![CRISP logo]

CRISP #1

*Magazine
April 2013*

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INTRODUCTION
Marjan Hammersma

It is with great pleasure that I introduce the first tangible results of CRISP. The combinations of products and services in such areas as healthcare and well-being are inspiring and appealing to consumers, suppliers and developers. Smart clothing and robotics in healthcare, accessible transport for the elderly, interactive games that entice children to keep fit, all these examples require innovative solutions for the real issues that society faces. I am also pleased to see that a once abstract idea is becoming reality. It all started in 2005 — with the policy letter 'Ons Creatief Vermogen'. The underlying idea was that businesses would become more innovative if stronger ties were made between the creative industries, manufacturing companies and the sciences. The main objective was to bring these parties together, including via the Creative Challenge Call.

The Creative Challenge Call had a sequel with a programme that further emphasised the connection with the academic community. It had by then become clear that the effort the creative industry put into the development of products and services often went unrewarded. The question thus changed to how the government could encourage the relevant parties to collaborate. As result of an initiative by the Universities of Technology a number of concrete ideas for product-service systems arose. It was clear that, although such a programme could bring about long-lasting societal and economic changes, it would require substantial government funding. In close cooperation with the Ministry of Economic Affairs and the NWO, necessary funds were found by the Ministry of Education, Culture and Science. Towards the end of 2011, the CRISP programme was launched. When we look back at everything that this programme has put in motion since the start, we see that it has brought us exactly what we were hoping for: designers, engineers and social scientists, people working in healthcare, industrial partners and many others meet in the (sub)projects, becoming familiar with each other's world. In doing so, they have not only come up with smart product-service combinations, but have also found new ways of working together and developing solutions. Thus we achieve the social innovation we wanted.

The experience gained and knowledge gathered in the CRISP projects are vital for the next stage in the creative industries. Consider, for instance, the newly established topteam creative industries, which has created an agenda for the future. Or the top consortium for knowledge and innovation, CLICKNL, which was also established to initiate research together with the sector. All these initiatives continue on the basis that is built by CRISP.

MARJAN HAMMERSMA — 1964

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THE ROAD TO CRISP

2005
The Programme for the Creative Industries is launched by the Ministry of Economic Affairs and the Ministry of Education, Culture and Science. The creative industry is assigned as one of the four so-called key domains (in Dutch: "sleutelgebieden") of the Dutch economy. The Programme aims at unlocking the economic potential of the cultural and creative sector and focused on improving knowledge on the potential of creativity in industry, existing governmental instrumentation and entrepreneurship in the creative sector.

2008
The first ideas about CRISP pop up during a meeting of a Dutch Delegation in Hong Kong between representatives fromt the Waag Society, the Faculty of Industrial Design Engineering/Delft University of Technology, Design Connection Brainport and the Ministry of Economic Affairs. The development of the program is encouraged by the fact that there is money available for the creative industry from a fund called FES ("Fonds Economische Structuur-versterking"). Among others, FES aims for streng-thening the Dutch knowledge economy.

2009
Various parties in the Netherlands unite to start building a research programme for the Creative Industries. Cees de Bont (dean from the Faculty of Industrial Design Engineering), launches the idea to focus the research on product service systems. CRISP, the Creative Industry Scientific Programme is born. In the same year, CRISP is one of the main elements in the government policy for the time-frame 2009–2013, as defined in the "Brief Cultuur en Economie 2009: Waarde van Creatie" (Policy document Culture and Economy: 'Value of Creation').

2010
The CRISP proposal is officially submitted to the FES subsidy scheme initiated by the Ministry of Economic Affairs and paid by from the Dutch Gas funds. The proposal was accepted by the Dutch Govern-ment on May 28th 2010. NWO has supported the process of receiving the subsidy and is responsible for the administrative organisation. CRISP consists of 8 projects and the total program is steered by 5 boards (SB, EB, PC, ISAB and BCP), which all complement each other in making the program a success. The Rutte administration renames the key domains as Top Sectors. The Creative Industry becomes one of the 9 Top Sectors. This results in the foundation of CLICKNL, the national knowledge office for the Creative Industry. CLICKNL, like CRISP brings together science, industry and the creative industry in order to develop knowledge and insights.

January 2011
The Creative Industry Scientific Programme (CRISP) officially kicks off. The ministry of Culture, Education and Science (OCW) supported CRISP extensively during the application process. The final ordinance was sent by the ministry of OCW to the CRISP consortium.

PREFACE
Paul Hekkert

When we started CRISP nearly two years ago, we were not confident that 'it' would work. "It? What 'it'?" you may be wondering. Well, 'it' involves conducting eight diverse and multidisciplinary research projects; it concerns keeping the focus of CRISP on Product Service Systems; it deals with collaboration between academics, designers, and specialists from industry and the public sector; and it refers to our aim to have a qualitative and economic impact on the creative industries.

As you leaf through this magazine, you will notice that all eight projects are now up and running. Some of them already have much to share: for example, that designing PSSs is a complex, multi-stake-holder activity, where the role of the designer has changed / shifted, requiring us to redefine what we mean with designing. Other projects are still exploring the fundamentals of their objectives, and the seeds they are planting promise a fruitful garden of knowledge. In this magazine, it will be evident to the reader that every CRISP project-member has acknowledged the power PSS design holds for creators and users alike.

For CRISP, it has been and remains a major challenge to have such divergent parties collaborate so closely on research projects. Where academics traditionally want to take small steps with an eye to under-standing, practitioners notoriously ask for concrete and applicable results…or so the thinking goes. Our projects show that both parties can work intricately together when they let go of their assumptions; fortunately, both are more than eager to do so.

Will CRISP have the profound impact on the creative industries we anticipated and promised? Perhaps it is yet too early to say; but the stories in this magazine clearly demonstrate that we are on the right track. In an effort to convince a wider audience of the merit of our work, this magazine tells you about what we are aiming for and where we stand; it shows what CRISP can offer you and your organisation. Most importantly, it demonstrates the dedication shown by every pro-ject member towards 'its' successful execution.

To conclude, a word of thanks: CRISP owes much, if not all of its success to Cees de Bont, whose abiding faith in this programme and drive to make it happen make him difficult to replace and impossible to imitate. I will not even try.

PAUL HEKKERT — *1963*

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· Co-founder and chairman of the Design and Emotion society
· Chairman CRISP Executive Board

TWO LINES TO TELL OUR STORY…

Introducing the changing role of the designer

"…don't you design chairs anymore?" does not come out of the blue. Ok, we may exaggerate a bit but what do designers do if it's not designing chairs? And what will they do in the future? In this story line we elaborate on the changing role of designers in general and within the different CRISP projects.

Introducing Product-Service Systems

So we're not designing chairs, but experien-ces, memories, behavior and ways of living in the shape of Product-Service Systems. What's in the name? What does this mean for designers, academia, industry and practice?

The Wattcher is an electric plug that monitors energy usage in residential buildings and makes inhabitants aware both of the costs and their usage. The savings resulting from this awareness can range from 10 to 20%. The original concept was developed by an inventor called Innovaders. At FLEX, we saw an entrepreneurial opportunity and approached Marcel Wanders to come up with an initial design. We further developed the product, through user tests, interface design and final production. Design consultants increasingly take on this entrepreneurial role, not waiting for business to come to them but actively seeking such opportunities.

Jeroen Verbrugge is director at FLEX and studied Industrial Design Engineering at TU Delft. In 2012, he was the first industrial designer to receive a doctorate degree from the University of Twente for his dissertation 'Creative Reflection'.

THINKING BEYOND THE BOX

Jeroen Verbrugge

Why is it that designers are so valuable in the development of innovative products and services? Other disciplines, when presented this question, often mention our tendency to think 'outside the box.' As globalisation continues to lower the threshold to entry, companies find it difficult to distinguish themselves through technological superiority. Where that business-as-usual approach is no longer effective, designers consider a much broader scope of solutions.

Sometimes, however, we are asked to think about the box and we begin to wonder what more the box can do. Take, for instance, a case where KPN asked us at FLEX to redesign the packaging of their do-it-yourself internet, tv, and telephone installation box. Their original box caused major problems with the end-user and when we examined it, we immediately saw what the real issue was. Yes, there were issues with how the box looked; the plain box with all the required tools tossed in failed to match customer's expectations of the KPN brand. But customers were also at a loss how to go about installing the product, often opting for the most important-looking element first. The box did not provide any support to facilitate or to explain the installation. In our view, we should not only prettify the box, but we should broaden the brief to a much wider scope of solutions, including the packaging as a means to support and simplify the do-it-yourself installation. Designers have come a long way from only making things pretty.

With that early insight we set to work and within five weeks we could present customers with an early prototype that guided them through the installation step-by-step. It is an example of what Tom Kelley of IDEO has said: "Prototyping is the shorthand of innovation." I wholly agree with that idea and I think that that is where our strength lies; instead of trying to analyse an issue until all the variables are

determined, we quickly synthesise an early idea, analyse it to determine why we think it suitable for the current issue, and present it to potential customers so they can comment on it.

When KPN introduced the newly designed box, their support staff saw a sharp decline in customers calling for help with installing the product. With a small investment in design, KPN now saves 2.5 million euro yearly on support calls. What this example illustrates is that improving customer experience or profitability doesn't always revolve around breakthrough innovations. Sometimes thinking about the box itself is all that is required.

SOMETIMES THINKING ABOUT THE BOX IS ALL THAT IS REQUIRED
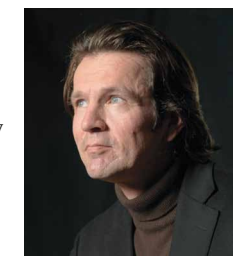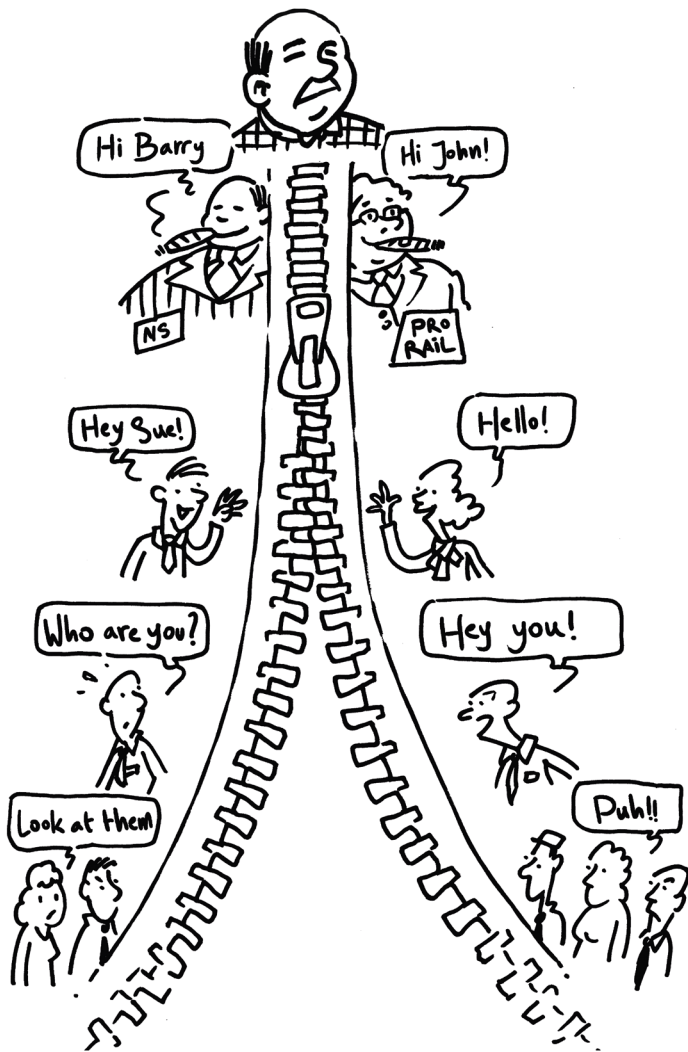
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INTRODUCING DESIGNERS TO THE BOARD

