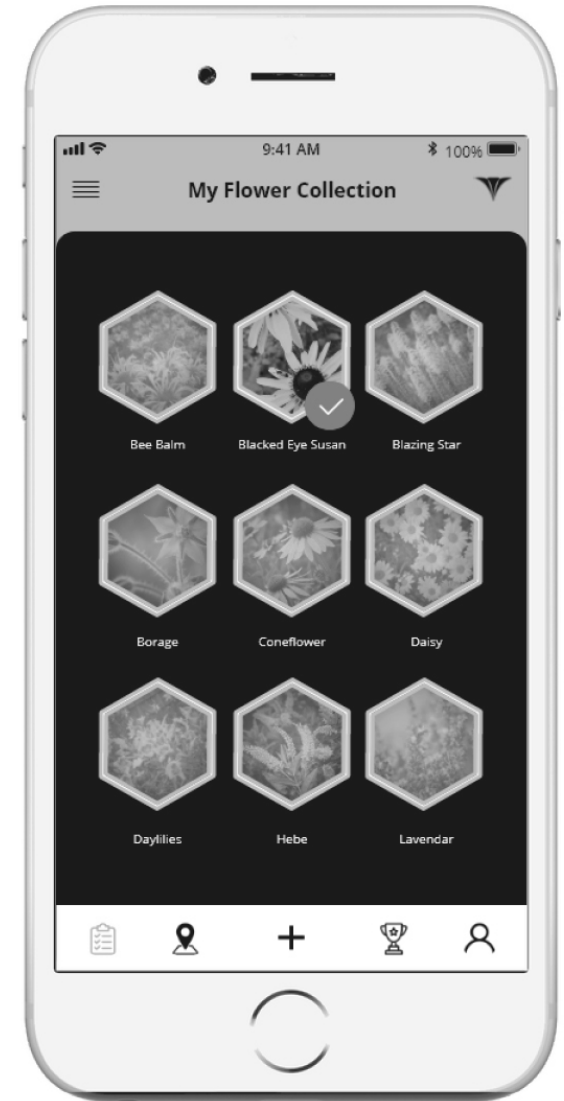
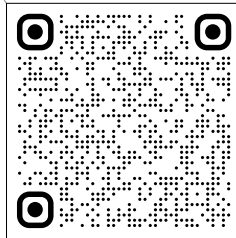


Figure 3: Flower collection screen of the Gardener part of the City Buzz app.

the rooftop owners and citizens that would like to benefit the pollinators. As such we decided to build up a GPS based game to strengthen this communication. By analysing successful GPS based games, like Pokemon- GO, we found that these games shared common features; they were fast to complete levels with instant gratification mechanisms, they ensured good user experience and social interaction, they let the user make decisions, understand what impact their input had, and they use leaderboards for competition. After taking inspiration from the existing applications and feedback from learners of DSS, the concept of the game was developed. The game thus acted as a major connection between the Artificial Flower, rooftop owners and citizens of Amsterdam.

The game consists of two roles:  
The Gardener and the Pollinator.

### THE GARDENERS

The Gardener character is for the people who own rooftop gardens or an open space to build one. The Gardener installs the artificial flower in their rooftop garden. Then, they connect the flower to the City Buzz App, so they can be notified about their bee visitors, and be a part of the online community. The goal of the Gardener is to achieve a higher rank attracting bees and other pollinators in their garden. This can be achieved by planting a diversity of flowers, which gardeners are encouraged to do through the app. When bees visit the flowers of the Gardener detected by the Artificial Flower, the location lights up

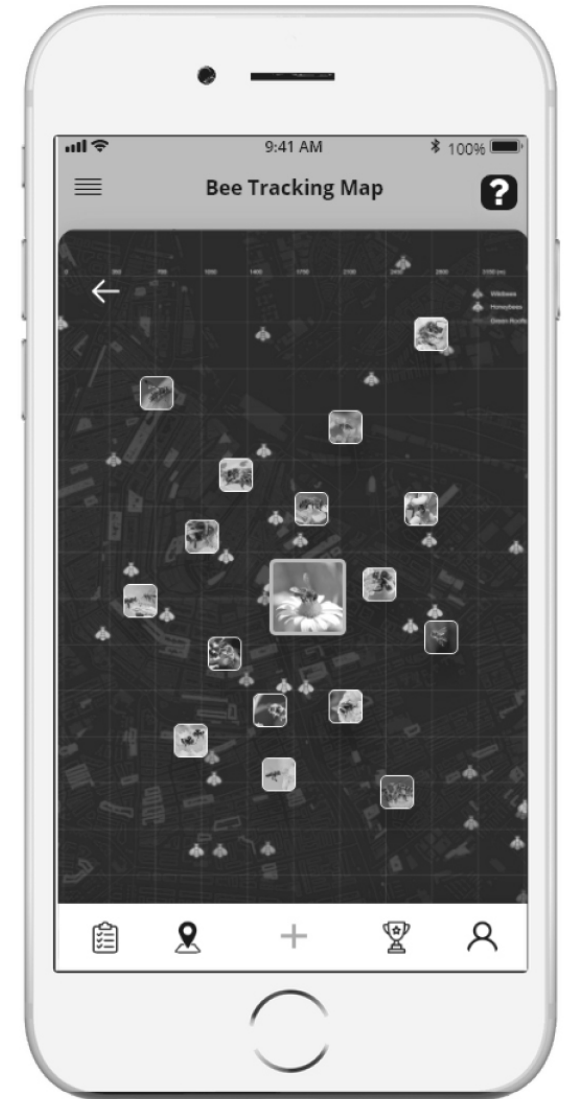


Figure 4: Bee tracking screen of the Pollinator part of the City Buzz app.

in the map inside the City Buzz app to notify the community.

<i>Aims of the Gardener (see figure 3)</i>
<b>To turn</b> their rooftops into greener and more biodiverse gardens
<b>To increase</b> their knowledge about different flower types
<b>To share</b> knowledge and insights with the other rooftop owners
<b>To be</b> a part of a strong bee-friendly community
<b>To collect</b> observational data about their flowers and number of bee visitors

THE POLLINATORS

The citizens who do not possess a rooftop garden get involved in the game as ‘Pollinators’. The goal of the Pollinator is to achieve a higher rank by gaining points for keeping the digital bee(s) in the interface alive. Further to this, the Pollinator has two tasks; completing the flower fragments collection, and digital bee collection.

When bees visit the garden of the Gardener, the logo of the visited garden in the artificial flower map is highlighted in the app interface. The Pollinator can collect points by physically visiting the highlighted location. Even though the Pollinators cannot contribute to the ecosystem by attracting bees, by visiting Gardeners’

virtual gardens they accumulate points for the Gardeners, which encourage them to plant more flowers. This way, these two roles encourage each other to play the game and gain more points while helping biodiversity and pollinators in cities.

Both the pollinators and gardeners will be ranked among their friends who have been invited to the game for friendly competition.

<i>Aims of the Pollinators: (see figure 4)</i>
<b>To increase</b> their awareness of bees and pollination in the urban spaces
<b>To be a part</b> of a strong bee-friendly community
<b>To have fun,</b> learning, interacting, and growing as an individual
<b>To learn</b> more about bees and plants for their future green spaces
<b>To observe</b> the bees in the city
<b>To encourage</b> gardeners to plant more flowers and help them gain more points

# CONCLUSION

During the DSS showcase, our solution and prototype got very positive feedback from the audience. They had the opportunity to experience the whole design proposal — QR codes were printed in brochures which directed them to the City Buzz App's interface. Moreover, with fake bees, they had a chance to experiment with the Artificial Flower's recognition process directly (see figure 5). The Artificial Flower and the City Buzz

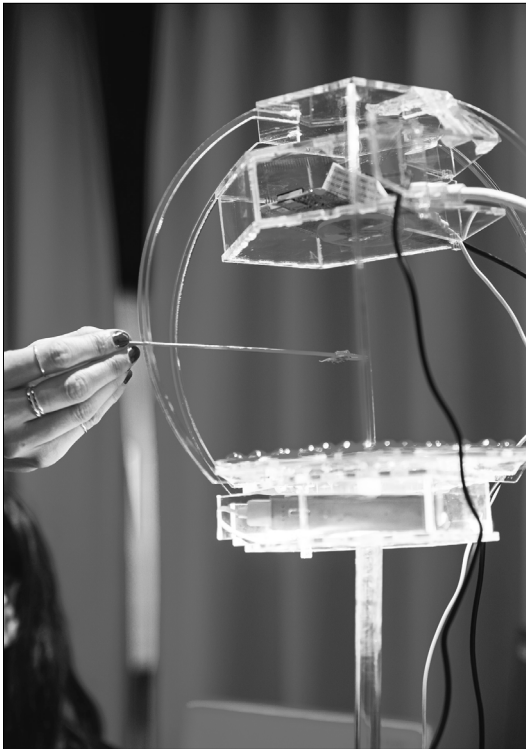


Figure 5: Testing the Artificial Flower with bees

Photo Credit: Marineterrein Amsterdam

App were the result of our 20 weeks work. As a team, we are aware there is room for improvement in this design solution. Because of the season (Fall/ Winter), the project could not be tested with real bees. To get better results, it would be tested in spring and summer with real bees. However, we believe there is a great potential for these tools to be incorporated into citizens' lives in the future, so we can increase pollination in urban ecosystems. As the Urban Ecosystems team (see figure 6), we hope that the Artificial Flower and the City Buzz app will be will be a step towards achieving this goal and inspiring people along the way to take action towards the problem.



Figure 6: The City Buzz Team at the DSS Showcase. From Left; Mudita Singh, Ilaria Zonda, Aslı Erdem, Yiting Tang, Vivika Ekman.

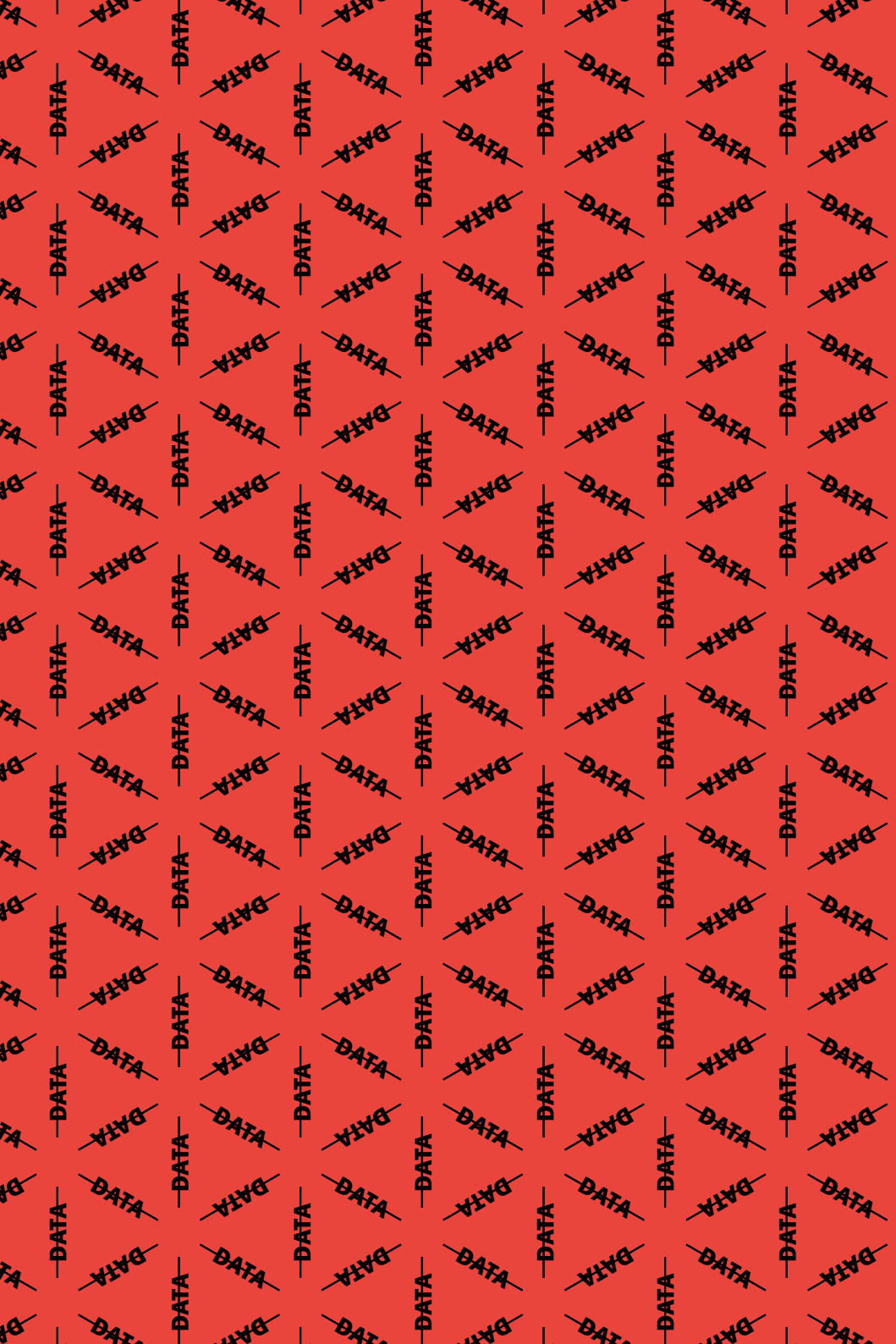
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# DATA- DRIVEN TRANS- FORMATION



“Within the Data-Driven Transformation track, we work on a future where data will be used to enable positive transformations of our society for the best interests of us all. We want to cultivate data literacy and design thinking, so that everyone can critically engage with data and data processing technologies. Hence we focus on bridging the gap between technology and design, and on fostering ethics, transparency and accountability.

How can we ensure that data is harnessed in a way that benefits society? We explored this question, considering domains such as climate action, health, and user experience.

We addressed this challenge by creating digital tools, digital methods, and educational materials, in tight collaboration with the variety of stakeholders who are at the core of our inclusive design process. In all our projects, we have put humans, society, and the Sustainable Development Goals at the heart of our motivations. In this perspective, we strived to develop positive changes and to develop the people that would build those changes. Thus our interventions were rooted within a variety of human organizations, from public institutions and grass-root associations to large and small companies.



We were most fortunate to walk those crucial steps towards a brighter future with multidisciplinary, multicultural, and multigenerational teams. Together we explored three domains of actions, identified in the Sustainable Development Goals of the United Nations:

- Health** and Communities (SDG 3, 10, 11)
- Climate** Communication (SDG 12, 13)
- Public** Recreational Spaces (SDG 10, 11)

We invite you to explore those topics with us, and to embark together on a course to address these crucial challenges with digital technologies and sustainability.”