Giulia Calabretta

Designers can use and make visuals to open up a discussion. This example shows two companies that used to be one and still have to work as one. They know each other at the board level, but are complete strangers at the frontline. (Peter Quirijnen for DesignThinkers)

The innovation game has changed; the pace is quicker, the playing field is larger, and it's crowded with adversaries and allies. Businesses playing this game are faced with many strategic decisions: of product portfolio management, of innovation strategy, and of business diversification, to name but a few. Each of these decisions has a highly uncertain outcome, often involves a prolonged course of action, and necessitates significant resource commitment. The traditional approach to making these decisions would be to gather and assess all pertinent information, evaluate costs and benefits, and ultimately reach a decision based on conscious and rational deliberation. But in this new game, filled with uncertainty, complexity, and hidden interdependencies, this rational approach alone no longer suffices.

In our research, we suggest that businesses teamup with design partners to deal with the new rules of the innovation game and ensure that they keep winning at it. Design consultants often struggle to claim this role as innovation partners, given business' preconceptions of their skills and the difficulty connecting their work to the Key Performance Indicators that business managers are so fond of. Our research offers an answer to this struggle by exploring how design consultancies add value to their clients by improving their decision-making in the turbulent innovation playing field. Thus, design consultants don't influence their clients' KPIs directly, but indirectly by improving their clients' decision-making capability.

Unlike the firms who hire them, design consultancies are more likely to use an intuitive decision-making approach that, while encompassing the same building blocks as rationality — problem definition, analysis, and synthesis– is faster, often subconscious and deeply intertwined. Intuition relies on chunks of knowledge accumulated by decision makers over time and on their ability to generate solutions by recognising patterns and making holistic associations. Unlike rational decision-makers, whose effectiveness is largely determined by collecting and assessing as much information as possible, intuitive decision-makers rely more on meaningfully selecting and connecting new information with the knowledge they already have. In situations where time is scarce and information is never complete — as is often the case in the innovation game, the latter approach can be more efficient and successful. Rational decision-makers also have a tendency to approach new problems as variations of previously experienced problems. This might bias their decision-making towards incremental innovation.

Design professionals help rational decision-makers in their search for truly innovative solutions to overcome these narrow problem formulations through the use of visual artefacts. Where verbalisation might be difficult and limiting, these visuals make connections across concepts clearer and make neglected cause-effect relationships explicit, facilitating a more open discussion on radical directions for innovation.

As experienced users of associative thinking — the core of intuitive decision making — design professionals play an important role as knowledge brokers in the innovation strategy of their clients. The designer's inclination to connect seemingly unconnected elements helps clients overcome the boundaries of their specific industry, market, and department within the company. Thus, design professionals can approach and resolve their clients' strategic issues in innovation through effective matchmaking.

Although managers have come a long way to recognising the value of intuition, they sometimes still find it difficult to embrace the benefits it offers, especially when they need to take highly strategic decisions. As a consequence, presenting intuition decision-making as 'the alternative' to rationality in innovation decision-making might not be a winning approach. Our research suggests that when design consultancies position their approach to innovation as complementary to a rational one (rather than an alternative to it), they are more likely to gain the clients' trust and become a key innovation partner.

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CLIMBING UP THE VALUE CHAIN

Gijs Ockeloen

Each year, our educational system pumps more design professionals into the design ecosystem which leads to the question, 'What are all these designers going to do?' Although people in academic circles may think that the Design profession has been undergoing a transition, it seems to me that, in practice, most designers do more or less the same things they have been doing for ages: cutting foam, shaping clay, and organising pixels!

Most senior studio managers I talk to have a pessimistic outlook on the economic prospects of this type of work. As much as I agree a shift is needed, I think it a myth to say that it has already taken place. Worse still, I happen to think that design has lost a lot of its more promising appeal to obsessions with style, fame and trends. As design became mainstream, and designers reached rock star status, the bulk of their talents and efforts was directed to museums, coffee table books and birthday present boutiques. CRISP gives us the opportunity to recalibrate our professional compass. We don't need to completely reinvent our profession: all we need to do is remember what design was about in the first place and check whether the time is right to put specific design aims back on the agenda. One thing that surely deserves to be put back on the agenda is 'Information'. Consider architect Robert Venturi, who characterised our 'mother'

profession, architecture, as an 'information surface' almost half century ago. Of course, when he wrote 'Learning from Las Vegas', he was thinking about billboards, neon sings and logos. In those days, the early seventies, his building designs seemed bizarre enough to be considered as being vernacular. But looking back, Venturi may have been pointing out something that will become commonplace once innovation provides us with the technology of screens printed on cans of soup or wallpapered onto a building. The information surface will become a truly challenging reality not only in architecture, but even more so in design.

IT IS TIME TO PUT CERTAIN AIMS BACK ON THE AGENDA

As designers start to think more about how a product handles information, this will certainly change their role. One of these shifts is to focus upwards along the value chain. Consider the following example. If you were asked to come up with suggestions to develop a

RECALIBRATING OUR PROFESSIONAL COMPASS

The core of designing still stands. Even though the designers' role might be changing. Understanding people's lives, imagining futures and developing viable solutions still remains the same. However, designing services might present new challenges for designers.

sustainable highway, yesterday's way to go would be the 'hardware' approach. These hardware solutions might incorporate solar panels in street lights, increase the number of windmills, or offer an adventurous system to recover the energy stored in asphalt. Although these still are all valuable ideas, many consider them to be examples of common practice. In contrast, Venturi's son would take a completely different approach and probably look for improvements in the driving behaviour of drivers. When design solutions start to persuade drivers to adjust their cruising speed or deal with congestion more effectively, the net effects of this behaviour can be really impressive because they are repeated every single day.

Designers who see themselves as 'information surface' creators will want to make the road communicate. These designers will point their clients, usually in the business of boiling asphalt and spreading it around evenly, towards directions they should think about innovating. These clients also need to reinvent themselves, as their world has also changed dramatically. The redefined brief does not ask for a road, but a service to store, manage, assess, and communicate data.

It may initially seem expensive to develop a system that both reads a car's GPS data, extracts engine-metrics from the in-car management system, and provides the driver with feedback and recommendations regarding their driving speed.

These costs, however, should be compared to the costs of milling sensor loops into the pavement, placing displays alongside the road, and maintaining all the traffic lights. Consider the savings resulting from sensible driving behaviour: these costs can be saved once roads collect and communicate information, and will benefit a much larger group of stakeholders than just the road building contractor. These stakeholders must first be persuaded to invest in the project. The people in charge of the asphalt boiler have little interest in these calculations; this discussion will have to take place high up in the value chain.
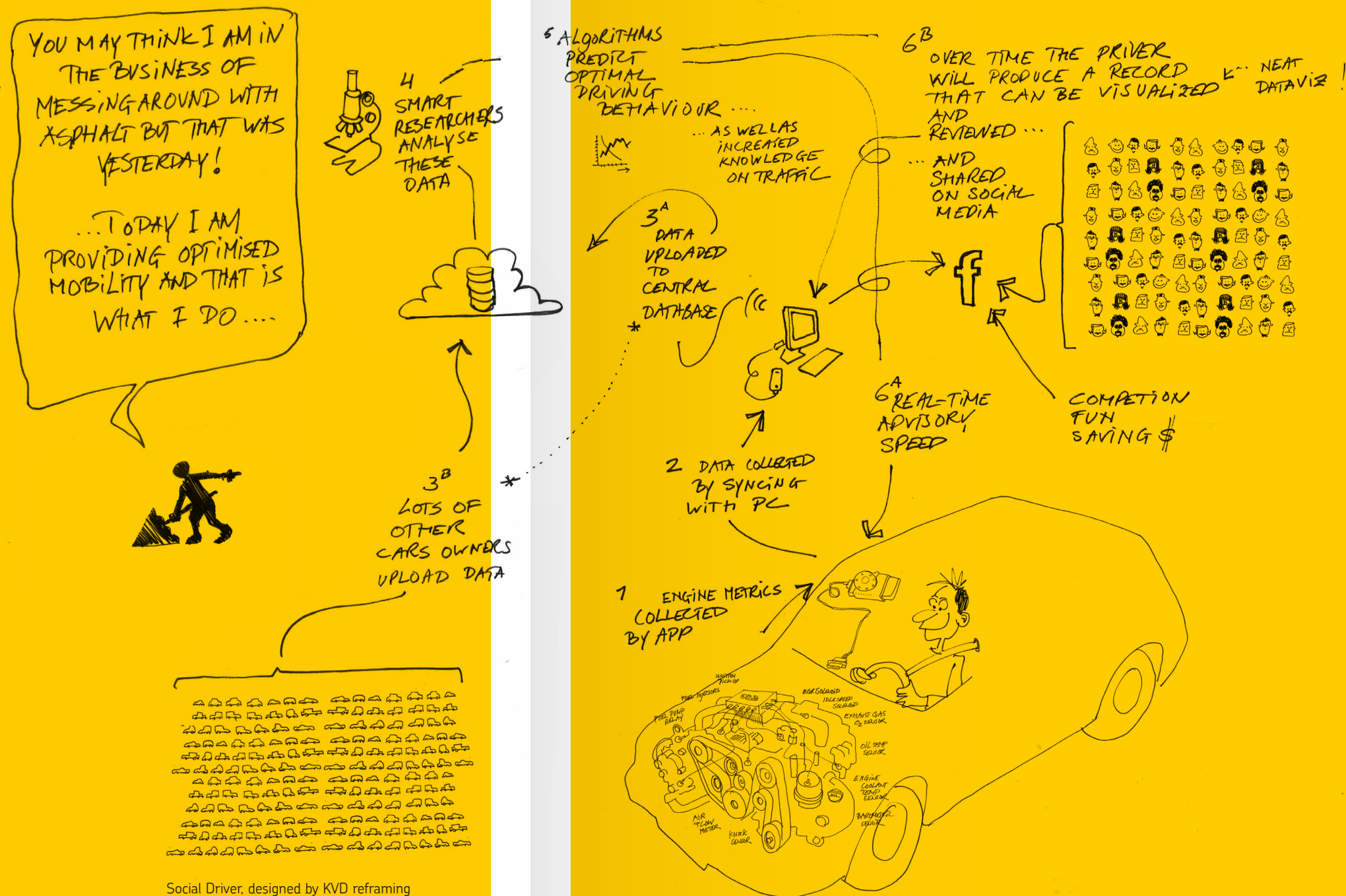
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Social Driver, designed by KVD reframing for Ballast Nedam in the N329 project.

Designing motivation. Changing human behaviour using game-elements. Achieving lasting change is difficult; people are often poorly motivated to change their status quo.

YOU ARE THE CONTROLLER

Persuasive Game Design—Game design aiming to create a user experienced game world to change the user behaviour in the real world.

Gamification—Design of game-elements applied on real-world attributes to create a user experienced game-world.

Transfer—Effect of user experienced game world on forming, altering, or reinforcing user-compliance, -behaviour, or –attitude, in the real world.

Game Designer · User · Game Designer + User

Real World

Gamification · Transfer

Game World

Persuasive Game Design Model
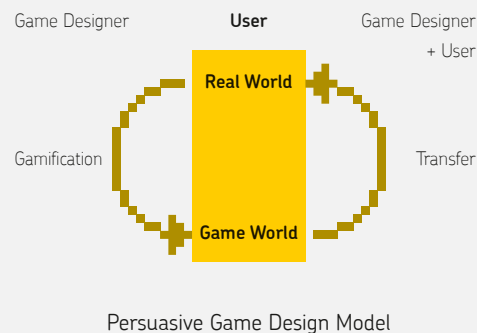
In his article, Gijs Ockeloen concludes with an example of how the effective use of information can influence or even shape the behaviour of, in his case, drivers. The G-Motiv project has a similar goal: changing people's behaviour by using elements of game design.

In the last decade, we have seen a surge of interest in theory of games, in how they are designed, how they are used, and for what purpose. Although this has resulted in some interesting overviews of the theoretical aspects of games, we have yet to see a unified model of persuasive game design — that is, the design of games aimed at behavioural change. At G-Motiv we proposed a first model integrating the process of game design with the design of behavioural transfer effects.

When people think of games, they often think of the attributes required to play a game. Consider baseball: using the baseball bat as it should be used is likely to generate a game experience. But a baseball bat can also be used for other purposes, for instance as a weapon. Using it in a different manner will therefore generate a non-game experience.

For this reason, we think that instead of asking "what is a game", the question to ask is "when is a game". When users experience games, they are typically immersed in a game world that is, to some extent, separate from the real world (c.f. Huizinga's Magic Circle). Game worlds differ from real worlds with regard to their behavioural consequences. For instance, unlike the real world, a game world often rewards winning at the expense of a fellow player. Game elements, such as competition, rewards, fantasy, challenge, physical interaction, are symptomatic for game worlds and motivate the user to behaviourally engage with the game world and make the game world experience enjoyable and immersive.

Game designers use these game elements as tools to elicit this game world experience in its users. Persuasive game designers take this approach even further: they not only aim to

elicit a game world experience but also seek to use this game world experience to achieve a transfer effect of a user's changed behaviour into the real world.

In the G-Motiv project, we aim to generate knowledge and prototypes for persuasive game design specifically aimed at social, physical, and mental healthcare. The Persuasive Game Design model (Visch, Vegt, Anderiesen & vdKooij, 2013) generalises the knowledge we have gathered in our projects. In the next phase of G-Motiv, we will not only use the model for inspiration to design our prototypes, but also to refine the model theoretically and turn it into an application manual for persuasive game designers. On the right hand page, we give an example of how we can use the model to change behaviour within the context of mental healthcare.

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PLAYFUL PERSUASION

Games and play can be used to persuade people to change their behavior. In the I-PE project gaming is used to lure children away from their TV's and video games to become physically active.
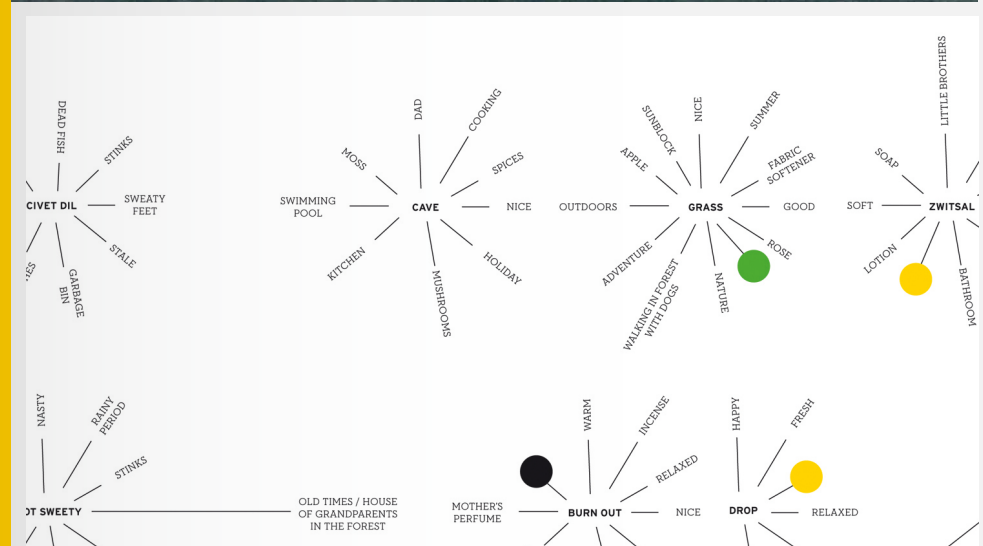
Susana Cámara Leret

TALKING SCENTS

smells can trigger vivid memories of previous experiences

DROP — RELAXED

PLANTS · CHILDHOOD

When people play a game, they hardly ever need external motivation; the game itself is sufficiently rewarding to keep on playing. One reason for this is that game designers use storytelling elements like characters and settings to entice players to keep on playing. However, the use of narrative is not limited to game design; it also forms the basis for many forms of therapy. As people are asked to relate their personal stories, they begin to detect patterns of behaviour that may aid or hinder their recovery.

One effective trigger for these personal stories is people's sense of smell: experienced as either pleasant or unpleasant, smells are often linked to, and can trigger vivid memories of previous experiences. We have been using this associative power of smell to explore the construction of meaning through personal stories in a series of experimental design workshops at the Mistral clinic and detox centre in The Hague. In this context of addiction and drug rehabilitation, we ask patients to explore emotional associations from their past. Using such an abstract tool for communication creates a low risk environment which encourages patients to talk about past experiences. We prepared these sessions in collaboration with the Olfactive Design Studio from International Flavours and Fragrances, and, this year, on the 10th of January, began the first of a series of interactive smell workshops with a select group of Mistral's patients. As these patients use the sensory stimuli to explore their emotional associations with the past, they aim to discover an encouraging, positive smell that they and Mistral can associate with rehabilitation. These sessions serve to reveal and characterise ways in which the different stages of rehabilitation in the clinic are experienced.

DEAD FISH · STINKS

CIVET DIL · SWEATY FEET · STALE

SWIMMING POOL · KITCHEN · MUSHROOMS · HOLIDAY

MOSS · DAD · COOKING · SPICES

CAVE · NICE · OUTDOORS

APPLE · SUNBLOCK · NICE · SUMMER

ADVENTURE · WALKING IN FOREST WITH DOGS · NATURE · GRASS · ROSE · GOOD · FABRIC SOFTENER

SOAP · LITTLE BROTHERS

SOFT · LOTION · ZWITSAL · BATHROOM

GARBAGE BIN

NASTY · RAINY PERIOD · STINKS

OT SWEETY · OLD TIMES / HOUSE OF GRANDPARENTS IN THE FOREST · MOTHER'S PERFUME · BURN OUT · NICE · DROP · RELAXED

WARM · INCENSE · AAPHI · FRESH · RELAXED

ALICE WILL TAKE CARE OF YOU

Johan Hoorn

Such personal insights will provide the basis for the concept and design of a product-service system which will focus on the long-term effects and needs of rehabilitation, once treatment at the clinic ends.

The smell workshops, with their focus on the subjective, anecdotal and emotional aspects of personal life stories, highlight design's concern with the human scale. Paired with an incremental approach, design can provide valuable insights through first-hand, experiential data from people. During the first two sessions, we focused on blind smelling tests, where patients received the fragrances in white containers without a descriptive label. We quickly noticed that these exercises stimulated patients firstly to talk about what they were smelling, as well as to exchange personal experiences amongst themselves. So far, the workshops have offered several new experiences for the staff and the patients, as both became acquainted with the properties of scents. The patients explored the world through their nose and the staff considered the notion that scents may have personal and therapeutic utility and value. Using scents as a way to explore personal associations and memories can provide useful information for

subsequent therapy sessions. The outcomes and stories derived from such exercises will also add information to the quantitative studies from previous G-motiv initiatives, and will encourage designers, healthcare providers and patients to exchange information.

blind smelling tests stimulate patients to exchange personal experiences

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At SELEMCA, we think it is better to be taken care of by a loving robot than by a cold nurse; better to be offered a creative solution by a machine than a doctor repeating the same advices all the time; better to make a decision based on knowledge from the entire Internet than from your daughter who knows someone who knows someone who knows nothing; better to be entertained by a conversational agent who never tires of telling the same old story, than to face your children who are fed up with your Alzheimer.

That is why we think that Caredroids should have the following general purpose functionality: they should be capable of showing affection, be smart reasoners, creative problem solvers, and easy-going entertainers. They also need to be trustworthy, otherwise, people will get scared, which is why Caredroids should know about ethics. Finally, Caredroids should understand that you do not regard them as real. Although humans are quick to believe the lies of their fellow humans, they will reject the robot that tells them the truth. Taking all these requirements together suggests that the Caredroids need to be humanised.

We started humanising our systems by translating twelve years of research into how people dealt with virtual others into models of artificial intelligence. Our focus was on those aspects that are believed to distinguish humans from machines: emotion, creativity, morality, a sense of aesthetics and epistemics. We took these models and tested them against real humans in formal lab experiments but also confronted them with people from the field: patients, care professionals, and informal caretakers. All this information was (and continues to be) fed back into the system to further improve its human-like performance. On the one hand, this advances basic theory; on the other, it makes our systems more user-oriented. In doing so, we are now heading for electromechanical companions that can relate to what people believe is good, beautiful, and true, to what moves them

and entices their imagination because these machines themselves can have a human-like experience. In our quest to make Caredroids more humane, it is not enough to consider only the input of one or two disciplines. It requires that the concerns and expertise of the various stakeholders are brought together, so that the Caredroid can, for instance, take perspectives and change communication styles. Within the framework of SELEMCA, we also work with occupational role switching. Designers perform social scientific studies, computer scientists study ethics, health researchers worry about creativity, and psychologists have to think up novel interfaces. The role of the classic Industrial Designer changes just like the role of each discipline that enters the SELEMCA project. Instead of thinking about labels and boxes, we think in terms of 'heat maps': people may have their domain of expertise but this does not relieve them of the duty to delve into the field of the other. Everybody has a say in everything albeit from their own vantage point. Thus, everybody is a connector as well as a specialist, Industrial Designers included.