Citation from the Data-Driven Transformation Track Legacy, 2020

# ABUSE, AUTOMATION AND AMBIGUITY

By Maxine Hanrieder  
and Hillary Jaap

Project	Conversational Agents to Address Online Harassment
Coach	Abdo Hassan, Multidisciplinary Researcher
Team	Zahra Sokoot, Data Scientist Maxine Hanrieder, Data Scientist Hillary Jaap, Designer
Partner	Digital Society School
Topic	Researching the potential for automated interventions to disrupt abusive language on Twitter

At present, abuse on Twitter is still an open issue that requires intervention and prevention. In the absence of comprehensive direction from Twitter on how abuse can be eradicated from their platform, our team adopted the role of active bystander to see how intervention affects abusive behaviour on social media. We are team Botanik and we spent 20 weeks researching the nature of online abuse. We wanted to understand why abuse happens, and how we might combat abuse using automation.

Twitter is an accessible platform for researching abusive habits online. The platform provides access to a developer account which allows researchers to explore methods of compiling and analysing data. These affordances make Twitter a suitable space for us to work toward our goal: to better understand abusers' motivations in order to find out how to combat abusive behaviour online.

**“ABUSE IN THE DIGITAL  
REALM HAS BECOME  
SO COMMONPLACE  
THAT IT IS UNDERREPORTED  
AND UNDERESTIMATED”**

— (Mapping Media Freedom, 2019).

## WHAT IS THE PROBLEM?

According to an extensive analysis by Amnesty International, every 30 seconds a woman receives an abusive message on Twitter. Next to women, main targets of online abuse include marginalized groups, such as people of colour, and public figures, such as journalists and politicians. (Amnesty International, 2019).

The consequences of this abuse are severe and can lead to serious health risks, ranging from emotional distress, panic attacks, anxiety, depression, to substance abuse, and even suicide. Online hate can also result in physical violence in the offline world. One study suggests that increased negative sentiment against refugees on social media likely reflects a causal relation to an increase in physical attacks against the same group (Müller, 2017).

## FACTORS THAT CONTRIBUTE TO ONLINE HOSTILITY

### ANONYMITY

People are more inclined to display aggressive behaviour online than in the real world. This phenomenon is known as the Online Disinhibition Effect (Suler, 2004). Users on social media can participate anonymously, meaning that even if some correct information is provided on their online profiles, the true identity of a person is not identifiable. This dissociation between real and virtual identity reduces feelings of vulnerability.

## BODY LANGUAGE

Face-to-face cues and non-verbal communication, otherwise referred to as body language, is a key element of successful communication. Social media platforms strip away this aspect of communication. The absence of body language results in an empathy deficit between online dialogue partners.

## ASYNCHRONICITY ONLINE

Chats, comments, and forum discussions give the user the choice of when to respond, if at all. Not having to face the immediate reaction of a dialogue partner disinhibits users and leads to more confident displays of extreme behaviour that are less likely to be expressed in a real world confrontation.

## PLATFORM FAMILIARITY

An analysis of profiles involved in the gamergate controversy\* revealed characteristics that distinguish abusers on Twitter from average users. Compared to average users, abusive profiles use fewer intensifiers associated with aggressive behaviour, such as harsh language and the use of all caps letters to imitate 'yelling'. A possible explanation for this could be the fact that abusive profiles typically have longer memberships and are more active than average users. Due to this prolonged

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*\*Gamergate was a coordinated harassment campaign across many social media platforms against efforts to diversify the traditionally male video gaming community, particularly targeting outspoken women which began in August 2014 (Chatzakou, 2017).*

experience with the platform, these users could have learned to identify and actively avoid the blocking mechanisms of Twitter that are often triggered by conspicuous behaviour such as the use of all caps letters (Chatzakou et. al, 2019).

## A CONSEQUENCE OF OUR ENVIRONMENT

Even users who do not chronically post abusive content are capable of, and even likely to be, contributing to harmful content on social media platforms. Research shows that mood plays a crucial role, noting that generally moods worsen during the week after work hours, citing a significant drop on Mondays. The context of an online discussion influences the sentiment of interactions, indicating that trolling behaviour is contagious and can influence bystanders to participate (Cheng, 2017).

## troll

/trɒl, trəʊl/

### noun

1. a person who makes a deliberately offensive or provocative online post.
2. a deliberately offensive or provocative online post.

### verb

1. make a deliberately offensive or provocative online post with the aim of upsetting someone or eliciting an angry response from them.

# TWITTER'S POINT OF VIEW

## TWITTER'S REGULATIONS AND COUNTERACTIONS

The Twitter Rules explicitly forbid engaging in or promoting abuse, harassment and hateful conduct in any form. Twitter enforces these rules first by removing abusive content, or contacting the abusive profile to warn the user that their content has been reported and needs to be altered or removed. Frequent rule violation can result in restrictions to users' account access, such as temporary or permanent suspensions (The Twitter Rules, 2019).

## THE NEED FOR TRANSPARENCY

There is little insight into whether Twitter is willing and able to assume responsibility for abuse by actively monitoring abusive behaviour and enforcing their code of conduct. The platform hosts an enormous volume of user-generated content, which creates logistical issues in terms of moderating content to ensure users' safety. At the time of writing, these platforms employ human moderation teams to review and manage user-reported content. This poses a mental health risk to employees whose job is to review abusive content, presumably for 40 hours a week (Newton, 2019).

There is also an incentive not to moderate Twitter content too heavily in order to preserve users' sense of freedom of expression on the platform. Any consistent form of moderation might

be interpreted as censorship, which would negatively impact the platform's image and rate of use. However, if Twitter were to bring researchers to the table by disclosing their moderation processes and aspirations, then an automated solution may be expedited.

## AUTOMATING ABUSE DETECTION

Like most tasks in machine classification, detecting abuse in text presents diverse challenges, such as the correct interpretation of context and the identification of negation, indirect speech, and irony. In the case of abuse detection especially, we observe the additional problem that even for humans it is hard to agree on one definition of abuse — mainly because abuse is relational, and therefore a highly subjective phenomenon. To better understand abuse, the context, cultural environment, and individual perception should be investigated more.

It is difficult to find a common definition of abuse that all parties agree on, and even more difficult to present machine learning tools with "correct" and "false" examples of abuse. As machine learning models can only be as good as the examples they are given to learn from, the automated detection of abuse remains a complex challenge.

In our preliminary experiments our team agreed on a narrow scope for our automated agent in order to avoid ambiguous situations wherein our

intervention might not be necessary or might cause more harm than good. Below are some examples of ambiguous abuse that an automated agent would not be able to accurately classify.

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**Typos:** ‘Kike’ vs. ‘like’ and ‘cunt’ vs. ‘count’. An automated agent might identify the phrase “I kike to party” as abuse due to lacking understanding of context and typographical errors.

---

**Reclaimed terms:** ‘Nigger’, ‘bitch’, ‘slut’. Reclaimed terms, or reappropriated labels, are derogatory labels that disempowered groups adopt to refer to themselves as a means of empowerment (Galinsky, 2013).

---

**“Righteous” anger:** Wishing harm, insulting, belittling, and threatening criminals or public figures expressing political opinion.

---

**Self-harm:** Not abusing other users, but publicly bashing themselves.

---

In order to operate within the subjectivity and ambiguity surrounding abuse, we narrowed the scope of our work to a specific subset of online abuse:

**“THE UNITED NATIONS DEFINE HATE SPEECH AS “ANY KIND OF COMMUNICATION... THAT ATTACKS OR USES PEJORATIVE OR DISCRIMINATORY LANGUAGE WITH REFERENCE TO A PERSON OR A GROUP ON THE BASIS OF WHO THEY ARE, IN OTHER WORDS, BASED ON THEIR RELIGION, ETHNICITY, NATIONALITY, RACE, COLOUR, DESCENT, GENDER OR OTHER IDENTITY FACTOR”.”**

— (Guterres, 2019)

From here on, we use the term ‘abusive’ to mean ‘containing hate speech’. Using a list of xenophobic and homophobic terms and racial slurs, we were able to filter the stream of newly incoming tweets on Twitter for potentially abusive tweets.

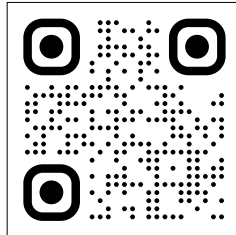
# CLASSIFICATION

In order to train a machine to identify abuse we needed to find good examples of the type of abuse we want to interact with. Existing research provides datasets which contain these example such as tweets that have been manually labelled as abusive or not abusive. Larger volumes of diverse and properly labelled examples will result in better performance for a classification model. But because a model requires thousands of diverse examples to perform accurately, and because our project had a limited time-frame, we looked to existing research to get us started on building a classifier.

We selected six relevant sets of data that had been used to train classification models to detect abuse. We analysed the labelling process and level of expertise of annotators, aiming for datasets labelled by experts or amateurs trained on the sensitive topic of abuse. However, we found that most of the data available was annotated by crowd-sourced amateurs, which may result in poor classification quality and subsequently, poor classifier performance.

To account for the diversity of the datasets we collected, we combined them into a seventh balanced collection of diverse examples of abuse. In order to determine whether or not a tweet is considered abusive, we use a majority vote of the seven classifiers built.

*For more information  
on the technical aspects  
of our research and  
development please  
visit our website  
at [botanik.dss.cloud](http://botanik.dss.cloud)*



# INTERVENTION STRATEGIES

Our team conducted some manual experiments to test language strategies for interacting with abusers. Informed by the concept of counter speech, we employed five strategies: warning, humour, empathy, labelling, and affiliation (see figure 1) (Benesch, 2016).



Figure 1: Examples of the counter speech

We also tested different types of Twitter accounts. Research shows that abusive users on Twitter are more likely to reduce their abusive behaviour when contacted by another user with more social agency (Munger, 2017). In other words, in this study, intervention from profiles who appeared to be white men resulted in a decrease in abuse more often than those from profiles who appeared to be black women. We tested the difference between a human appearance profile and a bot appearance profile to see which garnered more interaction (see figures 3–4).

Research on a larger scale is needed to make conclusions about the outcome of this experiment, but preliminary results informed our choice to use an empathetic counterspeech strategy that we compared to neutral language replies, without a counterspeech strategy applied. The bot that appeared to be human elicited a rate of response from both abusers and other users on Twitter.



Figure 2: Counter Speech Strategies Experiment Results

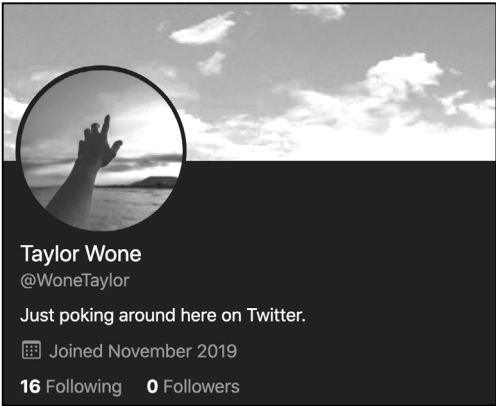


Figure 3: The human profile



Figure 4: The bot profile

# A BOT IS BORN

## STREAMING

A previously compiled list of keywords, mostly racial slurs, is used by a Twitter stream listener to detect and refer Tweets highly likely to indicate hate speech.

## PRE-PROCESSING

A potentially abusive tweet is referred by the listener to the processor to compute sentiment scores and toxicity scores from Google's Perspective API on it.

## CLASSIFICATION

To determine whether or not the tweet is considered abusive, the text and the scores of the tweet are then classified by our previously trained classification models. If the majority of our classifiers label the tweet as abusive, the processor posts a reply to the author of the tweet on Twitter and adds the conversation to the database.

## INTERACTION

When other users interact with our bot by liking, replying to, or retweeting our interventions those events are stored in our database. If an abuser replies to one of our interventions the processor will continue to respond with more tweets and log the interactions in our database. Within the scope of this project, the dialogues are designed for up to four interactions, after which the bot will stop responding but any other interactions will still be recorded.

The result of our 20-week project is a functioning chat bot with a proposed abuse interaction design that further research can build on and add to the understanding of online abuse. This project was not without its challenges,

however as a team we learnt a lot about the complexity of the social phenomenon of online abuse and we hope that our contribution can support on-going research in this field.

## LOOKING TO THE FUTURE

Our bot is available for researchers looking to further investigate this issue. The main concerns we have are the ethical issues surrounding abusive behaviour. Because the topic of abuse is so subjective we feel it is an issue that requires more conversation and more research.

Considering the rapid rate of evolution in our social and communal spaces, it is essential that more time and intention go into better understanding the implications of sociology and design in public platforms.

## OUR TEAM

### **Abdo Hassan** — *Coach.*

A multidisciplinary researcher, Abdo is a creative programmer and occasional spoken word artist. His work combines the technical and social aspects of digitality, stemming from an intersectional, non-western perspective. He loves the colour purple and his mother thinks he is handsome and moonlike.

### **Zahra Sokoot** — *Data Scientist.*

With experience working in the finance industry, her favourite food is nutella chocolate cake and



she loves to walk in the woods and appreciate nature. She exercises caution in her approach to research and is a champion of precision and attention to detail. She is a passionate fan of financial mathematics and often supported the team with self made cakes and rare specialties from Iran.

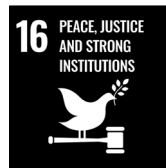
**Maxine Hanrieder — Data Scientist.**

Maxine is currently working on projects that will make the online world a better place and looks forward to her afternoon snack to stay energized. She applies herself to bridging the functional gaps between the physical and virtual world and loves small fuzzy animals, especially cats.

**Hillary Jaap — Designer.**

Hillary is a design polyglot and a multimedia storyteller. She has a strong sense of social justice and her palette of passions include reading fantasy, soulful food, and combatting partisan politics on Facebook. You can find her in the park when the sun is out and in the kitchen cooking for friends at every opportunity.

**SGDS THIS PROJECT TACKLED**



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# SEE YOU ON THE STREET, A DIGITAL CLIMATE PARADE

By Manlio Massimetti

Project	A Climate Protest Lab for a Data-Driven Futures
Coach	Carlo de Gaetano, Information Designer
Team	Robert Carr, Researcher Orestis Ioannidis, Developer Manlio Massimetti, Designer & Developer
Partner	Visual Methodologies Collective, Re-Set
Topic	Celebrating the Climate Movements by combining digital and physical activism



*Credits: Li-An Lim. Unsplash.com*

In September 2019 alone, more than six million people stopped work or school to go out into the streets and protest for climate justice (The Guardian, 2019). Climate parades of this magnitude were, until this moment, unprecedented, and thus mark the transition of environmental activism into the mainstream.