To avoid drifting away from the original plan (so called "scope creep"), we make sure that all our activities are motivated by the theories we study (e.g., creativity and emotion). We singled out a number of factors that are crucial for the user experience of virtual others, for instance, design issues regarding functionality, aesthetic appearance, realism, and use intentions. But of course, Industrial Design encompasses far more than what is necessary to build a Caredroid.

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CARE-DROIDS IN THE PRESS
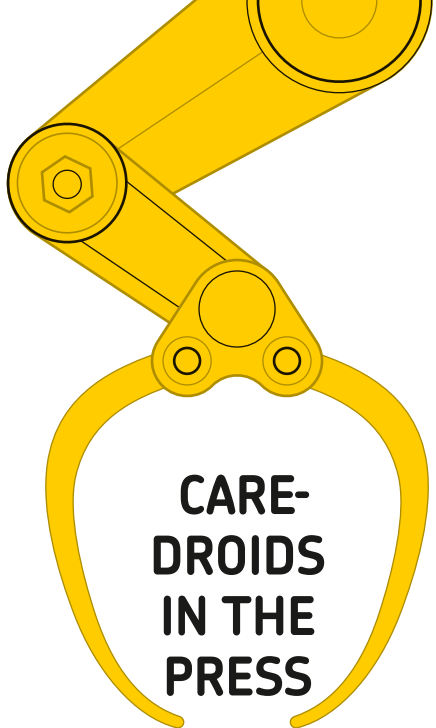
SELEMCA addresses a hot topic and consequently has managed to generate a lot of press attention. Few people remain unaware of our aging society and the changes required in healthcare, and many are also interested to hear how caredroids learn to deal with difficult concepts such as emotions and ethics.

Robots in de Zorg

Het aantal ouderen met gebreken zal de komende jaren zodanig toenemen, dat het huidige bestand aan jongeren dat de zorg in wil bij lange na niet aan de vraag zal kunnen voldoen. Cijfers zijn overal te vinden, dus daar gaan we in dit artikel niet op in. Waar we wel op ingaan zijn de mogelijkheden en beperkingen die de inzet van robottechnologie met zich meebrengt. Kunnen we wat leren van de inzet van robots in de industrie

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Wondere wereld — integratie van emotionele intelligentie in zorgrobots

Samenwerking tussen mens en robot zal steeds vaker noodzakelijk zijn met de toenemende vergrijzing. En de tijd is er ook rijp voor. Robots worden steeds slimmer. Ze doen mensen in bad, brengen ze naar de wc en strikken de veters. Ook zijn er sociale robots, zoals Paro, een zachte witharige knuffelrobot voor ouderen met dementie. Of Alice. TvB Zorg duikt in deze wonderlijke wereld.

Matthijs Pontier werkt als postdoc bij CAMeRA (Center for Advanced Media Research) aan de Vrije Universiteit (VU) Amsterdam binnen het SELEMCA (Services of Electromechanical Care Agencies) project. Zijn achtergrond is Kunstmatige Intelligentie en Psychologie. Tijdens zijn promotieonderzoek ontwikkelde hij emotionele intelligentie voor computers. Over SELEMCA zegt hij: "Dit project valt onder het door de Nederlandse overheid gefinancierde Creative Industry Scientific Programme (CRISP), een overkoepelende organisatie die zich richt op de ontwikkeling van een kennisinfrastructuur in de creatieve sector. SELEMCA kent diverse projecten. In elk project zitten verschillende partijen. In ons project zijn dat zorginstellingen, universiteiten en de creatieve industrie. De focus ligt op robots en 'agents'. Het verschil? Wij noemen alles een robot. Maar bij een robot denkt iedereen aan een robot met een lichaam. Daarom maken we een onderscheid met 'agents'. Dit zijn computerpoppetjes die op een beeldscherm te zien zijn. Ze hebben dus geen fysiek lichaam. Denk bijvoorbeeld aan een poppetje op een scherm dat helpt bij zelftherapie."

Speeddaten

"Tijdens mijn promotieonderzoek heb ik op basis van psychologische en sociaal weten-

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Robots kunnen positieve bijdrage leveren aan de zorg

Robots die kunnen helpen met patiëntenzorg schieten als paddenstoelen uit de grond. Hoewel de robots alleen zijn bedoeld als ondersteuning, is de acceptatie het grootste probleem.

Het Kivi Niria jaarcongres dat op 11 oktober plaatsvond, richtte zich dit jaar op de techniek binnen de zorg (zie pagina 7). Tijdens het congres keek de ingenieursvereniging of de inzet van techniek het tekort aan goed geschoold personeel kan opvangen en of de zorg wel behoefte heeft aan de tot nu toe

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Caredroid over twee jaar beschikbaar voor ouderen

Over twee jaar is een sociale robot beschikbaar die met eenzame of demente ouderen praat, hen motiveert te bewegen, en uitzoekt welke hulp ze het beste nodig hebben. Deze Caredroid gaat binnenkort voor de laatste onderzoeksfase aan de slag in Amsterdamse zorginstellingen, als Mentrum, Osira/Amstelring, Alzheimer Amsterdam. Dat meldt het dagblad Spits.

'De Caredroid kan zeker een forse kostenbesparing zijn in de toenemende zorgkosten', stelt Matthijs Pontier, onderzoeker/psycholoog op de website van het dagblad. 'De robot is sociaal-emotioneel intelligent, kan morele beslissingen nemen en communiceren. Dat kan betekenen dat de robot vraagt hoe een oudere zich voelt, of aanspoort tot het maken van een wandeling bijvoorbeeld. We stoppen veel patiëntenkennis van de zorgverleners in de robot. Ook leert de robot van haar ervaringen met patiënt, 'leert' hem/haar kennen en bouwt zo een persoonlijke relatie op.' Voor dat doel heeft Pontier software voor emotionele intelligentie en moreel redeneren op elkaar aangesloten.

Prototype

De komende twee jaar kijken de onderzoekers naar de interactie tussen de doelgroep en de robots. Aan het eind van deze periode is er een prototype dat in productie genomen kan worden, voorspelt Pontier. 'Het gaat er niet om dat de zorg vervangen wordt door de robot, maar dat deze een aanvulling is. Om bijvoorbeeld telkens opnieuw


Sociaal intelligente robots: droom of werkelijkheid

Er is geen twijfel over mogelijk: robots worden steeds slimmer en gaan in de toekomst steeds meer taken van de mens overnemen. Dat er al robots bestaan die u een glaasje water kunnen brengen is niets nieuws maar een robot waar u een gesprek mee kunt voeren wel.

Tijdens de boekpresentatie van *Overal robots—Automatisering van de liefde tot de dood* waren sommigen toch nog sceptisch. Zo dacht iemand dat robots nooit sociaal intelligent konden worden. "Een robot stamt niet af van apen, mensen wel". Ook waren mensen bang dat robots in onze samenleving zouden leiden tot desocialisering. Dr. Matthijs Pontier, werkzaam aan de Vrije Universiteit Amsterdam denkt dat dit wel mee zal vallen. "Ik denk niet dat robots leiden tot desocialisering. Als robots zich sociaal-emotioneel menselijk gedragen, waarom zouden we dan onze menselijke vaardigheden verliezen? Sterker nog, robots worden succesvol toegepast om mensen met autisme meer sociaal vaardig te maken," vertelt hij in een interview aan Scientias.nl. Pontier ontwikkelde een model dat robots sociale intelligentie geeft en is nu bezig met een model dat hen moreel kan laten redeneren. "Een sociaal intelligente robot kan wel degelijk werkelijkheid worden".

Wat dacht u toen u deze robot voor het eerst zag? Dacht u niet eerst aan een mens? Dat is helemaal niet zo vreemd; er zijn meerdere mensen die dit dachten. Philip lijkt zeer echt, maar schijn bedriegt: zodra hij begint te praten valt u op dat er iets niet klopt en dat kan u letterlijk rillingen bezorgen. "De zogeheten Uncanney Valley theorie" vertelt Pontier. "Als mensen iets zien dat op een mens lijkt maar toch ook weer niet, dan vinden zij dit beangstigend. Iets wat duidelijk niet tot onze soort behoort, vinden zij niet eng. Er is nog sprake van een duidelijke 'mismatch' tussen mensen en humanoïde robots. Deze laatste hebben al een menselijk uiterlijk, maar gedragen zich er niet naar en dat bezorgt

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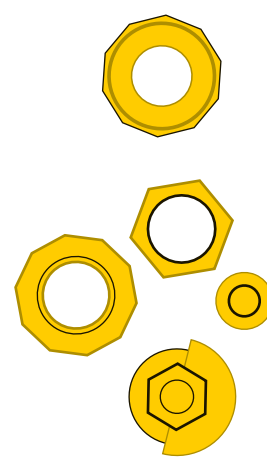
Robots in de zorg goede aanvulling, maar ze moeten gevoeliger worden

Robots worden steeds slimmer. Ze kunnen bestaande zorg dan ook goed aanvullen: er zijn al robots om te knuffelen, veters te strikken en als huisdier. Maar als robots met mensen in contact komen, moeten ze ook gevoeliger worden.

Voor industriële en huishoudelijke taken, zoals auto's monteren, stofzuigen of grasmaaien, zetten we in toenemende mate robots in. In Nevada mogen sinds een jaar de eerste robot-auto's zonder bestuurder de weg op. Door samen een treintje te vormen passen er 273 procent meer auto's op hetzelfde wegdek. Auto's die zo ook nog eens veel zuiniger rijden.

Ook in de zorg kunnen robots ingezet worden. Een succesvol voorbeeld is Paro, een zachte witharige knuffelrobot voor ouderen met dementie. Uit onderzoek blijkt dat deze aaibare robots veel positieve effecten hebben op het welzijn van deze ouderen. Ook worden AIBO robothondjes ingezet om eenzaamheid te voorkomen bij ouderen in verzorgingstehuizen. Dit blijkt

With the design of Intelligent Play Environments, playful persuasion encourages social and physical play to promote well-being.

PLAYFUL PERSUASION

Tilde Bekker

YOU MAKE THE RULES!

Pepijn Rijbout

At first glance, the Intelligent Play Environment (I-PE) project may seem remarkably like that of G-Motiv; both projects use game elements as triggers for motivation in an effort to solve societal issues. There is, however, a clear difference. What I-PE seeks to do is to learn how to design play environments built around open-ended and decentralised intelligent game concepts. With these play environments, we want to playfully persuade people to change their behaviour.

Consider, for instance, the play of children. Play takes a large role in a child's development, as it helps them practice new (social) skills and explore imaginary worlds. In the past, children's play took place outdoors and was highly social and physical in nature. With the temptations of television and video games, children are not as physically active as they once were, which may lead to serious health risks. Another negative consequence is that, as a lot of their communication takes place in a virtual as opposed to the real world,

children's development of face-to-face social skills may also suffer. What if we could come up with a form of play that is an attractive alternative to computer games and television: a form of play that adds interactivity to the playground and enriches outdoor play in an appealing way? As we took on this challenge, we quickly learned that there is no straight-forward approach to designing for play, because it can take so many forms. You need to think about what form of play the design should inspire: should it be physical or social, or a type of fantasy play, or a combination of these? Besides form, you also have to choose the type of experience: playful experiences can be triggered by a sense of curiosity, or of exploration; by a challenge, or competition or fellowship between players.