See You On The Street, a Digital Climate Parade, is a platform that celebrates the phenomena of taking to the streets to demand climate justice by combining digital and physical activism. The website takes visual content of recent instances of climate protests from Instagram and compiles this content into one 'digital demonstration'.

This website is the culmination of several months of investigation into the rise of climate activism. At the start of September 2019, our team

was tasked with creating an open and accessible dataset which was able to tell the story of young climate movements. Through social media exploration, we managed to collect a plethora of data that illustrated the climate activism phenomena made popular by charismatic individuals like Greta Thunberg, and disruptive movements like Extinction Rebellion. The project presented on this website is just one element in the larger, long-term project, spearheaded by the Digital Society School in collaboration with the Visual Methodologies Collective, and Re-Set (all of whom operate within the Applied Sciences University of Amsterdam, or HvA) in the city of Amsterdam. This larger project investigates the climate change debate through the perspectives of different stakeholders, such as policy makers, climate experts, and now the growing public climate movements. Together, the project aims to provide a holistic view of the current state of climate change communication.

Throughout the project, we studied climate movements from a variety of angles, starting with creating a dataset of the most prominent, current movements. This dataset contained the following features for each movement; date of establishment, purpose statement, verbs used within purpose statement, target audience, target 'action against' (who/what the movements are opposing), geographic location, and social media followers. From there, we focused on one movement, the most active and the most popular on social networks, namely Extinction Rebellion, to learn about their methods



Figure 1: See You On The Street, website front page.

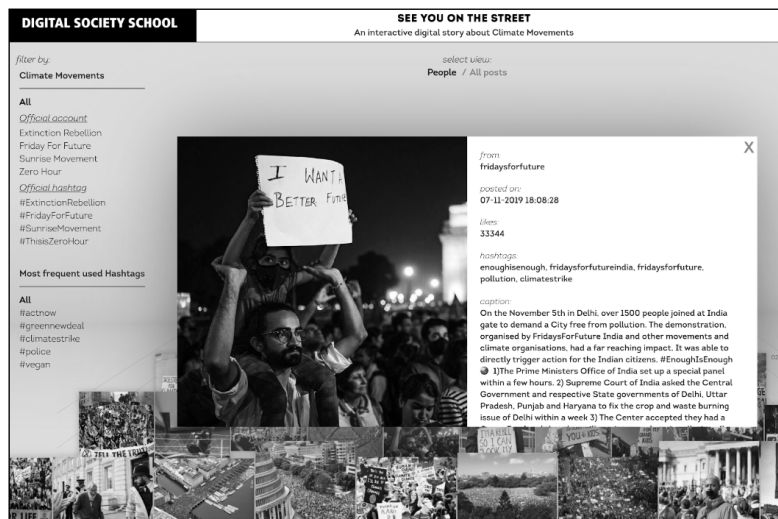


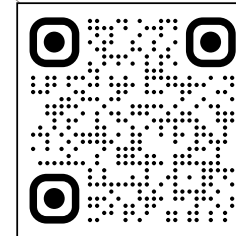
Figure 2: See You On The Street, website single post view.

of communication, and develop a framework for studying other movements. After establishing this framework, we selected four movements to analyse for our final tool. Once we had our final subjects, we had to decide how to present the data we had collected. When combing through our data, we noticed the majority of the images showed people, out on the streets, protesting for the climate. Because this was a common trend across the four movements, we came up with the concept for a digital climate parade. This digital parade would combine protest imagery from the communication channels of each of the movements into one digital space. The parade is not only a collection of images, but also a celebration for the growing number of people taking to the streets (*figure 1*).

This platform is based on a dataset that contains images from climate demonstrations between the years 2015–2019. Images from four main climate movements are present; Extinction Rebellion, Fridays for Future, Sunrise Movement, and Zero Hour. We also included images from individuals who used the official hashtags of the movements within their post, such as; *#ExtinctionRebellion*, *#FridaysForFuture*, *#SunriseMovement*, *#ZeroHour*.

The platform is a visualization of the dataset where users can filter and sort images by movement, date, level of engagement, hashtag(s) used, and more. The intention was for the filters to enable the exploration of the recent months

Scan the QR code to visit the website.

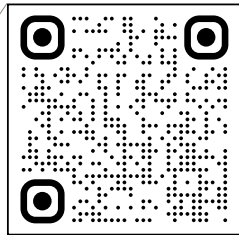


of climate activism through photos, by giving individuals freedom in how to arrange the images and subsequently derive meaning. The filters and sorting mechanisms can be combined in many different ways to create alternate storylines from the same base data. Furthermore, users are able to click on individual photos to see a pop-up box with more details about the given photo and the post it originates from (*figure 2*).

Through our platform, See You On The Streets, we wanted to celebrate the growth of climate movements and show the world that climate activism is not just a series of isolated incidents. People are coming together all over the globe in support of the same goal; changing human behaviour to improve the conditions and the health of our one and only planet. These gatherings of unprecedented magnitude should not go uncelebrated. It is with this in mind that we present our platform as a space to exhibit, understand, and analyse the rise of climate movements through online visual content. See You On The Streets, A Digital Climate Parade was created using one large dataset.

The dataset contains all the Instagram posts from the four official movement accounts. The following identifiers are included; movement name, hashtags present, post url, image url, people (present or not, manually detected), timestamp, date, number of comments, likes, engagement rate, and caption. The engagement rate was calculated by adding numbers of likes and comments, and dividing

Scan the QR code to access  
the dataset used  
on the website.



the sum by the numbers of followers. The images range from August 2015–November 2019.

The second part of the dataset concerns unofficial communication; it has all the images with over 100 likes that contain at least one of the hashtags from the official movement campaigns, but not directly sent by the official accounts of the movements. While the first sheet has just four different authors, the second sheet has an unlimited amount. The same identifiers as above are also present for this sheet, however, instead of engagement rate, the engagement is calculated in absolute terms (sum of number of likes and comments). This is because many of the posts are from private accounts where follower count is not available. The images for the second sheet have a narrower date range, from October–November, 2019.

The platform is designed to be used by researchers and climate enthusiasts who are interested in exploring recent months of environmental demonstration. The multiple filters and sorting mechanisms are tools intended to give users the power to arrange the data in ways that suit their individual needs. The ability to combine filters gives users the freedom to create different narratives from the data. Researchers can compare and contrast the visual communication of different movements, or see how image content is related to engagement metrics for example. Additionally, the platform enables users to study how official channels of communication differ from individual accounts, or how different hashtag campaigns influence the imagery produced. The dimension

of time is an important metric we have also provided to allow another layer of analysis. Essentially, we want to provide different ‘lenses’ for researchers, climate enthusiasts, students, and other interested parties to use when studying the visual communication of climate movements.

By giving users the power to sort and filter the data, we believe our platform both holds analytical value as well as appropriately celebrates the phenomenon of taking to the street to fight climate change.

SGDS THIS PROJECT TACKLED



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# AN INCLUSIVE EXPERIENCE FOR THE ARENA

By Anissa Cochran

Project	The Stadium Experience App; prototype of a conceptual application
Coach	Slim Belkadi, Digital Transformation Designer
Team	Anissa Cochran, UI & UX Designer Victoria Winstone, Graphic Designer/Video Editor Yujin Guo, UX Researcher/Interaction Animator
Partner	Johan Cruijff Arena
Topic	Prototyping an inclusive and personalized stadium tour experience, with the help of an app and Augmented Reality (AR) technology



Figure 1: Walkway to the Johan Cruijff Arena entrance

## THE PROJECT

Up to 100,000 people take the Johan Cruijff Arena Tours every year. The Arena is therefore one of the most visited venues in Amsterdam. Besides the popular local football club AJAX, international headliners such as Madonna, Disney on Ice, and The Rolling Stones — among other stars — have graced the soccer stadium with their performances. Reliving famous moments in soccer history, concerts and events by visiting the Johan Cruijff Arena, became a priority for many tourists visiting the Arena. However, a tour of this prestigious venue can take many forms, and the tour experience is dictated by the styles of the diverse tour guides. As such, one guide could provide an outstanding venue experience with lots of wit and background information, and another could

provide a rather conventional type of tour with a lack of energy.

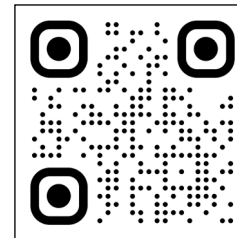
Through our research it became apparent that initially the venue, and the tours were not built to satisfy the needs of a diverse group of people. However, many opportunities are arising now, during the modification of the Johan Cruijff Arena, to make inclusion a priority. We discovered that people from all ages, interest areas, nationalities, and demographics were interested in the stadium tour experience; it is not just soccer fans who will take the tour. Our solution therefore aimed to conceptualize how the Arena could tailor the tour experience to anyone and everyone interested in visiting the venue.

Our solution is a prototype of a conceptual application called the 'Stadium Tour Experience App'. The task was to turn a regular, guided stadium tour into a more engaging, innovative and memorable

experience for visitors. In order to channel our team's multiple approaches into an enhanced experience, we decided to develop a mobile application specifically for the Stadium Tour. The app supports visitors and tour guides with a small set of powerful features, which aim to cater to visitors' individual needs, their creativity and inquisitiveness. The app features allow users to learn about the venue before the tour starts, enhance the tour experience by

introducing interactive digital content, and provide options for visitors to continue engaging with the stadium after the tour has ended.

Scan this QR code for  
the promotional video  
of our prototype:



# RESEARCH APPROACH

To begin our research into the tours at the Johan Cruijff Arena, we mapped out the full ticket and tour journey of a visitor. We then visited the stadium ourselves in order to answer the following questions; what do visitors experience when they book their ticket and travel towards the arena? What exactly happens when entering the venue and after exiting? How does the Arena stay in touch with the visitors?

Through this customer journey and ticket journey maps, we were able to locate the points of tension within these journeys which should be improved or communicated differently.

While we gathered our most useful research via our personal stadium tour, we also gathered insights through the following research methods;

- 
- Interviews** with tour guides to gather information on the behaviour of tour groups
  - Desk research** into the Johan Cruijff Arena's own branding and communication to understand their current efforts and strategies of attracting and keeping visitors
- 

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**'Social Listening'** which is a method used to sift through user-generated-content (like reviews of the tours, mentions on social media). We conducted conducted this through ticket re-sellers and social media platforms

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**'Web scraping'** which is a method used to measure the Arena Tours hashtag representation on Instagram

---

This helped us to understand the visitors' actual wants and needs and search for a technology-based solution that can be a valuable companion for both visitors and tour guides.

To find out why these points are considered successful or are damaging the visitors' experiences, we also researched the different types of experiences one might encounter at different public leisure venues. We looked into the behaviour of fans experiencing soccer games, how visitors interact with sensory content when visiting an educational venue, and why parks that encapsulate one theme (such as Disney Land or Efteling) are so popular. We also wanted to find out what makes a visitor stay in touch with the venue after the encounter.

Our research on innovative technologies such as Virtual Reality (VR), Augmented Reality (AR), and Holograms, gave us valuable insights into the possibilities for a tour enhancement which is applicable to different age groups and cultural differences. We concluded after viewing several case studies concerning VR, AR, and Hologram,



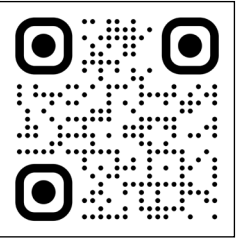
that the use of AR was the most appropriate technology to foster engagement and inclusivity. AR provides an approximation of the experience for people with impediments (such as hearing-deficiency, and language barriers) and is, in comparison to the other researched technologies, the easiest to understand for first-time users.

With the help of a mobile device, the user is in full control of the AR experience and may abort the interaction at any time if they feel uneasy. The AR feature is also perceived as an optional addition to the stadium visitor, rather than a necessity, as it supports the guided tour experience instead of replacing it entirely. AR technology also allows the possibility of growth in terms of offering more personalized tours and/or new interactive tour types (e.g. photo tours, special needs tours, scavenger hunts, and so on). With the use of navigational and explorational AR, visitors can choose how they personally explore the venue, and therefore interact with it on a deeper level.

# THE STADIUM EXPERIENCE APP

Our team conceptualized three main features that provided instant instructions about the app, simplified stadium navigation, and allowed the user to personalize their tour experience. Information was provided to the users depending on their on-site or off-site location.

Want to test our prototype?  
Scan the App Prototype  
QR code below:



The following section will explain the three different app 'states' and their related features:

## STATE 1: BEFORE THE TOUR STARTS

**Ensures** seamless e-ticket integration and view of your e-ticket after purchase. Found an error in your ticket? It is possible to edit your ticket information before starting the tour, directly through the app. There is also the chance to add information such as special needs, accessibility concerns, or questions the users may have for their tour guides.

**The user** can also plan their journey to the stadium by using the Arena Mobility Center or Google Maps.

**The AR-Feature** called 'Explore' is introduced but inactive in this state

**The settings** page is available to alter language and notification preferences

**Notifications** can remind you about your Stadium Tour time slot, and when to start travelling towards the arena to avoid a delayed tour start

(see figure 2)

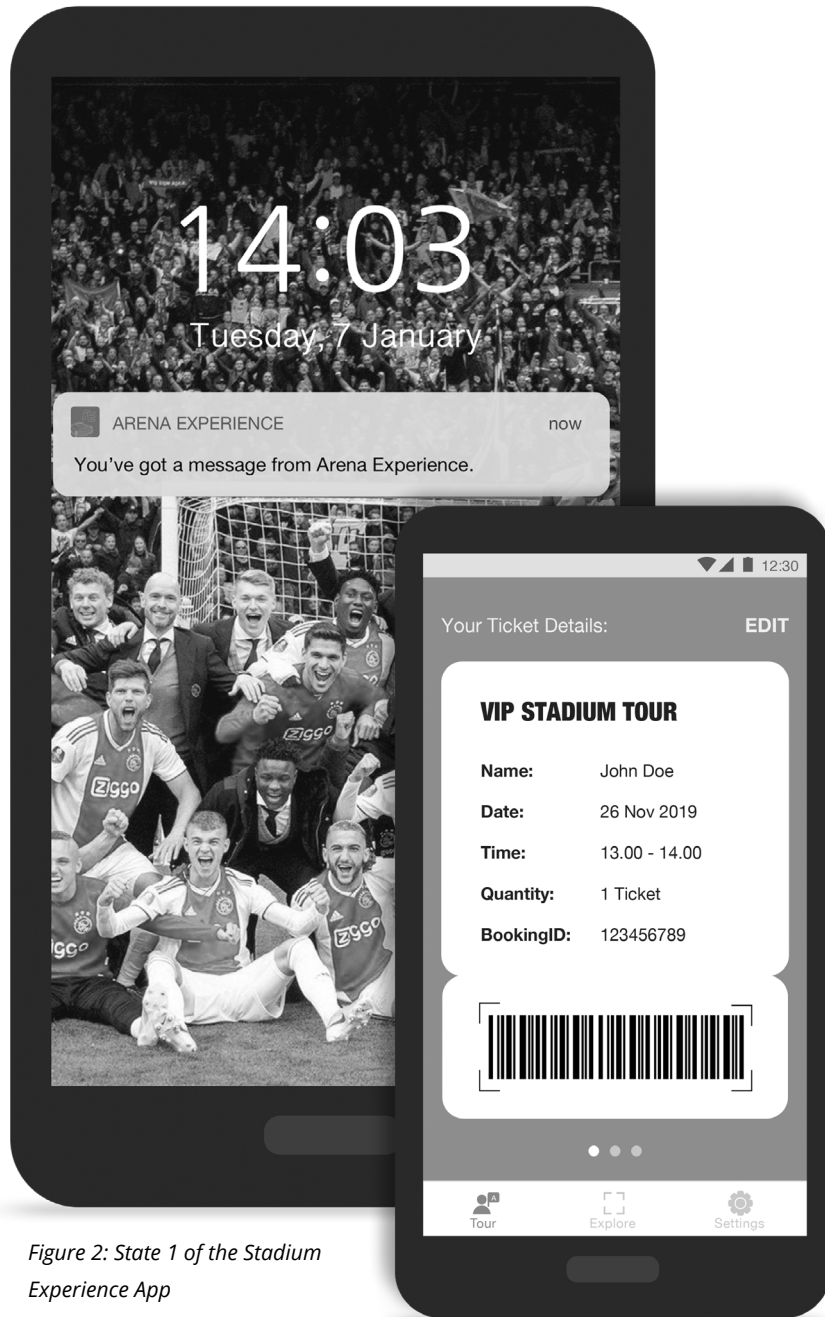


Figure 2: State 1 of the Stadium Experience App

## STATE 2: DURING THE TOUR

**Live-information** about the users tour-process and the possibility to ask the tour guide questions remotely

**The 'Explore'** feature is enabled. 'Explore' opens the mobile device's camera and presents the coded AR content when a user is viewing a marker through the device. This encourages exploration of the venue, provides additional information for dedicated visitors, and creates engaging situations when interactive content is intermittently displayed in the form of games. The hashtag '#TheStadiumExperience' is always visible when opening the camera mode. This provides a strong unified representation on Instagram for the Arena when pictures of the tour are taken and posted by users.

**The settings** during the tour allow a wide range of adjustments. Users can change the language and volume of the tour guide's voice if they have hearing difficulties. It is also possible to toggle notifications that warn you about battery drainage when using the app.

(See figure 3)

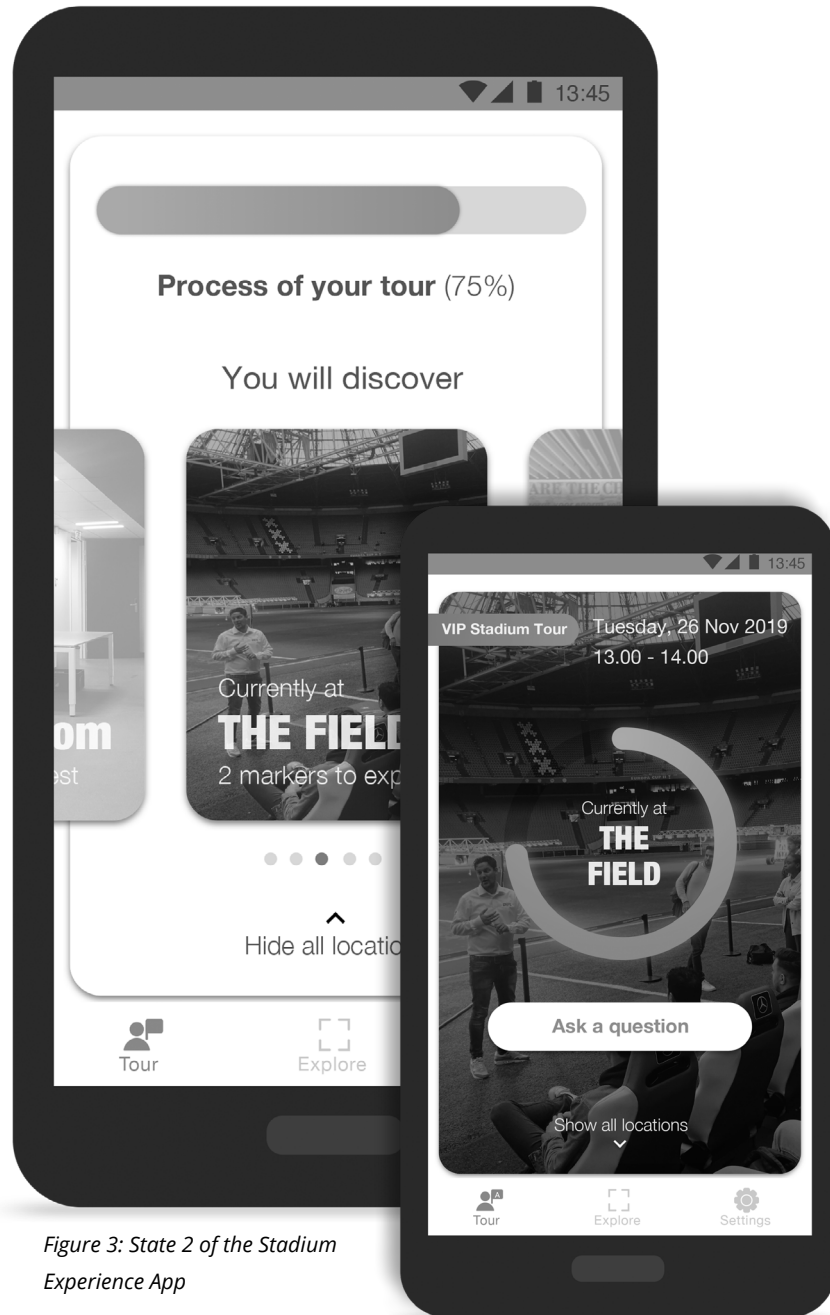


Figure 3: State 2 of the Stadium Experience App

### STATE 3: AFTER THE TOUR

**When** the tour is completed, it is possible to give feedback by rating the tour with stars. There is also an option to either recommend or not recommend this type of stadium tour. The feedback data is subsequently available to the Arena staff, so they may incorporate constructive feedback, improve on points for negative feedback, and make selections of potential brand ambassadors. (See figure 4)

**Once** the feedback page is completed, it is possible to view and download pictures the user took with the 'Explore' feature during the tour.

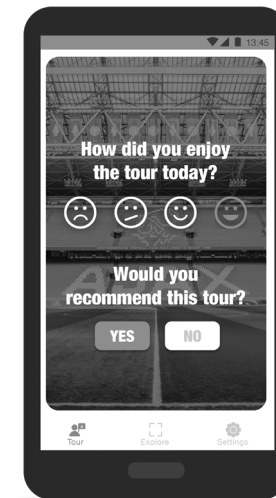


Figure 4: State 3 of the Stadium Experience App

# THE DEVELOPMENT

Our team consisted of designers and researchers from different professional backgrounds. As such, we combined our skills to develop our clickable prototype. We used Sketch (a wireframe and app design software) and Principle (software for animating micro-interactions) to create a clickable prototype that works on any mobile device. The web-based prototype allows the user to navigate all three of the 'states' in the Stadium Tour Experience App. This allowed us to conduct user tests with the application to ensure handling the app features felt natural and straightforward.

In order to develop a functioning AR feature, we relied on one team member to use their basic knowledge of HTML, CSS and JavaScript to learn how to code AR content, within the project's tight time-frame. Our main goal was to demonstrate how our interactive AR content would fit within the venue and the venue tour experience. To achieve this we had to learn about AR 'markers' which are able to trigger AR content once a user scans them using the camera of their mobile device. This method allowed us to provide informational AR content throughout the tour, by placing these 'markers' on different objects within the Arena space (*see figure 5*). Furthermore, it was also possible for users to interact with the displayed AR content, making the prospect of adding mini-games within the tour feasible.

To successfully create the AR example in our clickable prototype we had to research and experiment with; 'A-Frame' an open-source WebVR

Framework, 'AR.js' a library by Jerome Etienne for web-based AR, and 'markers' to trigger the coded content. When experienced in this area, it is possible to create an infinite amount of content that is animated, interactive, static, or even user-generated. However, due to our time-constraints, we had to limit our AR example to simple animation, and proximity triggered functionalities.



Figure 5: Demonstration of the AR-Feature of the Stadium Experience App

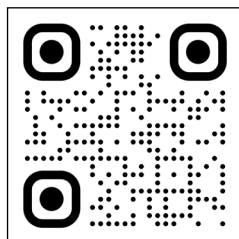
# THE CONCLUSION

Overall it was very exciting and beneficial to do this project. The lack of a coder/programmer who could dive into the AR feature did limit our team in time and thoroughness of our prototype. However, we used the time as efficiently as possible to grasp a good understanding of the venue itself, the people visiting it, the stakeholders wishes for innovation, and the secret to successful tours, to compile a valuable solution.

This concept is only one of the possible outcomes of our research into stadium tour experiences, inclusive/engaging interactions, and feasible mixed reality approaches. Some ideas included sensory content like smells and nostalgic audio content. Others conceptualised placing holograms of famous football players around the venue to engage people's curiosity. We did not follow through with these approaches, because we believed it was more important to create something tangible, that made the venue more inclusive, and responded to the target group's actual needs. It was our mission to expose the lack of accessibility and inclusivity for people with barriers and different needs, and to design our intervention to counter it.

The Stadium Experience App is a door to many possibilities for the Arena to grow into a more empathetic venue, with services designed

*AR Prototype + Hiro-Marker to enable the content. First, scan the QR code to load the page:*



*Enable your mobile camera and make sure the Hiro-Marker is clearly in view through your mobile camera to display our coded AR content.*



for everyone instead of most. Our app adds value to the successful tour activities with its unlimited ways of adding diverse information and interactions for tour visitors. While drawing special attention to those in need of assistance, with simplified communication with the Arena staff, and built-in features for deficiencies and barriers.

## SGDS THIS PROJECT TACKLED



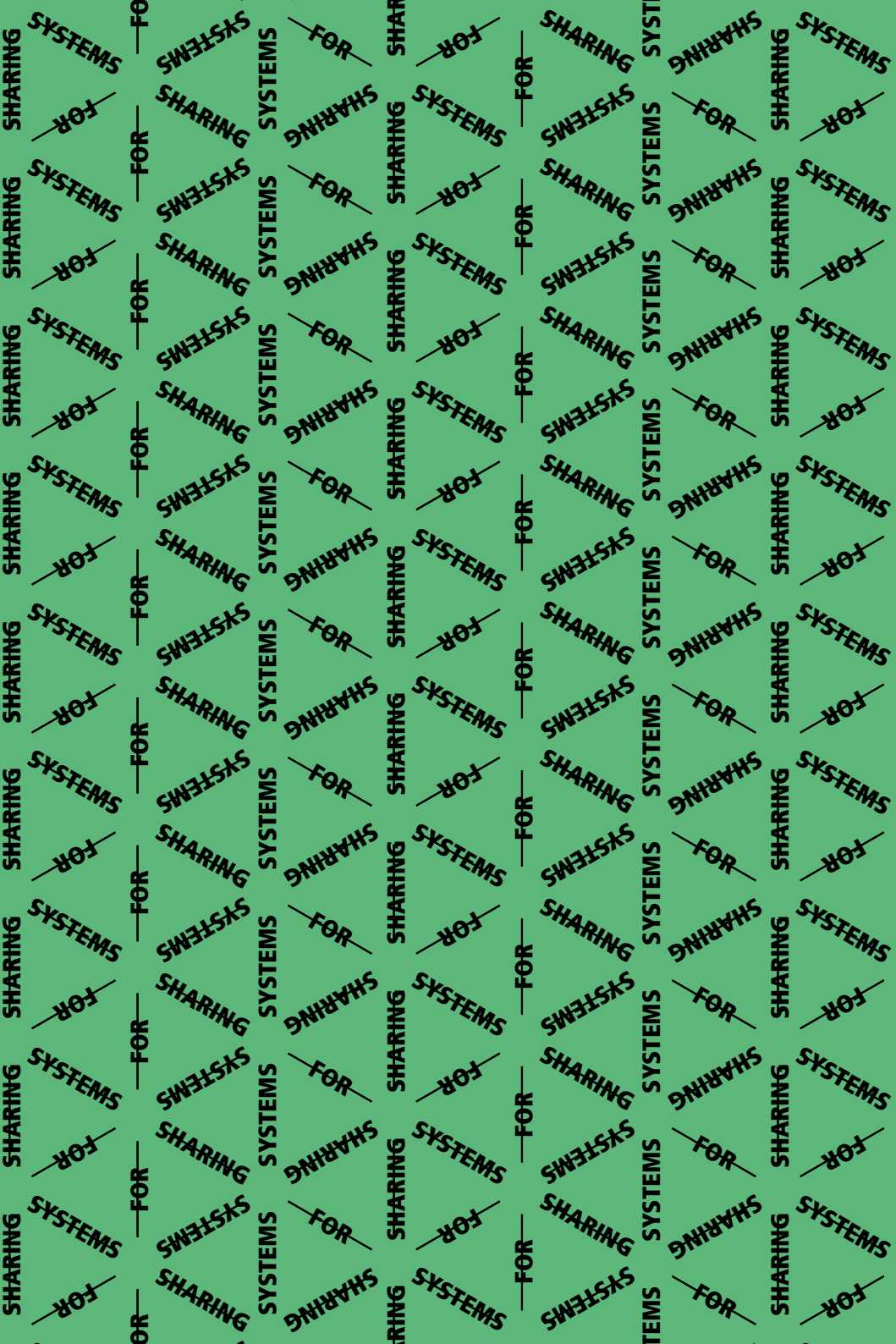
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SYSTEMS

FOR

SHARING



Everyone and everything are part of at least one system. Our track, Systems for Sharing (S4S), focuses on social systems, believing they should be based on human rights and public values. We do this by working on/with technological systems to facilitate and contribute sharing ideas, information and resources while adapting collaboration as a leading value.