To further complicate things, play often develops over time, with several distinct phases. To ensure that people keep playing, the play environment needs to support players as they progress from invitation, to exploration, to immersion. A game may initially be inviting, but as time progresses, it may stop being interesting. On the other hand, if the initial learning curve from invitation to exploration is too steep, players may quickly give up. Because so much is still unknown at this stage, we follow a research-through-design approach. We give our students a basis of theoretical assumptions and a design brief. They use these assumptions to create prototypes in various iterations, and try to validate their design decisions by involving users in evaluating the outcomes. We subsequently analyse the results of their work to test our initial theoretical assumptions and, of course, correct where needed, resulting in general rules that we can use in subsequent student assign-

ments. A benefit of this approach is that, instead of having design-relevant knowledge only at the end of the four-year project, we quickly come to useful insights, not only for our own research but also for other organisations involved in the project. We've learned, for instance, that open-ended play is ideally suited to elicit social interactions. What makes this approach more effective than, say, a functional approach, where you explicitly tell people how to behave, is that this type of play environment triggers people's intrinsic motivation. Because the game itself does not provide clearly defined rules, people will need to cooperatively negotiate what rules they want to incorporate in their playful activity.

We have bundled our initial insights of 'things to consider during the design process' in a theoretically supported framework. It helps in considering how the choices we make in our designs (MICRO level) are influenced by the considerations of higher level issues (MACRO), such as what experiences we are designing for. At the same time, practical concerns at the micro level might limit the ambitious goals at the macro level.

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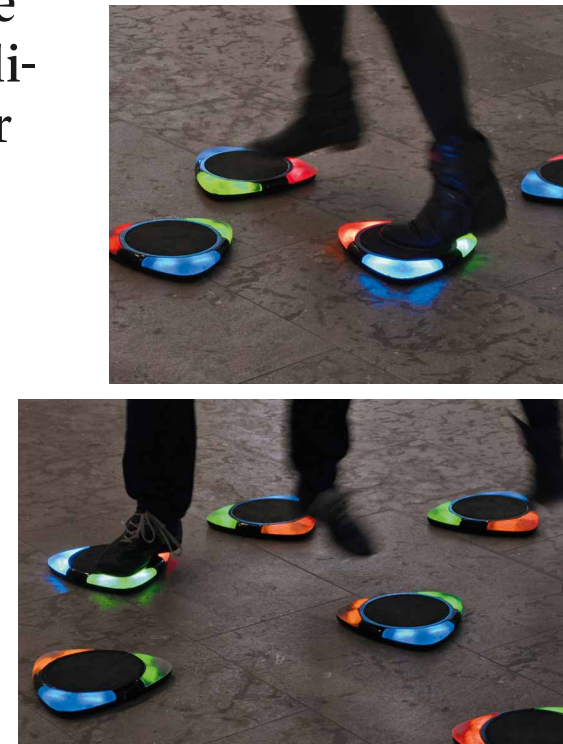· Project leader CRISP project I-PE
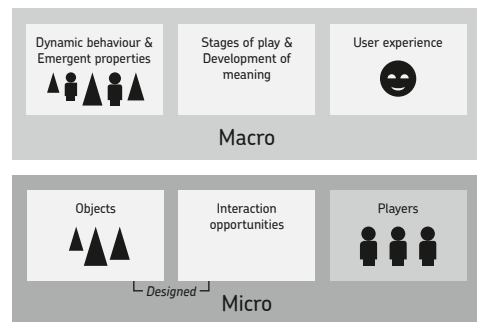
Context of play

As an open-ended play environment, the design should not explicitly provide games or narratives.

As children play, the rules of their games are often not predetermined but defined and changed in the moment. The Intelligent Play Environments project (I-PE) investigates how we can create play environments that support such open-ended play. Instead of designing one central play element, we chose to create environments that consist of multiple interactive objects: each object has a computing device, can communicate with the other objects, can sense touch and the presence of a player, and in turn emit either light or sound which allows players to interact with the environment. As objects in these environments can communicate with each other, they can begin to show complex behaviour. This requires that the interaction design looks beyond the interaction with individual objects to explore how players can use multiple objects to define their play. If for instance, an object can pass 'its' light to other objects, the player's interaction focus moves from the interaction with objects to those changing lights.

In this project, I am investigating how the object's interaction rules can be designed so that play is supported. Designing interactive objects for play involves designing local interaction rules [MICRO] as well as rules, for the complex behaviour of multiple objects [MACRO]. I explore the relations between these aspects by actually designing, build-

ing and programming environments. A first iteration led to the development of Flow-Steps: programmable mats that can detect a user standing on them and can emit light. As a test, we built ten FlowSteps and let ten children between the ages of 6 and 8 play with them. We noticed that, although a moving light can lead to competitive play, the scarcity of a colour can lead to cooperative play, as children start to discuss how to 'catch' the light when it appears. In developing the Flow-Steps, we also experienced what taking on such a design challenge requires. One thing we've learned, for instance, is how closely related technical development and play

design are, which makes defining the design much more difficult. From a technical point, the system should provide interaction opportunities that stimulate players to interact, and move, and shape their play. At the same time though, as an open-ended play environment, the design should not explicitly provide games or narratives.

As we begin to understand how to approach this design process, the role of the partners involved in this project also becomes clearer. Almende, for instance, as one of the technical partners in I-PE, are investigating how the data gathered from the play environment can be used to analyse the behaviour of players. With this knowledge, Almende may come up with new software solutions that can be incorporated in the next iteration in I-PE. The creative partners, Driessens and Verstappen, are supporting our design process by exploring the opportunities our prototypes offer and providing us with valuable examples, to be further discussed in the following article. We believe that traditional approaches to the design process might no longer apply. Designers need to collaborate with partners from a very early stage, incorporating their vision and knowledge during each step of the process and, together with partners, define their roles.

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CREATING A SUPER ORGANISM

Erwin Driessens & Maria Verstappen

It is not often that we, as artists, get the opportunity to play a role in a larger group of designers. So, when TU/e invited us to participate in the I-PE project, we were interested in the concepts it explores, of open-ended play, of emergent behaviour, and of decentralised cooperation.

For some time now, we have worked on developing systems that create creativity, that is to say, systems that serve as fertile ground for creative processes to arise and flourish. Many of our projects involve massive interactions of simple components and simple rules. These interactions often lead to unplanned and unforeseen complex and dynamic wholes, with intricate features and global effects. With the FlowSteps prototypes, we recognised an interesting opportunity to experiment with possible rules and behaviours. We have begun implementing a computer simulation of a set of 50 FlowSteps which allows us to experiment rapidly with the possibilities in a relatively easy way. We stay close to the hardware in question so that we can eventually transfer the simulated FlowSteps algorithms to the actual prototype play elements.

Our aim is that the group of FlowSteps act as if it were a super organism, influenced by player activity. In our current simulation, each FlowStep has an identification number and can listen to the messages that other FlowSteps broadcast. We assume that they can determine the relative proximity of neighbouring FlowSteps by analysing the strength of the incoming radio signal. After a while, when each FlowStep has formed an idea of its surroundings, it knows how dense the local environment is and this density measure affects its behaviour. As the player interacts with the play elements, by moving them around they change the configuration, thereby changing the dynamics of the FlowStep super organism.

We have come up with a few simple FlowStep rules that seem to invite a variety of possible play scenarios:

1 — Each FlowStep can be in one of two colour states, let's say blue or green.
2 — Each FlowStep sends a "I (23) want you (8) to become colour *" message. The numbers between brackets are the agent IDs and the asterisk is their current colour. The frequency of the message depends on the local density of agents, and the FlowStep will only send a message to a nearby FlowStep.
3 — When a FlowStep is in a high-density environment (closely surrounded by at least 6 others), it will change its current colour.
4 — When a FlowStep is pressed by a player, it changes colour.
5 — When a FlowStep changes colour, it emits a specific sound, belonging to that colour.

These rules lead to chain reactions whose outcomes are somewhat unpredictable, as they are affected by the exact timings of the messages and the choice of neighbour to send the message to. The rules do not dictate what game to play. They are hidden from the players, who can learn them through interacting and experimenting with the FlowSteps. The actual dynamics of the simulation, showing the changing patterns that occur over time, is lost in the static images. They do, however, give an impression of how spatial arrangement can be a fertile game element.

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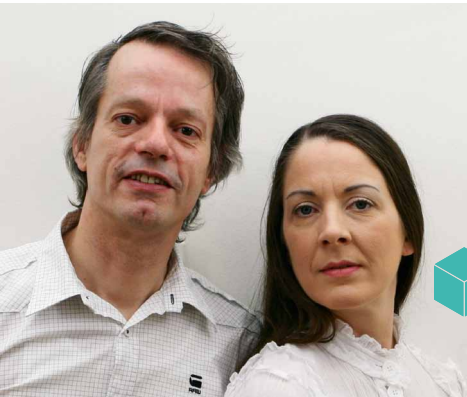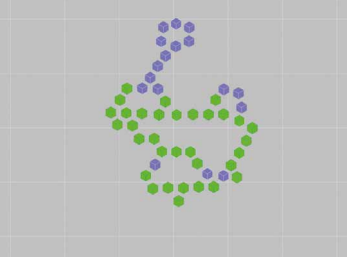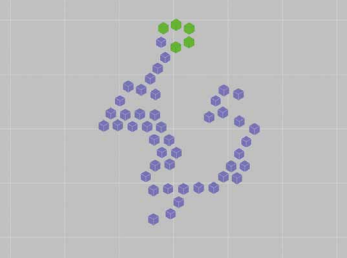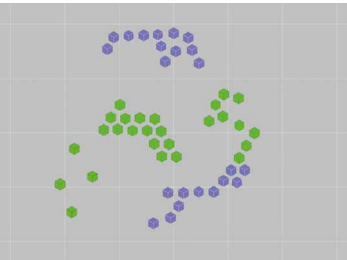
THE POWER OF BEING IN-BETWEEN EVERYTHING

Bas Raijmakers

A designer friend works at the British National Health Service as a coach of innovation teams. She told me once that she often gets asked the question: **"Don't designers make chairs anymore?"** Well… many don't actually, and for a good reason.

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· Owner and creative director at STBY
· Member CRISP Programme Committee

Making chairs is no longer a designer's most valuable skill, and many like to set their teeth into something more challenging: creating Product Service Systems that address societal problems or business opportunities. They'd rather design health services than waiting room chairs.

Unlike a chair however, the creation of Product Service Systems requires a holistic approach. Simply put, we need to think of everything at the same time when we create PSS or services, as most people have come to call them. A playground can be seen as a few objects that need to be sturdy and properly fixed and maintained, but once you start to connect playgrounds to helping kids and their families live more healthy lives and fight obesity, there is much more at play than a nice and safe slide. Suddenly, the design requires, in addition to the engineers and designers, input from social workers, health professionals and city marketeers. It might even be relevant to engage artists, software engineers and game developers. Each of these professionals would have something exciting and relevant to contribute to solving these complex problems. The question is, "How can they do this together?"