We look critically into those systems and we examine their paradoxes, complexity and relation(s) with other systems.

What makes the book you are reading now 'a book'? It is the collection and the relation between all the pages. It is also the thread connecting the ideas and the relation between the sections. This is an example of a system.

In the S4S track we look into all different systems; human systems like families and communities, computing systems, organizational systems and others. The common ground for all the systems we work with: human rights, based on the UN declaration of Human Rights, and public values, guiding concepts in theory and practice meant to serve better the public. Even when the main focus of the project might seem technological, those aspects are the underground beliefs we work with.

In all our projects there is a technological aspect as well. In today's world, technology is not a question of 'if' but of 'how'. Those who did not deal with technology earlier needed to do so due to COVID-19 and suddenly for millions of people the 'if' turned to 'how'. The internet is becoming a basic need. Therefore, all our projects have a technological system or aspect as part



of the solution. Not because it is nice to have, but because this is a must have when trying to resolve specific challenges in today's world.

Yet, we try not to re-invent the wheel and create more systems, unless the one we need does not exist. While from an educational perspective it might be tempting to create more for learning better, we believe in the power of sharing instead. This way stimulates saving design-waste, encourages creativity, and works according to one of the main values of our track — sharing.

Sharing ideas, information and resources is one of the ways to move forward in our aspiration to create a more sustainable world. Sharing plays a central role not only by the act of sharing itself. Furthermore, it is also the underlying layer for sharing to take place. For example, freedom and trust are essential for sharing to happen, and having a safe environment is a crucial element for the sharing to take place within a system and across systems.

While striving for solutions, we keep a critical mindset. We do that by stepping back and examining the system from outside. In addition to inspiring innovation, by doing so, we also try to see what the challenges are. Are we dealing with the real challenges or the symptoms of it? During the process we look into the paradoxes, complexity and relation(s) with other systems. Finally, we would like to share with... a smile :) We try to embed within our systems as well!

Sobhi Khatib,  
Systems for Sharing Program Manager

# ONLINE COMMUNITY FOR MUSEUM EDUCATION

By Willemijn Schmidt and  
Patricia F. Mancebo May

Project	Online Community For Museum Education
Coach	Youngji Cho, Media Artist
Team	Peipei Yang, Sustainability Oriented Engineer Andréa Casarin, UX Designer Patricia F. Mancebo May, Learning Experience Designer Willemijn Schmidt, Qualitative Researcher
Partner	NEMO Science Museum, European Commission, MONA, 'Museopedagogy and Augmented Reality: Recognizing Museums As Educational Spaces', Hogeschool van Amsterdam
Topic	Enhancing museum education in small institutions with a collaborative online community for museum educators, researchers, and high school teachers

Would you like to know how a museum educator can work together with teachers? Are you intrigued about researchers democratizing knowledge? Can you imagine how teachers could save time by exchanging experiences? Our project at the Digital Society School revolved around designing a system for sharing that tackles these problems — our solution was our online community BrightME. Is this your cup of tea? Then read on!

Where and how we learn is continuously changing. Besides our education in classrooms, cultural spaces have always taken up the role of being an educational space. The importance of cultural spaces, such as museums, has become even more critical in the educational journey of many people (Kristinsdóttir 2017). Our education now does not necessarily end with our high school diplomas or university degrees, but is transformed into a journey of lifelong learning. It is not strange to think about museums within this context, as we see the origin of the museum as inseparable from its educational goals; as a space that should serve the public and give the public access to the world of art and knowledge (Prottas 2019). And just like the public, the museum is also expected to make an appearance online (Din 2015).

**"I THINK THAT WOULD  
BE FANTASTIC, TO SHARE  
WOULD BE THE BEST THING..."**

— Excerpt from interview with Museum Educator,  
61 years old.

**"I AM OPEN TO EVERY SOURCE  
CREATING A CONNECTION  
BETWEEN REAL-WORLD AND  
ACADEMIC WORK..."**

— Excerpt from interview with Researcher,  
29 years old.

Museum education inhabits this idea of lifelong learning and uses objects such as art or artefacts to teach skills about seeing, listening, and asking the right questions. We found that this field has been struggling with professionalizing itself in the past 50 years (Kristinsdóttir 2017). Museum Education, and the professionals who work within this field, could benefit from incorporating new technologies and innovations. During our time at DSS, we aimed to improve this exciting field of informal education by facilitating new paths for cooperation among museum educators, teachers, and researchers.

Our project partner was the NEMO science museum in Amsterdam. Via NEMO, we became involved with the European Commission project MONA; 'Museopedagogy and Augmented Reality: recognizing museums as educational spaces'. Our brief instructed us to think of a way to connect not only professionals within museum education with each other, but also to connect them with teachers and researchers — a triangle of exchange among these three stakeholders.

This came together in a broad research and design challenge:

*“How can modern technology democratize knowledge and transform museum education?”*

While super exciting, this design problem was lacking an active perspective; what were we going to focus on, and what was going to be fundamental in the challenge? Our first idea was to deconstruct the brief and make the problem ‘workable.’ Verbs such as ‘democratizing’ and ‘transforming’ are interesting, but a tad vague. To tackle this, we tried to change these verbs to tangible actions. One of the primary roles of modern technology is to help people share knowledge through common platforms and electronic expertise, open-source knowledge, and open education being prime examples (Soto-Acosta and Cegarra-Navarro 2016). So, we wanted to continue and accelerate the democratization of knowledge by creating an online community that makes knowledge and knowledge production inclusive and transparent. The act of transformation takes place when different perspectives encounter each other. In this way, the concept of ‘transforming’ turned into a modern community of learners, all working together and benefitting from museum education.

Our initial challenge was broken down and built up again into two design challenges:

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**How** can we enhance synergies and engagement among schools, museums and research institutions?

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**How** can we design a self-organized system, which will provide resources, services and space for co-creation and collaboration?

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## TAKING ON THE USERS’ PERSPECTIVE

We applied user-centered design in our process, aiming to deeply understand our users through research, organizing information, and visual design. Often digital products are designed without having the final users of that product in mind. Because our team held a lot of research experience, we wanted to make a prototype based on real claims, real needs, and real users.

We started our project with desk research on four different topics:

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**Theories** built on online communities as self-organizing systems

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**Online communities** and sustainability

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**Best practices** of online communities and sharing services

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**Needs** of teachers, researchers and museum educators related to the role of education in a museum context.

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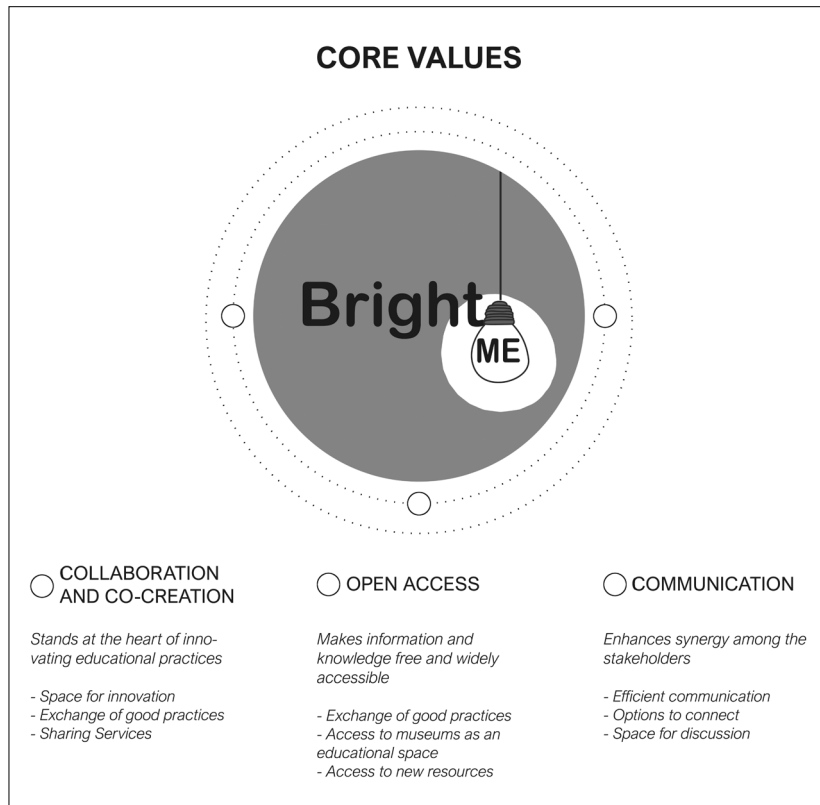


Figure 1: Online community logo and core values

In the end, this desk research helped us build up a framework that we used to further kick off our user research and concept development. We collected all of our results in a cohesive and visual poster and used this to present the ‘theoretical’ groundwork of our digital product as our core values. We also decided on a name for our online community: Bright ME! (see figure 1).

## “WE WANT TO MAKE OUR RESEARCH AS ACCESSIBLE AS POSSIBLE”

— Excerpt from interview with Researcher, 31 years old.

We had our concepts and ideas down and now it was time for some user research! Qualitative research was useful for us to gain insights into the problems our prospective users had, and what current structures we wanted to disrupt. We interviewed three museum educators, three teachers, and three researchers. You can read some of the excerpted quotes from the interviews we conducted throughout this chapter.

The interviews provided us with a lot of raw data, which we organized and analysed in a matrix. The matrix offered a lot of insights. We organized and visualized the data into a concept map. A concept map shows the relations between stakeholders and the importance of these relationships. We used our user research to validate our insights from our desk research and, more importantly, to give the user needs a face and personal story.

The personal stories of our interviewees were translated into personas: Stephanie the teacher, Leonie the museum educator, and Robert the researcher (see figure 2).



**Robert van der Wallen**  
RESEARCHER

**ROBERT** is 31 years old  
**HE WORKS AS A** researcher at a Dutch University  
**EDUCATION** Ph. D. degree  
**EXPERIENCE** 2+ years

“In our daily work, we are quite technical, but if we would work with teachers and museums, I would try to think in parallel how we can communicate what we do to the general audience in a friendly way.”

*Figure 2: One of the personas (researcher) built with qualitative data*

## PROTOTYPING

With the concept map in one hand and the personas in the other, we mapped out the first version of functionalities to offer in the online community. The data revealed that the user needs could be grossly divided in two; between a need for better communication and network, and for a way to exchange knowledge, resources and work together. This divide was backed up by our desk research, which showed that people join virtual communities to exchange information and social support (Ridings and Gefen 2004). We had our concept down, now it was time to make some prototypes.

With an array of possible functions, we made a paper prototype of how BrightME would function. This paper prototype gave us the option to do quick user-testing and gave us space to have a rapid iteration circle, making fast adaptations to our ideas so as to not get stuck in our heads.

After an initial iteration round on our paper prototype, we developed a digital wireframe. The digital wireframe represented all the elements, interactions, and functionalities that are part of the community, excluding content, and can be seen as the bare skeleton of any digital product. We tested the clickable wireframe to have an impression of the user's feelings going through it. Testing in this stage is interesting; a wireframe is not supposed to score points for flashy colour or illustrations, but forces the user

(and designer!) to focus on what is actually happening while interacting with the product. Our tests gave us enough feedback for another iteration round.

**“[...] SO [THE STUDENTS] WILL HAVE ACCESS FROM MUSEUMS OF WHERE THAT INFORMATION CAME FROM AND HAVING ACCESS FROM THE RESEARCHERS AND WHERE THAT INFORMATION IS GOING. [...]”**

— Excerpt from interview with High school teacher,  
44 years old.

## OUR USER JOURNEY CONTINUES...

The experiments with our paper prototype and wireframe made it possible to include adjustments to the functionalities of the online community, so back to the drawing board it was. We re-thought the functionalities but kept the two main pillars; communication, and exchange of services.

We decided to integrate the communication pillar into the online community by developing a community map, messaging functionality, following opportunities, and virtual office hours. The exchange of services became the ‘unique’ selling point of our online community. This is how we pitched the functionalities in our final prototype:

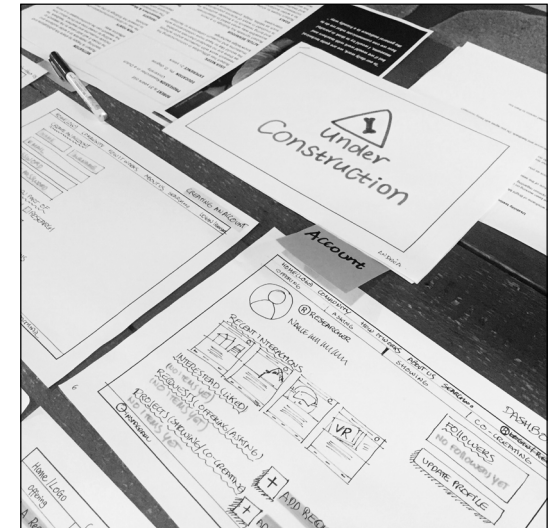


Figure 3: A quick user test of the paper prototype

Bright ME supports the empowerment of museum education as a medium of change.

**Bright ME** offers three functionalities to develop innovative and pedagogically successful museum education experience; Request, Showcase, and Co-Create. Museum education is a goldmine of untapped possibilities and a unique resource for developing creative approaches in education, theory, and research. With Bright ME museum educators, teachers and researchers are actors of change. Be ready to tap in!

**Requests** — Ask your fellow community members for feedback & advice, or offer your skills to the community.

**Showcase** — Share your finished Museum Education initiatives and solutions in our communal showcase. Find resources and inspire others.

**Co-Creating** — Pitch an idea for new solutions within Museum Education and ask for the input of other community members.