That is where typical design skills like connecting and synthesising come in , however these are perhaps not immediately obvious to those who see designers as chair makers. Solving complex problems calls for fresh and diverse perspectives that different disciplines, from artists to social workers in the case above, can bring to a project. These perspectives help us to think beyond the limits of each individual discipline. But when everyone thinks outside the box, how do we bring things together again? After all, we need a coherent answer to child obesity. This is where designers are starting to develop new roles for themselves, as connectors and synthesisers. Designers enable the mutual sharing of expert knowledge, for instance, by bringing it together in strong visualisations that then form a foundation for co-creation.

By positioning themselves in-between all the experts involved, as opposed to claiming their own clearly-bounded turf, designers can overcome some of the limitations of well-defined silo-boundaries found in many projects and organisations. By no longer being chair makers but something less tangible, designers gain the necessary freedom to explore possible solutions on a strategic level, in-between the silos of the different disciplines involved. They can't do this on their own, but they seek the help of others, from kids to all kinds of experts. If you happen to be one of these 'new' designers, don't forget to tell people why you stopped making chairs!

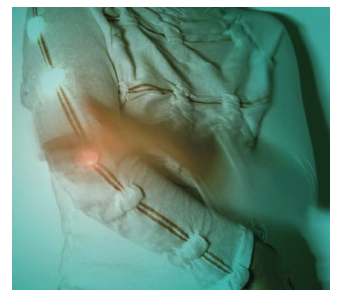# DON'T YOU DESIGN CHAIRS ANYMORE?

KNITTING THINGS TOGETHER

With Product Service Systems, prototypes can also be used to design touch points, the internal structure of organisations, the value networks, and business models.

A typical design skill is making prototypes. These prototypes are no longer used to get a sense of the actual product to-be-designed.

An inspirational test bed enables textile developers to understand the multi-disciplinary opportunities and challenges of creating Smart Textile Product Service Systems.

MAKING OPPORTUNITIES TANGIBLE

The textile companies that remain in the Netherlands are struggling to stay profitable: competition, high technological know-how and a culture of cost-focused SME companies makes it difficult for this industry to collaborate and combine their strengths. Although there are many interesting smart textile concepts, we have seen few relevant examples that are producible and valuable for our society: the 'killer application' has not been found. That is why it is important that multi-disciplinary parties teamup during the ideation process to come up with innovative solutions. In the Smart Textile Services project, we are exploring new applications for smart textiles and stakeholder adoption. We try to create shared ownership of the ideas and solutions through collaboration and engagement in workshops where we invite people from a variety of disciplines: fashion designers, interaction designers, textile engineers, and service providers. We hope to provoke innovation and collaboration not only in workshops, but also when people return to their company, institute or service.

These workshops are also a great way to explore the technology available. As designers and engineers come together, they start to experiment with the materials and look beyond the traditional approach. Together, they can go beyond the boundaries and explore radically new ideas. In June of last year, we organised a full-day workshop "Beta textiles, Textile and Code", which was hosted by Waag Society in their FabLab, an environment where people can rapidly prototype their ideas. In this workshop we were interested to learn who should take the lead in such a project. To reflect the real-world situation, we invited participants to act

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CROSSING BOUNDARIES

The Smart Textile Services project uses prototypes as boundary objects to collaborate with the project partners. Lilian Henze is building a framework to map all interactions between partners in PSS development and the use of boundary objects to support these interactions.

as fashion designers, technology experts, and textile engineers in the morning and collaborate in multidisciplinary themes during the afternoon.

The most challenging and at the same time most rewarding moment during the workshop was right after lunch. We had asked the group who worked as fashion designers in the morning to come up with a shape for the garment and after lunch the other participants from the "textile engineering" group and the "technology group" had to decide how their expertise and input would best suit the concept of their choice. Each of the resulting six groups brought participants from the different disciplines together.

With the goal to have a working prototype at the end of the day, the groups set to work with knitted fabric that was produced in collaboration with the TextielMuseum. One of the fabrics had conductive areas to measure stretch and the other fabric had integrated circuitry and pockets for LED lighting. This set-up ensured that the participants could start immediately, instead of first having to produce a smart textile themselves.

One of the great things about the Smart Textile Services project is that through these workshops there are so many tangible objects to show our progress and inspire other companies. At the end of the Beta textiles workshop, we had six iconic garments that all made use of technology: a dress that could shorten the hem line with actuated thread, or one that can sense movement and heat up and emit light when outside. Although the prototypes were only made in a day, and some parts quickly stapled together, they clearly illustrate what people can do and want to do with these smart textiles. At the end of the workshop the participants were asked to

think about how the textiles could be improved to better suit their needs, while the academia reflected how to solve the collaboration issues they came across during the workshop. This workshop is one approach to foster collaboration between partners with very different backgrounds. But in real-life projects we are stimulating multidisciplinary collaboration as well.

The textile used in the workshop may be used for a broad range of applications. A first prototype used to explore this application is a touch sensitive garment: Tender. It is made of a technical knit textile, which has programmable microchips in each pocket integrated into the material. These microchips can react to different inputs and perform a range of actions. In this touch-sensitive prototype, the garment reacts to stroking: by bringing the pockets into contact with the wearer's skin, the individual pockets light up. This feature of the garment can be used to gather light around the neck, or around the chest area as a reading light, or as a spotlight near the hands. vimeo.com/51436809

Many of these low-tech prototypes are actually the first step in an inspiration loop. Kristi began the bed linen project because she was curious to explore the use of craft. "I was looking at the patterns and symbols of traditional clothing and was inspired by their underlying meaning. I thought about those patterns and came up with a bed cover and pillow case that contained a QR code. You could scan the code with a smart phone and it would trigger any QR code reading software that would tell you a fairy tale."

When the project began, Kristi was in the lead; She set the wheels in motion. Relatively quickly after that initial concept, though, Léon Meertens contacted her and said he wanted to be involved in the project. He works as an R&D manager for a large textile manufacturer, Johan van den Acker Textielfabriek BV.
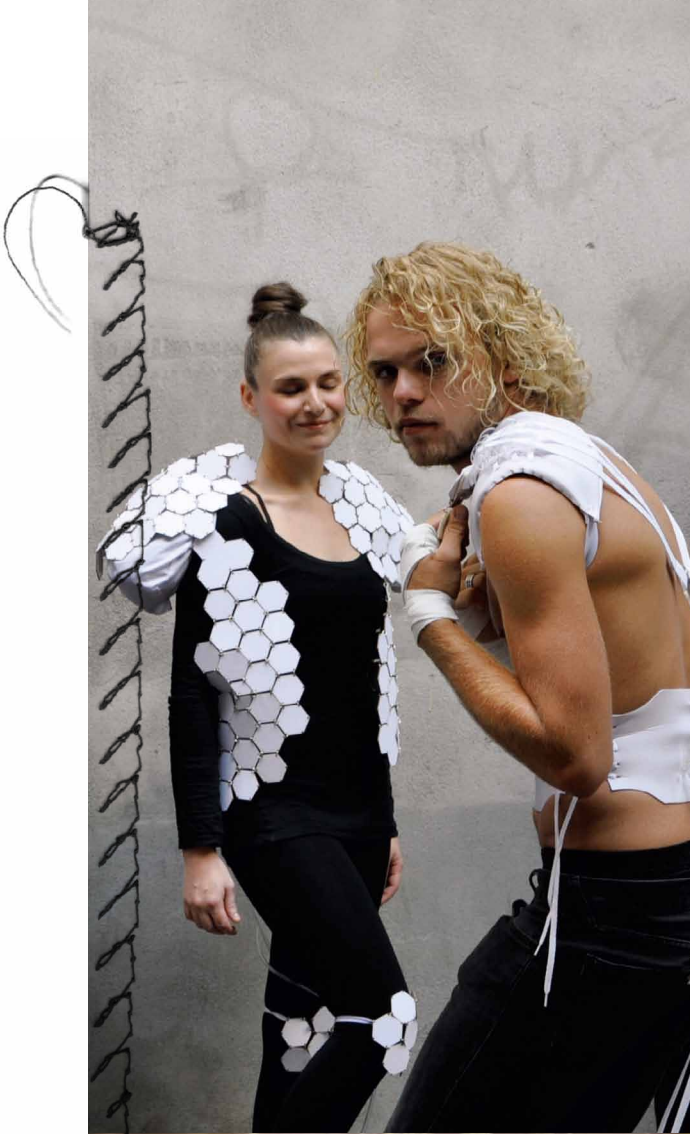
And soon other companies who saw opportunities to further improve the concept approached us. Guido van Gageldonk and Wouter Widdershoven from the technology company Unit040, for instance, suggested we switch from QR codes to image recognition. And the final application is conceptualised and designed as a collaboration between all parties involved.

Many interactions between the different partners often take the form of challenges. "If I can build such an inspiring but low-tech prototype with my hands alone," we would ask a textile manufacturer, "how can you build on that idea but do it properly, with the necessary tools and make it so that it is ready for production?" These challenges go in any direction — each development from one partner challenges the others to work further on the ideas. vimeo.com/54711270

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Kees Dorst is one of the founders of 'design thinking' with over 20 years of experience in design research. He is part of the International Scientific Advisory Board of CRISP.

DESIGN RESEARCH IS REACHING ADULTHOOD

Kees Dorst

'Provoke and foster indispensable criticisms and reflections'

During its long journey from being a craft to a sophisticated professional practice and now a firmly established academic discipline, design has had to find novel ways to deal with the ever increasing complexity of the problems it sets to address.

With each new challenge, design first borrowed and then incorporated more research findings, theories and methodologies from such fields as psychology, sociology, business, and physiology.

But yesteryear's approaches no longer suffice. Many organisations (commercial and public sector) find themselves powerless in the face of today's radically open, complex, dynamic and networked problems. In search of new problem-solving strategies, organisations and business schools have recently turned to the design professions ('Design Thinking') for help — and they have achieved positive results by applying design practices to achieve innovation. However, although designers are better equipped than many other disciplines to deal with these complex problems, the designing disciplines too are hitting the limits of their current approach and paradigm. In earlier times, companies played an important role in the development of new approaches — at both an applied and fundamental level. Look back forty years, and you'll find that a large proportion of groundbreaking innovation research happened in the R&D departments of large multinationals. In contrast, these days, as short-term profitability (Return On Investment) has become the main measure of success and many R&D departments are downsized, it is up to universities, through publicly funded initiatives, to push these boundaries forward. With CRISP, the Dutch design research community has a unique opportunity to take the lead in expanding and redefining the design paradigm in face of the new complexities of the modern world. What I find interesting is that the CRISP program will also help to further develop the practices of design research itself. In the early days of design research (the 1960s), the general approach to the study of design was primarily formative — the field emerged from practitioners developing new ways of working to help them cope with the problems they faced. Design research then consisted of more or less informal observations leading to prescrip-

tive recommendations of best practices in design. Although these efforts were far from fruitless, and the resulting recommendations were both plausible and useful, the lack of thorough descriptions and explanations made it difficult to critically reflect on each other's work and build a stable academic knowledge base. The last decades have seen a tremendous increase in research in this field, and I think it fair to say that we now have a pretty firm empirical foundation, as well as commonly established research practices. What this allows us to do is to move beyond mere observation and description. We know how design works, we know why design works, so we can now start to think about strategy: in what direction do we need to develop design? Which strategies and models will be effective for the complex challenges ahead?