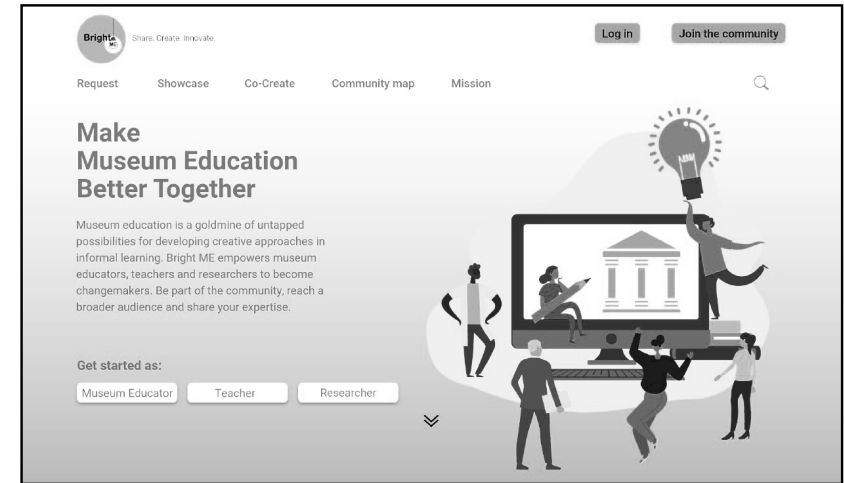
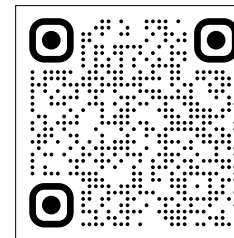


Figure 4: Homepage prototype

We designed a prototype homepage of our desktop-first community (see figure 4). While designing the website, it was extraordinary to see weeks of research and work finally being translated into something that looked like a finished product.

You can try our user-journey game yourself by scanning the QR code below:



Besides our prototype, we built a user-journey game where interested parties could experience the added value of our digital product. The User Journey-game was used in our showcase and was an excellent method to translate our research to the visitors in an engaging way.

# CONCLUSIONS

At the end of our project, we had some time to reflect and formulate some conclusions. We brainstormed, researched, designed, and made prototypes, and — hopefully, we gained new insights on the two questions we set at the beginning of our project;

*How can we enhance synergies and engagement among schools, museums and research institutions?*

The user research we did was significant for this question, proving the importance of a human-centered approach in a design challenge. As we imagined this synergy among these groups, we expected that each group would bring their unique perspective to the mix; teachers on pedagogy, researchers on knowledge, and museum educators on skills-based education. Some of the relations in this ‘user triangle’ were already existing or were quite logical — for example, the exchange between teacher and museum educators — but others were not. This required a solution on a more conceptual level; how to show that this connection could be the beginning of a fruitful collaboration? It was interesting to talk about how potential new relationships would influence their work. The more open exchange of knowledge between researchers and teachers was a good example for this.

Another side of the problem was more practical. We had developed networking and

communication channels for these groups to interact and exchange knowledge within the context of museum education.

*How can we design a self-organized system, which will provide resources, services and space for co-creation and collaboration?*

Within our concept, the idea that the community was self-organizing was necessary, as we did not want it to require a community manager or monitor. Our desk research showed that the most basic answer was to create “a common identity and a common purpose” (Slack 1998). But how do we do this in practice? Making an online community sustainable requires fresh content and timely interactions (Van Mierlo 2014) and the development of users as co-creators (Folstad 2008). These insights were valuable during the ideation and design process of the functionalities. We designed our community in such a way that it lives on the activity of its users and the exchange of information and resources between them.

We hope that our research outcomes and design prototype has taken some steps toward answering that big conceptual question we received at the beginning of our project. The fact that one question kept coming back during the showcase gives us the idea we did — “when is this community going live?”.

We were supported by our coach Youngji Cho, our track associate Dimitrios Vlachopoulos and our track owner Sobhi Khatib.



Our interdisciplinary and international team had great value and allows us to see things from different perspectives both culturally and professionally. The combination of brainstorming, design thinking and our international team perspective always helped us to achieve our project goals. Our advice? Trust the process and keep iterating.

## SGDS THIS PROJECT TACKLED



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# WHAT ABOUT GOVERNMENT AS A PLATFORM?

By Vanessa Cantinho de Jesus

Project	Government as a Platform
Coach	Olina Terzi, Digital Transformation Designer
Team	Francesca Argenziano, Aerospace Engineer Lauren Lundholm, Digital Designer Patricia Franco Pimentel, Lawyer and Strategist Timo van Elst, Software Developer Vanessa Cantinho de Jesus, Anthropologist
Partner	Gemeente Haarlem and Vereniging van Nederlandse Gemeenten (VNG)
Topic	Bringing citizens and governments closer through digital transformation

This chapter presents and reflects on the service design project developed by Team Haarlem, for the partners Gemeente Haarlem and Vereniging van Nederlandse Gemeenten (VNG).

Dutch municipalities are in a process of digitizing their services following a defined set of agile software development principles, called Common Ground. In this context, our project constitutes one of the demonstrator projects for this digital transition, with the Municipality of Haarlem as a test case. We departed from the following design challenge:

*How can we design transparent and personalized governmental services that facilitate the management of life-changing moments entirely online?*

Our brief asked us to dive into the theory and examples of digital transformation around the world, complement it with research of our own and adapt it to a case of a life changing moment, presenting a first proposal of what this could potentially look like. The specific deliverables we were asked to work on were the following:

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**Annotated portfolio** documenting examples of Government as a Platform (GaaP) and their design principles. How is this principle explained in different countries and what examples are there of successful GaaP services? Annotate the international initiatives and provide industry insight through research and statistics.

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**Proof of concept** for one or two life moments, including:

*A 'happy flow' of a life moment; visualizing a scenario and the interface a citizen would encounter.*

*Data flow visualization; how does the proposed service tie in with existing Information and Communications Technology (ICT) infrastructure.*

*Interoperability scenarios; how and under what conditions can third parties have access to APIs and data or would be able to offer services.*

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Furthermore, the brief proposed the following connection to the Sustainable Development Goals:

## **GOAL 16: PEACE, JUSTICE AND FAIR INSTITUTIONS**

This SDG is focused on bringing peace, stability and equal rights based on the rule of law. We will explore the organizational structure of the municipality and how their ruling can be communicated in a transparent and fair approach.

## **GOAL 17: PARTNERSHIPS FOR THE GOALS**

A successful sustainable development agenda requires partnerships between governments, the private sector and civil society. We will explore how public-private partnerships and multi-stakeholder collaborations can be established through the interoperability of our proposed software.

## **GOAL 9: INDUSTRY, INNOVATION AND INFRASTRUCTURE**

This goal relates to developing qualitative, reliable, sustainable and resilient infrastructure and the adoption of clean and environmentally sound technologies. We will explore how digitization could lead to diminished use of physical resources.

## **WHAT IS GOVERNMENT AS A PLATFORM?**

Since the early 21st century, governments around the world are adapting analogue operating models of national and local governance, in favour of their digitized counterparts. This unprecedented digital transformation has given rise to a paradigm shift that has changed the notion of government as a provider of solutions to that of a (digital) facilitator.

This infrastructural modernization brings incredible potential for innovation. In a time when the Internet and its associated technologies have such a vast and far-reaching impact on diverse

social dynamics, it becomes ever more important for governments to not only keep up with such transformations but to carefully assess their role in their landscape. Living as part of a “Platform Society” (Van Dijck et al. 2018), Governments around the world not only have to regulate this platform system accordingly, but also be an integral part of it. As such, Governments also need to audit their own practices when interacting with citizens and third parties, and strive to set an example when exercising their duty of guardianship over public values such as democracy, privacy, transparency and accessibility.

Numerous authors have acknowledged this necessity, which has notably been discussed through the concept of ‘Government as a Platform’ (O’Reilly 2010). Its original coiner in the homonymous article, Tim O’Reilly, advocates for an active role of Governments in this transformation, pointing to how this could open them up to more participative models of governance and change the traditional top-down relationship with civil society and third parties. The term has since acquired a number of definitions, including notions of public service improvement, creation of efficient tools for civil servants, development of open-source digital platforms for cross-departmental collaboration, co-creation and feedback loops for policy-making, as well as public-private partnership creation and multi-stakeholder collaboration. Inspired by the core values in O’Reilly’s definition and by the case-studies surveyed in the context of this project, we understand GaaP as embodying the following fundamental dimensions:



*Leadership dedicated  
to Innovation*



*Infrastructure  
as Facilitator*



*Cultivation of  
a Collaborative Culture*



*Transparent  
Communication*



*Digital Accessibility  
for All*



*User Centricity Across  
Service Layers*

Our positioning signals the importance of distinguishing between Platform for Government and Government as a Platform. We made an effort to get closer to the latter, as it progresses into a more collaborative ethos and practice; from a traditional top-down mode of organizing to a disruptive horizontal mode; from a passive consumption of (digital) services, into their active co-creation; from simple open access to full open participation. The underlying notions of citizen's collaboration in innovation and digital transformation of governments present here, appear as important in the context of the United Nations Sustainable Development agenda. Not only is participatory democracy a fundamental development indicator but as argued in the 2018 UN E-government survey (United Nations 2018), the digital transformation of governments has the potential to correlatively impact on a number

of other SDG's, such as Such as SDG 3–Good Health and Well-being, 4–Quality Education, 5–Gender Equality, 10–Reduced Inequalities, and 8–Decent Work and Economic Growth. This potential contribution complements the tackling of the ones already mentioned in the introduction.

Having been given the overall framework for this project at the beginning of our challenge, the definition we just presented was of course distilled at a later stage, as one of the results of a long process of research, and used to inspire the ongoing design during the different sprints we went through, as well as the final proposed solution. In the following two sections we elaborate on the different steps that led to it.

## TEAM, PROCESS, AND METHODOLOGY

As every team at DSS, ours was a diverse one, consisting of a digital designer, an anthropologist, an aerospace engineer, a software developer, and a lawyer and strategist. Our team coach is an architect and Smart Cities' researcher.

The challenges of working in diverse teams is part and parcel of the rich design process followed at DSS, and definitely counterbalanced by the advantages it brings. Going through an iterative, sprints based, design journey is a very demanding process, particularly in what concerns the personal relationships within a team. One has to be ready to not only be challenged in terms of the practical, day to day work tasks at hand,

but also in terms of one's own personal development and interrelationship skills. It is then part of the process to assess the different members' skills and bring about the best synergies and collaborations. To respect and work with everyone's communication preferences and balance each other's capabilities. We tried to do this to the best of our knowledge and worked to make it part of our process in every sprint. This is why one of our first exercises consisted in mapping out everyone's skills and learning gaps, so that we could better assign tasks and find partnerships to learn from each other. In order to keep track of progress and to check on each other we kept a routine of daily checking in and out, at the start and end of the day respectively.

The overall design process followed the general DSS five sprints structure, inspired by the classic design thinking principles of circular iteration, human centricity and research based ideation and prototype development. During the different phases in the process we made use of different methodologies, based on a collective assessment about the problem at hand and what type of solution we were looking for. Behind such decisions, there was also a continuous research and expertise exchange effort among the team, always supported by our coach. Next we get into more detail with an overview of each of the sprints.

## **SPRINT 1**

The first steps into our project consisted in undertaking a background and contextual research

that involved both getting acquainted with the overall theme of digital government and with the specific context of the Municipality of Haarlem. We did this mainly through desk and literature research. Some additional information was provided by the partners involved in the project. The theoretical dimension of the research, as well as what concerned the examples of applied cases around the world, albeit having been started at this moment, lasted throughout the first four sprints, as we kept on building one of the project's deliverables — the annotated portfolio — through the selection and distilling of such cases. During this first sprint we also went through problem framing sessions and we defined our stakeholders map. What was important for us at this stage was to finish the sprint with a good understanding of the problem at hand, in all its dimensions. This also meant digging into the infrastructural backend possibilities for our future service, which would be important in the development of our data flow visualisation.

## **SPRINT 2**

This was the time to take what we had learned from desk research, as well as from the analysis of the current services and processes, to focus on hands-on field research. At this point we were considering two life changing moments relating to municipal registration — the birth of a child and moving to Haarlem — to develop our service around. We knew that eventually we would have to settle on one of them, but we wanted to wait

to make that decision grounded on what the continuing research would tell us.

This sprint was one of the most challenging ones, as we ambitioned to plan the fieldwork, execute it and do the analysis of data, while still continuing to work on the annotated portfolio and pushing the knowledge on the IT infrastructure further. It was also the most frustrating phase, in the sense that we were left with a feeling of incompleteness, due to not having been able to always execute the fieldwork as we had envisioned it. On the other hand, and precisely because of it, this was a rich source of learning. We understood how important patience, resilience and a good distilling of the available data are important factors when doing research. Its human centered character demands that a certain level of flexibility, and a plan B attitude are set in place. In particular we had to deal with some access difficulties, as some people we would have liked to interview were not available.

Nevertheless and still striving to have the user at the center of our fieldwork, we prepared two research instruments. A survey that we asked Haarlem citizens in general to answer and two semi-structured interviews; one about the process of moving to, and registering in, Haarlem; and another one about becoming a parent and registering your newborn in the city. We particularly focused on finding out what were their pains, needs, expectations, what they valued about the process, and what they would wish for. In addition, everytime we were able to chat about the issues we were looking at — like those

of privacy, openness of the municipal system to third parties (from schools, to private businesses like moving companies), trust in online services, etc. — we would have informal talks that we took note of. In addition to this, we conducted some conversations with specialists on the Municipality user side. We also used these conversations to further our understanding of the existing backend and IT infrastructure.

There was a third tool we experimented with, a sort of interactive card survey, where citizens, in a playful way, would be able to pick and choose between their preferred combination of device, placement and mode of interaction with government services. Even though this was not applied to its fullest, for technical and time constraint reasons, it was still a good learning tool. It is an example of how spontaneity and creativity in the design process can create tailor made user centered research tools, and of how letting experimentation take its course can lead to such tools. In the spirit of iteration, which we strived for keeping in motion throughout the process, we also kept on brainstorming and discussing features for the design itself during this sprint. These included for example, coming up with different lists of essential features; for our service wireframes' and accessibility essentials, as well as for a visual overview of processes.

By the end of this sprint we had a lot of information gathered but only time left to do a preliminary analysis of it. It was during sprint 3 that insights came to be more consistent and started taking shape as design moulds.

### **SPRINT 3**

The third sprint revolved around three main areas of action; streamlining the annotated portfolio, completing research analysis, and the start of our prototyping.

During the first one, we aimed not only at advancing and refining the collection of case studies to include in the portfolio, but also to use what we have learned from them and the extended literature review to build our vision and mission. We wanted to settle on our own understanding of Government as a Platform. The one we would be putting forward with our service proposal. To help us complete both tasks we started organizing the case studies around the values they conveyed, the strategies behind their deployment, and the concrete initiatives they translated into. As with many of our brainstorming sessions, this was made in a collaborative way, using post-it notes on a big white board, and discussing ways of clustering different ones. From a compilation of the most recurrent and significant values we distilled our vision and mission statements. This exercise was extremely helpful to frame the two other areas of action we wanted to tackle during this sprint. It gave us the framework and grounds around which to think about our research data and to start informing design decisions.

Secondly, we proceeded with the content analysis of our survey and fieldwork data from where we were able to create personas and start shaping user stories. The preliminary personas and scenarios we sketched from such findings inspired

a couple of first tentative wireframe drawings. This was made in a low-fi, brainstorm way on A4 sheets of paper. At the same time we spent some time getting acquainted with the digital tools for wireframing, translating the paper sketches into digital ones, as a preparation for the continuing of prototyping during sprint 4.

The crossing of data steered us into three central dimensions to develop our design around; digital literacy, personalized service, privacy and transparency. We knew we had to design having in mind users with different digital literacies, offering options to personalize the service, ensuring a strong overview and control over one's privacy, and conveying information and uses of data as transparently as possible. Additionally, one of the meetings we had during this sprint — with an expert on digital authentication — also helped us greatly in starting to envision how to translate these features in technical terms.

By the end of sprint 3 we had a feeling of having learned and accomplished quite a sum of insights and principles for the design of our service but some focus was needed to better define the scope of it.

### **SPRINT 4**

Narrowing the scope of our service, creating value for the user and building trust was thus the way we defined our goal for this sprint. We started by making the decision to take newborn registration as our case study. We did this keeping in mind the whole goal of this project was to present a first



prototype for a digitized governmental service that could serve as a model for expansion.

The choice was fundamented by:

<b>The significance</b> of this life moment.
<b>The fact</b> that it constitutes a truly happy life time change and the overall complexity and importance of becoming a parent.
<b>The potential</b> for it to constitute a platform for expanding the service across the life-span.
<b>The potential integration</b> of non-commercial third parties like schools — since the research data pointed to people being uncomfortable with partnerships between commercial ones and the government.
<b>Plus the fact</b> that due to the age bracket of users — i.e. young parents, these constitute a more digital literate user base to test the service.

After deciding on the focus of our service, we proceeded to review our personas and user stories and adapt them to the case of registration of newborns. This resulted in different brainstorm sessions where — while revisiting research data — we strived to create value for our users, resulting in a new focused features map. We then went back

to review the existing user journey for registering a newborn and compared it to our envisioned journey — based on the lists of service features and principles we had been putting together. This resulted in a revamped user journey diagram and a service map. It is important to say that these were continually improved as we experimented with different design tools and progressed from brainstorm sketched forms into better visualizations. This space for experimentation proved important so that different team members could also improve their skills working with particular design software and to have the space to try what could work best. The same held for the backend map and authentication proposal, which was also under continued development, along the development of the user journey, during this sprint.

With the continuing effort of sharpening features, user journeys and backend functioning, the design of the digital platform itself started to become more and more clear. We kept on working back and forth on the digital wireframes, iteratively discussing their logic, flow and features. Bit by bit, our service prototype started to take shape.

**SPRINT 5**

The final sprint brought with it the realization of time having passed too fast and a feeling of slight frustration about how much further we would have liked to bring this project. Notwithstanding, we had reason to wrap up feeling proud of our journey. Our partner’s review of sprint 4 was a success.

We were on the right track with our prototype, and most likely able to hand in all the deliverables on time. This was nevertheless a very stressful sprint, as we also needed to save some time to prepare the final showcase at DSS.

Our priorities were set. We needed to finish writing the texts for the annotated portfolio, edit it and finalize all the design for it, to make it ready for printing. At the same time, wireframing was not complete and there was work to do, not only in terms of design but also a couple of structural and content-related issues to set straight. Plus, we wanted to produce a neat and final version of our service map, with a clear overview of both frontend and backend through the whole user journey. Lastly, and time permitting, we had a couple of physical props ideas to complement our digital service, which we wanted to prepare for the showcase. Namely, a 'welcome to the world' gift for the new parents and baby, and an informative leaflet about our service and the digital registration of newborns in Haarlem. At this point all that was left was to execute, and indeed we managed to finish everything that was planned, with the exception of having the portfolio printed. Alternatively we agreed to digitally display it at the showcase. This proved useful in illustrating our talks with visitors, while explaining to them the research and design process undertaken in the development of our service.

## RESULTS

Our journey of learning about digital government, its best practices and what users expect from it led us to develop a proof of concept for a comprehensive service, proposing to deliver more than just newborn digital registration. We called it 'Parent Journey'. Following our mission — to design a user-centric, accessible and personalized solution, that informs and guides users throughout while respecting their privacy — Parent Journey offers parents-to-be guidance and tutorial based information, the possibility to sync with medical and other pregnancy and child related services, while being very clear about the uses of personal data and easy to adjust preferences and personalization settings.

We envisioned this service as part of a wider system, where citizens have access to a personal page connected to the Municipality website that would eventually enable them to take care of other tasks, like paying annual municipal taxes or parking permits. Users would be able to give access to this personal page, or just some of its features, to other users like other members of their household/family or caregivers. This would enable them, for example, to share tasks related to children with their partners, or to have their doctor automatically upload documents needed for the registration of their baby. On the personal page, the Parent Journey menu opens two options:

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**The birth registration** page itself — with an overview of documents upload and help buttons with all the information needed.

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**'My pregnancy'** where the user can find full guidance on pregnancy procedures; synced calendar with health providers, municipal and medical task overview (as it also connects to the birth registration page), shareable content to other caregivers, and lifelong online document storage.

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All features are designed to be easily adjusted to the preferred privacy settings. Once the pregnancy is over and the baby's registration done — all online and in one place, from the comfort of one's home — there is the possibility to create a personal page for the infant, and to continue syncing healthcare and education features and info to it.

As specified in our brief, this project's main deliverable was a proof of concept - not a full working service. As such, our described clickable prototype, along with the final data flow and interoperability scenarios, constitutes a conceptual basis from where more features and improvements could arise. Along with it, the conclusion of our project delivered to the Haarlem municipality an annotated portfolio of good practices of digital government around the world from where to take inspiration for the development of our proposed service. We hope to have put the message forward

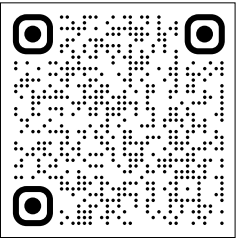
for a model of digital government that functions more like a government as a platform than a platform for government and thus upholds the values of leadership dedicated to innovation; infrastructure as facilitator, digital accessibility for all, cultivation of a collaborative culture, transparent communication, and user centrality across service layers.

Even though at times stressful and challenging, it was very rewarding to learn from this project and to see those learnings come to life through the design we came up with. To transform user pains like the need to leave the house just days after your newborn has arrived to go to the municipality and take care of paperwork — which mostly meant that the mother could not participate in such a process — into a happy moment of easily doing it online and together. To address users' privacy concerns by letting them be completely in control of the way they want to use the service. To make sure the service is accessible to all, or that there is a structure in place that helps it become accessible. These were some of the principles we brought to life from our research into the design of our service in an effort to make Haarlem's digital transformation one of a transparent and collaborative relationship between citizens and government.

As we mentioned before, the end of our project is just the beginning for the Parent Journey service. A logical and fundamental next step would be to start usability tests, iterating it with more UX development, while at the same time work further on the backend development

and integration, pursue partnerships with health care and education providers, foster collaboration between governmental departments, and ultimately expand the range of integrated services. Underlying this, a continuous dialogue between the service providers and its users is tantamount, so that a true open ended and collaborative definition of digital government, a government as a platform, becomes the reality of our governments' future.

For an overview of our clickable prototype and a short video about our project check our project page by scanning the following QR code:



### SGDS THIS PROJECT TACKLED



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# PLASTICFUL FOODS BY WASTE2WORTH

By Ellen McCarthy

Project	Changing Behaviours Within Waste Management
Coach	Stephan Ackermans, Digital Transformation Designer
Team	Alejandra Niño, Business Innovator Ellen McCarthy, Sustainability Designer,/Researcher Federica Marrella, Industrial Designer & Activist James Ric-Hansen, Environmental Scientist
Partner	University of Amsterdam (UvA), and Amsterdam University of Applied Sciences' (HvA) 'New Waste Vision' project
Topic	Using speculative design to change behaviours towards more sustainable waste management



*Plasticful Foods is an exciting new product range with a twist! No more plain, colourless food. Instead, enjoy vibrant foods, with new flavours. Plus, Plasticful Foods have the added bonus of contributing to the solution of the global plastic pollution / waste management problem. With each Plasticful Product that you consume, you are helping clean up the planet!*

*All of our products are made only from the finest organic ingredients, and recycled plastics, to ensure our quality is guaranteed every-time. Directly from the farm crops and the landfill, to you. Get your delicious Plasticful Foods today!*

**WARNING:** Always consume Plasticful Foods in conjunction with Plasteeze.



*Plasticful Foods promotional images. See these in colour at [plasticfulfoods.com](http://plasticfulfoods.com).*

Plasticful Foods is a Speculative Design/Design Fiction project. Developed by the Waste2Worth team, for the University of Amsterdam (UvA), and Hogeschool Amsterdam's (HvA) 'New Waste Vision'.

The UvA and HvA have committed to making their waste management processes completely circular by 2024. Therefore, they hope to be an example to the Municipality of Amsterdam for how sustainable circular processes could be successfully implemented on a large scale (the universities include roughly 90,000 students and staff across 10 campus locations). Yet, in order for waste management procedures to be more sustainable, the user's behaviours — in this case, the students and staff of UvA and HvA — would also need to change.

Therefore, our project began with the following goal:

*To design a product, tool, method or strategy to change the behaviour of students and staff to handle waste more sustainably within the campuses and university facilities.*

In order to achieve this goal, we would have to make the issue of waste management prominent within the user's minds. We had to make them think about a topic which is unpopular and often subconscious. Therefore, we adopted a speculative design approach, and Plasticful Foods was born.

The Plasticful project has taken facts from the present day, and projected them into a possible future, to invite audiences to imagine that Plasticful Food may be a viable waste management

practice within the coming decade. As we are already consuming large amounts of microplastic incidentally, and waste management procedures are not changing rapidly enough to contain the problem of global plastic pollution, eating our plastic waste may be our only option for plastic containment in the near future.

**IS THIS A FUTURE YOU  
WOULD LIKE?  
OR WOULD YOU ACT  
TO AVOID THIS FUTURE?**



*Plasticful Foods promotional image. See these in colour at [plasticfulfoods.com](http://plasticfulfoods.com).*

How do you feel about Plasticful Foods, after this brief introduction?

Shocked  
Disgusted  
Concerned  
Intrigued  
Interested  
Curious  
Seared  
Frightened  
Concerned  
Overwhelmed  
Shocked  
Seared  
Interested  
Guilty!  
Worried  
Intrigued  
**Uncomfortable**

— Quotes from Plasticful UserTests

Great! — Believe it or not, that is how we designed this project to make you feel!

The Plasticful project was developed in order to make the problem of waste management less abstract and more personal to the everyday user. Waste management is a significant contributor to the global environmental crisis. If we could make our waste management processes more sustainable, or even circular, then we could radically reduce our impact on the environment.

Through our research we discovered that the main issue regarding unsustainable waste management behaviours was that people did not

realise, or did not think about, the environmental effects of their waste.

As such, there was too much psychological distance\* between people's everyday behaviours, and the larger problem of waste management. This psychological distance abstracted people from the

problem and therefore they were not aware or not willing to act upon it.

This kind of psychological detachment has been encouraged by the current social system, and system of waste management itself... Even the language we use around waste confirms this. For example, when you are finished with something, you throw it 'away'. But where is 'away'? You are really just throwing it back into the built environment, to be dealt with by someone or something else. This distances you from the process, yet, your waste does not 'disappear' when you throw it 'away', although it may seem like it. All of that waste goes somewhere, and it is having major effects on our environment. Even the term 'waste' is counter-productive, as the majority

*\*This fancy term basically means that if people cannot see the link between their personal behaviour, and the larger problem they will not be motivated to behave differently.*

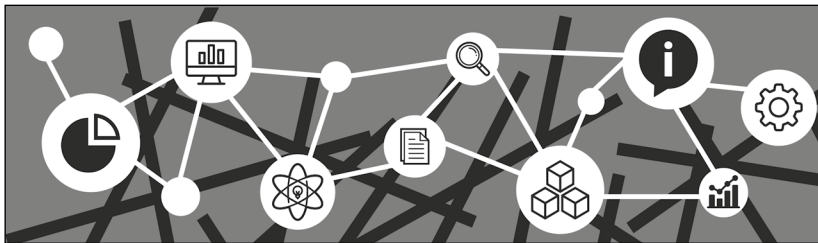
of residual materials which we dispose of are still useful or usable in some way, and are therefore not 'waste' but 'resources.' Therefore, we believe the very idea of 'waste' needs to be interrogated.

Humanity has been irresponsibly disposing of these valuable 'waste' resources for too long. A lot of waste around the world is not managed sufficiently, and therefore it slips through the cracks of our waste management systems and pollutes the environment. This affects the health of our environment, our insects and animals, and even ourselves...

**SO HOW COULD WE MAKE  
THE INVISIBLE, VISIBLE?**

**HOW COULD WE MAKE  
THE ABSTRACT, CONCRETE?**

**HOW COULD WE MAKE  
THE GLOBAL ISSUE OF WASTE  
MANAGEMENT, PERSONAL  
TO INDIVIDUALS?**



*'Learning Tools' graphic from [plasticfulfoods.com/thesolution](http://plasticfulfoods.com/thesolution)*

## SPECULATIVE DESIGN

Plasticful Foods is a speculative design project which draws attention to the amount of micro-plastic people are incidentally eating on a daily basis. The issue of micro-plastic itself is a waste management problem. Therefore, by drawing attention to the personal problem of micro-plastic consumption (which leads to negative health side-effects that scientists are only now beginning to research and understand), we hoped to decrease the psychological distance between behaviours and the problem, and therefore make the global waste management problem personal.

Yet people are creatures of habit, and habitual thought. Therefore, in order to change people's minds and behaviours, you have to disrupt their normalised actions first. This is one reason we choose to use speculative design for our project.

Speculative design is a novel design discipline. The practise involves gathering facts from the present day and projecting them into a possible future. Objects from this possible future are then designed, and disseminated to the audience in the current day. The resulting objects thus act as a catalyst for conversation regarding our possible future. They invite audiences to imagine situations vastly different from the present-day. Therefore, these speculative objects aim to spark debate among peers, which allows for critical reflection and analysis of the current situation, from which the possible future object was extrapolated.