Addressing these questions requires a major shift in the role of the university: it needs to move from being a semi-invisible objective observer to a position in which it is actively involved in the development of this professional field. By inviting other disciplines to become involved in critically questioning and developing the design paradigm, CRISP has created an environment that provokes and fosters the indispensable critical reflection needed for this development. Not a moment too soon — the issues we face in our society (globalisation, sustainability, etc.) will only become more complex and we need to address them through sophisticated design-based innovation.

With CRISP, academic partners take the lead in developing these design-based innovation practices of the future.

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CRISP DESIGN REVIEW SESSIONS

Sharing knowledge, findings and experiences within the CRISP network twice a year.

Twice a year, in April and October, CRISP organises Design Review Sessions (DRS), where some 130 participants attend plenary presentations, parallel discussions and listen to one or two guest speakers. Each of these sessions has a different focus. The first session was the kick-off on April 6th in 2011, followed by DRS 1 during the Dutch Design Week, combined with the Design as Service symposium. During DRS 2, in Delft, the research teams of the eight projects took the lead in discussing a shared understanding of PSS design. With DRS 3 in Eindhoven, the industrial and creative partners took the lead, reflecting on their role in academic design research.

As April 2013 marks the halfway point for CRISP, DRS 4 looks at the 'midterm' project results. With eight projects under one programme, this year we hope to see even more project crosslinks.
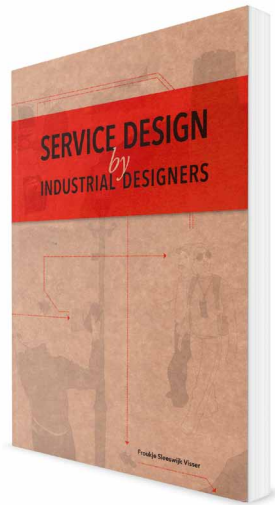
SERVICE DESIGN
by
INDUSTRIAL DESIGNERS

Froukje Sleeswijk Visser

Another project, Innovation in Services: Service Design in Practice (IIS), investigates how design agencies are currently active under the flag of 'service design'. The recently published book Service Design by Industrial Designers (Sleeswijk Visser, 2013) reviews the fit between design education and the 'service design' phenomenon, and provides a basis for the observations sketched in this section.

SERVICES BEYOND PRODUCTS: RESISTANCE IS FUTILE

Pieter Jan Stappers

PIETER JAN STAPPERS — *1959*

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· Research through design, experiential prototypes, contextmapping
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Have you heard? Design is changing again; or rather, still. In the last three years we have seen the notion of 'services beyond products' sweep through the European design discourse, with a message that, this time, something radically new is happening. Academia, the professional practice and education are all trying to cope with this new design focus and how it affects their business opportunities. **Looking at the new 'design speak', these changes seem immense. But are they really?**

NO

No, they're not. In design education, we've become used to an ever-increasing multidisciplinarity of what goes into design. In the past two decades, we have seen this with interaction design, experience design, contextual design, and empathic design (to mention just a few of the 'trends'). Elements from all of these have found their way into our basic design education programmes. This focus on services is yet another broadening of the educational scope. However, the fundaments of design remain unchanged: understanding people's lives, finding technological options, imagining futures, and developing viable solutions. Whether this involves a product, an experience, a service, a system, or a combination of these, the 'end result' does not define the activities, as it once may have done for craftsmen, where a furniture maker works in different ways to a potter.

YES

Yes, the changes are for real. The fact that we are used to changing doesn't mean there is nothing to change. The focus on 'services beyond products' brings a growing complexity to the understanding of what is considered 'a viable solution'. When developing these solutions, aspects of business models and an understanding of how to shape the organisation that provides services (or orchestrates them) become necessary ingredients of the discourse, and therefore part of the skills and toolset of the designers active in this area. Designers will not develop services or product-service combinations on their own (which is not to say that they often developed products entirely on their own). Designers will need to clarify what value they can add, because the persisting popular notion of a 'designer' is that of a stylist who can add some veneer after the big thinking has been done. In Delft, we believe that the designers we educate are primarily masters of developing new concepts for the future.

THE MESSAGE TO SERVICES IN DESIGN EDUCATION IS CLEAR: YOU WILL BE ASSIMILATED.

Using the strategic role of design to strengthen the competitive position of Product Service Systems and industrial design providers.
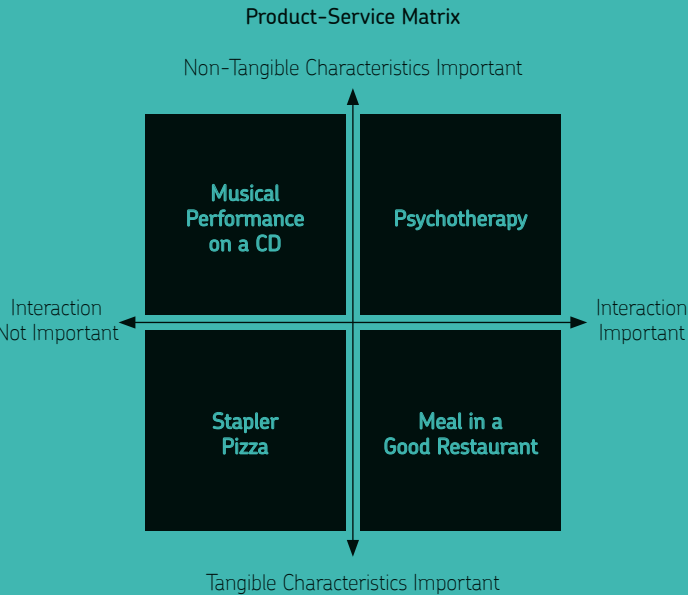
PSS... WHAT?!

Bram Kuijken

Would you be willing to pay more, if a hairdresser gave you a free comb?

We've long struggled to clearly define what a product-service system (PSS) is. This debate is by no means new. Some 40 years ago, Lynn Shostack published a series of influential papers and books in which she argued that all products and services consist of combinations of product and service elements. These days, some scholars and practitioners believe that all products are in fact services. This service-dominant logic considers services as the fundamental basis of exchange. However, when is a particular combination of product and service elements actually a PSS? Without a clear definition of what makes a PSS, many offerings may be labelled PSS, thereby diluting the concept's significance.

What we are looking for is a way to disentangle product and service elements. Design practice and theorist often distinguish between how users interact with the offering, its interaction, and the actual form or expression of the offering, its manifestation. Product manifestations are tangible with high material intensity; those of services are not. The user's interaction with a product is generally static; it is predetermined and cannot be changed over time. A service, on the other hand, is dynamic; it cannot be fully pre-programmed because services are co-created with users. Users and circumstances may be different each time a service is delivered.

It is important to recognise that, although goods may possess intangible aspects, and services tangible aspects, not all of these aspects add economic value. Would you be willing to pay more if a hairdresser gave you a free comb? Or if the cashier wrapped the present you bought for someone?

Product-Service Matrix

Non-Tangible Characteristics Important

Musical Performance on a CD	Psychotherapy
Stapler Pizza	Meal in a Good Restaurant

Interaction Not Important — Interaction Important

Tangible Characteristics Important

Besides these tangible / intangible aspects, we need something else to be able to clearly distinguish between goods and services. With a PSS, the interaction between supplier and customer can take place not only before or during the purchase but at many times during a PSS' life cycle. This is one of the main motives to consider PSSs, as this allows for a longer relationship between supplier and customer. This then is the second dimension which helps us distinguish between products and services: the degree to which recurrent interaction between producer and customers contributes to the value of the offering.

The matrix shows the (non) tangible characteristics on the vertical axis and the importance of interaction on the horizontal. The arrows signal that these dimensions are not dichotomous but continuous: a good is placed according to degree of intangibility and interaction.

We consider a combination to be a PSS when (a) it has more than one good / service with a (potential) separate final market and (b) the elements in the combination come from different quadrants of the 2x2 matrix. We think that a product-service system is most pure when the original component offerings contrast maximally, that is, when offerings come from the lower-left and upper-right quadrants of the matrix.

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GRIP PROJECT

Learning what a PSS is, and what its building blocks are helps us to understand what we are dealing with. In the GRIP project we try to build a process to design such a PSS.

When they design a PSS, designers try to find a balance between flexibility and control to create effective and socially responsible value for users and other stakeholders.

Knowing what PSS are is one thing. **Evelien, Mike, Geert, Erik & Dirk** explain what the design process for PSS looks like.

Philips and TU/e have collaborated on several (graduation) projects that looked at health care. Halfway during one such project Geert Christiaansen, of Philips Design, mentioned to Dirk Snelders of TU/e that biometrics and work-related stress might be an interesting area to look into.

Dirk—As I thought about all the different aspects, I realised how the sheer size of such a project was much more suited to one or even several PhD projects. Days later Cees de Bont, then Dean of Industrial Design Engineering at Delft University of Technology, first mentioned the CRISP initiative, as a programme to explore Product Service Systems for, among other things, health care.

At that time, there were already several products on the market that used biometrics to measure stress levels and give feedback. Philips' Rationaliser is an early example of this: by measuring the body's reactions to stress, the device could make the target group, home investors, aware of their stress levels and prevent them from making irrational decisions.

Geert—In testing, however, we noticed that few people understood its use. It is always difficult to point out why products don't take off, but I think the market just wasn't ready yet.

Stress is odd in that respect. Unlike people who are dieting or trying to exercise more, people who suffer from stress often find it difficult to interpret biometric data, because they are out of touch with their body.

Evelien—Those people are already overstimulated and overloaded and may need help to translate the insights from the data into healthy behaviour.

There are also large individual differences in how people perceive and approach stress: some have no issues with admitting they're stressed, whereas others prefer to keep it to themselves. There is, however, a strong social component to work-related stress and reducing it often relies on social support.

Mike—There is no such thing as a stressed individual, it is a stressed organisation.

The beauty of stress

The potential of a device lies not in the data but in analysing it.

What this meant is that the products should not be developed in isolation but could be seen as elements that stress experts could use in their service offerings to customers. The functionality of the product is realised in the relationship between client and coach.

Mike—A device is just a device, and it only takes a measurement. Its potential lies not in the data but in analysing that data, interpreting it, communicating it and thereby empowering people to change.