In our application of speculative design, we have imagined that in the near, possible future, people will eat plastic as a waste management practise. This possible future was forecast from the following present day facts:

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**An average human**, living in a western society, consumes roughly a credit-card's worth of micro-plastic every week. The sources of these microplastics range from consumer products, drinking water, and even the air. Therefore, they are almost impossible to avoid entirely within the present society.

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**This issue** is indicative of the scale of global plastic contamination, which now pollutes all corners of the world. Scientists have found plastics in the deepest oceanic trenches of the planet, deep in arctic ice, and in human and animal faeces world-wide. Thus it seems there is no place that has been untouched by the problem of plastic pollution, which at its core, is a waste management problem.

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**We have produced** more plastic in the last decade, than all the previous plastic ever manufactured.

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**Recently**, scientists discovered an enzyme which is capable of breaking down PET plastic. The enzyme is called MHETase, and acts similarly to other enzymes, by degrading or 'digesting' a specific material, namely PET plastics. Scientists are hoping to discover similar enzymes which will degrade other types of plastics as well.

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**We already use** non-naturally occurring enzymes to digest certain foods. The most well-known application of this is a pharmaceutical called 'Lacteeze.' 'Lacteeze' is used by people with lactose intolerances. The pill is orally ingested prior to eating foods which contain lactose, and therefore delivers the enzyme which digests lactose into the stomach. This allows people who do not naturally produce the lactose digestion enzyme themselves, to digest dairy products normally.

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As such, we have imagined that people in the near future would take a Plasteeze tablet (which contains the MHETese enzyme among other, yet to be discovered, plastic degrading enzymes) to enable their digestion of plastic. If people are taking the Plasteeze pill so they are able to safely digest the micro-plastic they are accidentally eating (which we predict will grow in volume within

the coming years) then why not eat plastic foods on purpose, as a waste management practise?

Of course, this seems radical — why would we elect to eat something such as plastic? However, this could be one of our most viable options, as other plastic waste management practises rely on storing or burning plastic waste. Both of these options produce more microplastic and thus perpetuate the problem. Further, unfortunately, plastic recycling is energy and labour intensive, and therefore it is also unlikely to resolve the plastic contamination problem by itself. So why not eat our plastic?! You may not agree that this is a viable waste management practise of the future. Great! Discuss why or why not you believe this with your peers. As stated earlier, we hope to spark debate and critical reflection upon the topic. We aimed to disrupt normalised thought processes. However, we also aimed to inspire more sustainable waste management practises among our audience, now, within their everyday lives. Which leads us to our next section...



## PLASTICFULFOODS.COM

It was very important to us as a team, to steer away from the normal 'sustainable' strategies of making people feel guilty about their actions. We did not want to focus on the negatives, but rather focus on the positives; the solutions. Therefore, in support of our physical, Plasticful Products, we developed a digital platform.

Plasticfulfoods.com serves to provide the audience with more information about the Plasticful Products they may have encountered.

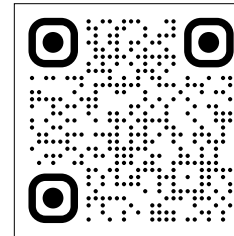
By keeping the physical products quite simple, we hoped to spark curiosity among the audience. If you were confused or curious enough, you would scan the QR code on the product's packaging, which would direct you to plasticfulfoods.com.

The website was simply divided into two parts. Firstly, 'The Problem', which detailed the Plasticful project, and the facts about micro-plastic in the current day.

Secondly, 'The Solution' side of the website, which collects helpful and trustworthy resources regarding waste management in Amsterdam.

The content for 'The Solution' side was carefully curated. We had discovered some very helpful resources, such as Milieu Centraal, in our early research into the topic of waste management. However, we had also discovered that these diverse resources were not well-known, and not collected into a single location. As such, we wanted to create a collection of these resources, and promote their use. We gathered user's suggestions for the type

Scan the QR code  
below to visit  
[plasticfulfoods.com](https://plasticfulfoods.com):





*'Solution' page on the Plasticful Foods site.*

of content they would like included in such a resource, and found that while the results varied, the same themes were repeated among users' suggestions. It was also important to us to offer different types of engagement, as different people have different preferences and means of action.

As such, we divided 'The Solution' into the following sections;

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**'Learning Tools'**, which includes more standard educational resources, such as product search websites which allow you to see how much microplastic is in which brand of product, or which tell you which bin to correctly dispose of a product in.

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**'Get Involved'**, which includes methods for individuals to take action against the waste management problem, such as by volunteering for plastic clean-ups, or joining student associations committed to sustainability.

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**'Calculate'**, allows you to either calculate your personal plastic footprint, or see the data on which countries consume the most plastic. (The Netherlands is one of the highest users!) For people who like exact data and numbers, or who like tracking the progress of their new sustainable waste behaviours.

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**'Inspiration/Innovation'**, which includes news or information about developments in waste management technology. This section was also intended to motivate/ provide hope for people who may be overwhelmed by the scale and complexity of the problem.

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It is our hope that by reading segments of our 'Solution' side of plasticfulfoods.com, our users will be inspired and enabled to practise more sustainable behaviours towards their waste. Even if the behavioural change is as simple as learning where to correctly dispose of a coffee cup on campus, we will have achieved our goal of getting people to critically reflect upon their waste management.

## DISSEMINATION

In order for us to disseminate Plasticful Foods to our audience, the students and staff of UvA and HvA, we created physical installations in two test locations within the university. These were placed



*Plasticful Foods display stands  
in the HvA's Kohnstamhuis,  
13th-24th January 2020.*



in the cafeteria of the Amsterdam University Library building, and near the cafe on the ground floor of HvA's Kohnstamhuis. The installations consisted of a 'marketing' style stand, which displayed the various Plasticful Foods, along with a few Plasteenze packets. Our test dissemination within the UvA and HvA buildings ran between 13<sup>th</sup>-24<sup>th</sup> January 2020.

We specifically included minimal information on the stands, electing instead to prominently display the QR code. As mentioned, scanning the QR code would take you directly to our website.

Our hypothesis, which was researched and tested before the launch of the project, was that creating curiosity among our users would lead them to the action of scanning the code. Therefore, if they were intrigued, confused, or curious enough to scan the code, we had already succeeded in making them think about plastic in a novel way. Further, we could measure the user's engagement with plasticfulfoods.com using google analytics. Therefore, we could count how many people scanned the QR code, and how long they subsequently spent on the site.

The users who scanned the code would be presented with both detailed information about the Plasticful products, and the solution for more sustainable waste management behaviours. We hypothesised further, that our motivated users would then discuss and/or share the website information with their peers. As such, the conversation regarding waste management within the universities would be more prominent.

# RESULTS AND PROJECT DEVELOPMENTS

The Plasticful project has been considered successful by all stakeholders. This is due to a number of signifiers.

Firstly, our google analytics of the site, which were our main quantitative data. Between the 13<sup>th</sup> of January 2020, and the 29<sup>th</sup> of January (when we presented our final project pitch to our partners) we had had;

<b>177</b> unique site visits
<b>Total</b> of 719 pages views
<b>Average</b> amount of time spent on site was 3:14mins (quite long comparatively to other sites average visit lengths)
<b>Yet</b> some visitors spend over an hour on the site! (Which we can see, they spend mainly reading through our 'Solution' links.)
<b>66%</b> of site visits come from scanning the QR codes found with our products/stands.

Our site was designed to stay functional (with up-to-date information) after we had completed our time at DSS. As such, the site is still live and is still being visited by international users; at the time of writing (late April 2020) we have had over 700 unique page visitors. This is by no means

a staggering amount, but we still consider this a significant result.

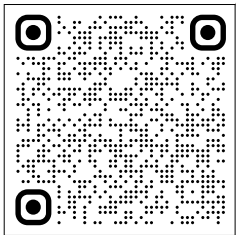
Secondly, people are extremely interested and curious about our project. As we specifically designed Plasticful Foods to spark interest and curiosity in our audience, this is a compelling measure of success.

As a further exemplifier of this success, many of our Plasticful products were stolen from our stands during our trial period. Of course, this was frustrating and costly for us as a team. Yet we also quickly realised that it was tangible evidence of our audiences' engagement with our stands! (Which we also confirmed through observations of our stand installations.) People were spending time at our stands, playing with our prototypes, discussing our project with their peers, and in some cases taking the prototypes with them.

We were also interviewed by Hvana and Folia magazines (the HvA and UvA internal magazines) and articles were published about us. We were promoting our project to external entities, however, it was journalist Kyrie Stuij who approached for an interview after one of our stands caught her eye in the university space. We saw a spike in our google analytics on the day the articles were published.

Further, we were also selected to exhibit our Plasticful project at both the Milan and Dutch Design Weeks, through Isola Design District! As such, we were invited to discuss our design solution on prestigious international platforms.

You can read the original article (in Dutch) by scanning the QR code:



Unfortunately, these events have been postponed due to the COVID-19 pandemic. However, we still plan to exhibit if and when the events go ahead.

Additionally, our project partners at the UvA and HvA requested that we continue to disseminate the Plasticful Foods message after finishing with DSS. It was proposed that we produce and install Plasticful stands in each university location, and track the audience engagement with them over a period of six months, utilizing a budget provided by the partners. Unfortunately again, this has been postponed due to the COVID-19 pandemic, yet even the request from the partners was beyond our imagined scope of possibility for the project.

Our final signifier of success was how we felt as a team. This sounds incredibly cheesy – however, we were extremely proud of ourselves. We exceeded our own, and our stakeholders expectations by listening to each other, and applying alternative perspectives to our problem. Not only this, but we learned a lot during the process; new skills through skill sharing, new methodologies, efficient work-flow organisations, and how to positively harness our diverse backgrounds. Therefore, we had each personally developed throughout the process and this was another measure of success.

We were able to create a simple intervention that people from different walks of life could understand and interact with. We showed that you can use humour to start a serious conversation, and we showed that audiences are indeed interested in participating in critical conversations about the future — even if they

surround the unpopular topic of waste management.

## THE WASTE2WORTH TEAM

Plasticful Foods is a project created by the Waste2Worth team. Waste2Worth are an international team who are all passionate about creating sustainable change. The team consists of:

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**Alejandra Niño**, Colombian, with a background in circular economy and business innovation.

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**Ellen McCarthy**, Australian, with a background in visual communication, sustainable design, academic & applied research.

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**Federica Marrella**, Italian, with a background in industrial design and design for social sustainability.

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**James Ric-Hansen**, South African, with a background in geographical information systems and environmental science.

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**Stephan Ackermans** — our team coach — a Dutch, digital a Dutch, digital transformation designer with a background in circular economy practises.

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We were lucky enough to have a wonderful synergy and matching work ethics as a team. As such, we were able to play to each other's strengths, and support each other to create something we were really proud of as a team. The Plasticful Project reflects our personalities and values, and we have been overjoyed to hear others respond positively towards it.

Plasticful Foods was a project completed in partnership with the UvA and HvA's 'New Waste Vision' project, as lead by Joep de Hoog, Suus Rood, Jasper Bok and Jan Buursma, between September 2019 and February 2020.



*The Waste2Worth team at the DSS Showcase, 22nd January 2020.  
From Left; James Ric-Hansen, Stephan Ackermans, Alejandra Niño, Federica Marrella, and Ellen McCarthy.*

## SGDS THIS PROJECT TACKLED.



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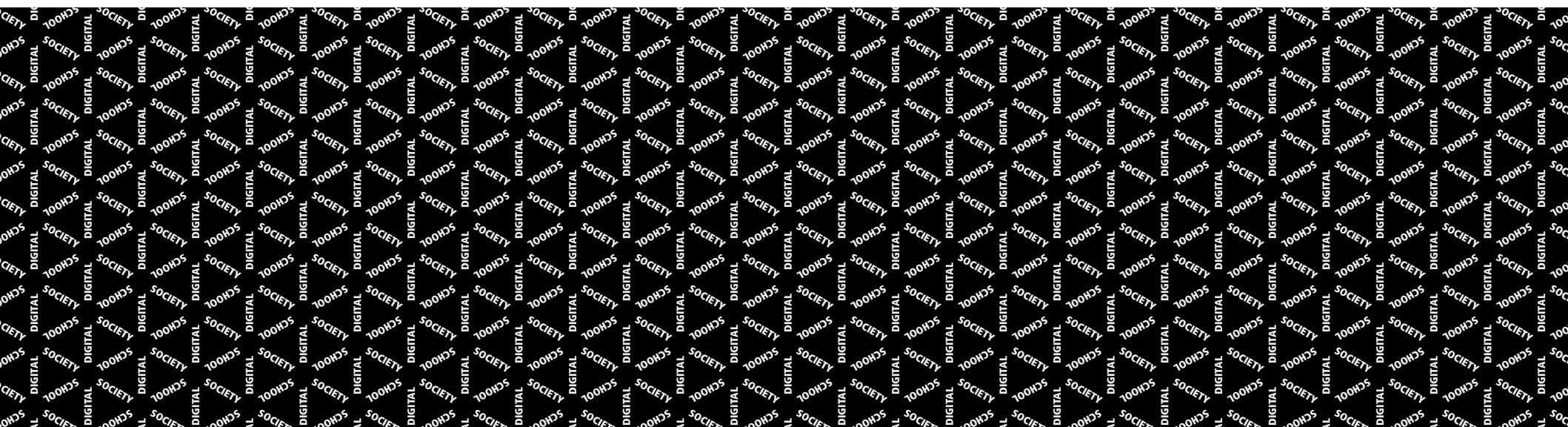
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This is a collection of project stories told by multidisciplinary professionals from across the globe. Each of the nine projects discussed here took place from September 2019 — January 2020 as part of the Digital Society School, in Amsterdam. We came together to contribute to the United Nations' Sustainable Development Goals, and as such, these are personal tales of struggle and success on the road to meaningful digital transformation. Every chapter is a document of navigating issues, cultivating an adaptable mind-set and agile work-flow, critically questioning and applying design thinking, employing applied and academic research methodologies, iterative processes, learning as we go, and collaborating with diverse stakeholders. We hope to demonstrate that anyone can contribute to a better tomorrow and to inspire you to take our learnings, apply them in your work, and make a positive impact. Our goal is a just, sustainable, and happy future for all, and we are confident that together, we can achieve it.

Dear Future — We're Ready!

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