Looking at these products from the perspective of a PSS requires looking beyond just the end user. Designers will also need to think about the care workers and what they are trying to achieve. Traditionally, this might have meant that they would have quickly read through the relevant material and acquired the rudimentary skills and knowledge. Designers, though, will never reach the same level of expertise of care workers, nor should they. This project explores a different approach and the model it is developing offers a way to get together with the most important stakeholders to determine which challenges may benefit from a design approach.
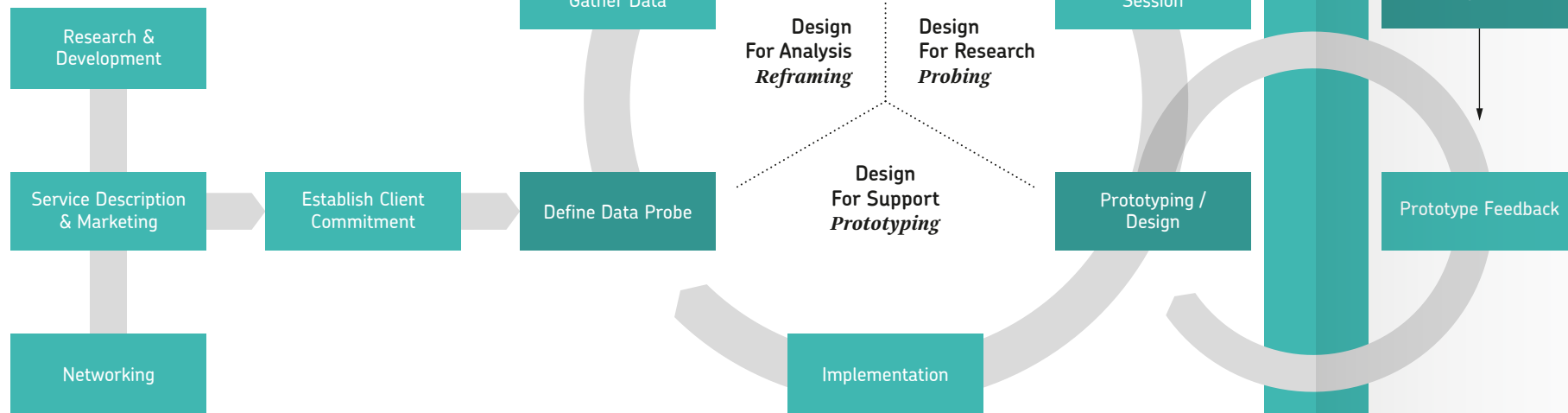
The field of mental health is built around services and although there has historically been a gap between psychiatry and technology, with the opportunities now available to measure and thereby monitor how the body is reacting, that gap is closing. Many of the early attempts to bring technology to this field aimed only to bring the traditional approach to healthcare to a digital platform. Although these solutions were recognised as innovative, they were often developed nearly entirely without input from health care professionals.

Erik—Such an approach will not bring health care to the next level.

By working closely with stakeholders from early on in the process, you see that the field of mental health is also changing and moving forward. Instead of coming up with solutions that lack a real problem, you get to use technology in areas that benefit from it most.

Geert—The value that design can add in such situations is not to start from a technology perspective, but to first consider what moves people, and then translate that back into potential technology.

Research & Development

Visualising Data Probes

Data Probe: Gather Data

Co-creation Session

Predesigned Tools

Design For Analysis *Reframing* | Design For Research *Probing*

Design For Support *Prototyping*

Service Description & Marketing

Establish Client Commitment

Define Data Probe

Prototyping / Design

Prototype Feedback

Networking

Implementation

There is no such thing as a stressed individual; it is a stressed organisation.

The first stage of the model reflects that approach. As the end result is uncertain, it is difficult to give assurances or clear answers to the role of each stakeholder.

Evelien—The initial service model started almost as a way to explain to partners what role everybody would be taking and how they would benefit from being involved.

The model has gone through several iterations. It has developed from a designer centric perspective, where designers took the lead at every stage, to a process that has a certain rhythm, moving back and forth between designers and stakeholders. In the current version the white activities are those closer to a designer's expertise, whereas the black activities are those where partners can particularly add value.

Some early co-creation sessions with the GGZe helped identify what directions could work:

Dirk—At the outset, we thought that interactions between staff and clients would be most stressful. We hadn't even considered bureaucracy to be a stress factor.

At that early stage, the data you gather can be used to determine and clarify what everybody's interest is and what the data means. Before you can deploy these data probes, though, you must first decide what kind of data to collect and with what type of probes. Whether you will choose for the personal, individual level or the social, group level affects the direction solutions can take.

Dirk—When a stress coach thinks he is looking at an organisational problem, then development will lean towards giving feedback on that level. When, on the other hand, a stress expert decides to look at stress prevention, feeling that she is continually behind the times, designers may try to support such preventive measures.

This also shows how stakeholders during this process are by no means validators of the concept, but active partners during development. GGZe is in that respect an interesting partner.

Erik—At GGZe, we have a culture that can talk openly about stress, it isn't considered taboo and we have quite a few words to describe it.

Although the mental health expert traditionally has had a dominant position, these days they are joined by the experiential experts, who have gone through a recovery process and have experienced the effects of stress.

Erik—At GGZe, when it comes to issues as stress or other issues related to emotions, you will quickly see whether something works or not. Our clients are very honest in their feedback.

By testing prototypes on such outliers, you get to the underlying principles much quicker.

Erik—In that sense, we are an interesting partner, not necessarily as a business opportunity, but as a testing ground to explore future solutions.

Geert—Although there are no concrete plans at this moment, I am almost certain that if we would decide to translate this into a business, we would use the same approach. I don't think it is possible, in this field we are talking about, to work any other way than this.

What this means for designers is that they have to, to a degree, relinquish control over the process. They may lose some control, but gain stakeholder ownership. As stakeholders are highly involved in the design process, they are more likely to accept the end product and recognise it as their own.

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· Visiting professor at Aalto University Helsinki
· International Design Business Management Programme (IDBM)
· Project leader CRISP project GRIP

GREY BUT MOBILE PROJECT — *CRISP Magazine #1*
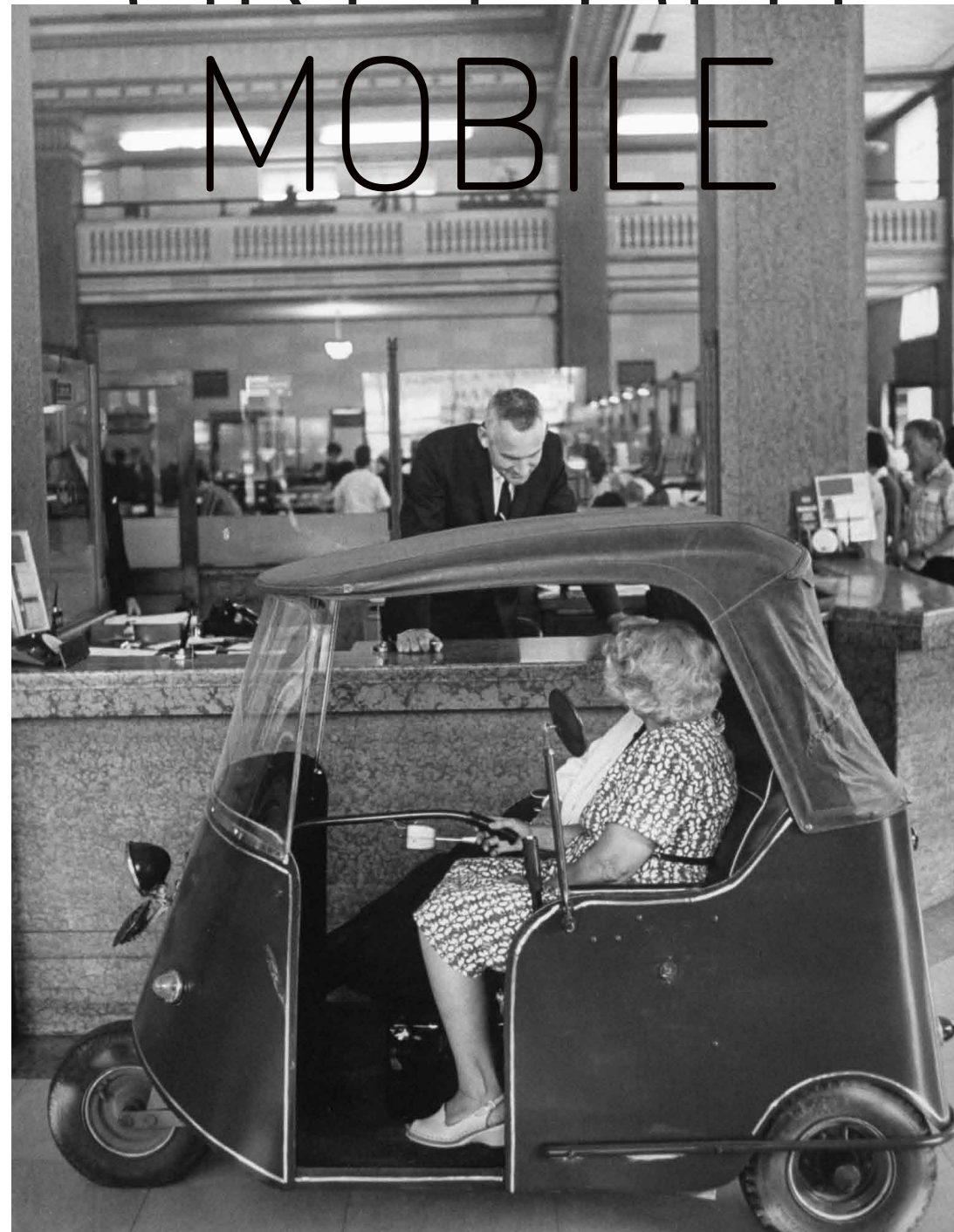
Improving care-related mobility services for the elderly supporting them
to live independently and stay social connected.

**Elderly mobility
solutions can be achieved**
with the sustainable
electric vehicles currently
on the market.

Marc Beusenberg

GREY BUT MOBILE

Grey but Mobile is about keeping elderly mobile. When elderly lose their independent mobility and rely more on care, they risk becoming isolated. The mobility solutions currently in use do not sufficiently match the needs of elderly in our ageing society. If we can find a mobility product-service system that does match their needs, the elderly can maintain both physical and social connections, which also benefits their health.

What makes designing such a mobility PSS so challenging is that mobility care for elderly requires a collaborative effort between many stakeholders with different interest. Many elderly also have different types of limitations or require a high level of care: one that is not often found in public transportation systems. This complexity makes it difficult to predict how stakeholders will respond to a newly designed PSS, especially when it is not offered within a proper context. People can only give realistic feedback when the test conditions are as realistic as possible. An environment that supports this notion is known as an inspirational test bed or experiential design landscape. Although this approach makes it difficult to generalise research outcomes, the benefit of using a set-up with actual stakeholder is that outcomes are both realistic and relevant to the condition studied. We are still investigating how we should handle this paradox and expect that our findings prove to be relevant for many PSS design efforts.

At the start of the Grey but Mobile project, the first inspirational test bed, "Skewiel Mobiel", was set-up at the Tellens Group, a care organisation in Friesland. Several volunteers chauffeur a rather basic, though highly appreciated electric vehicle and Tellens Group clients can book a trip for any short distance, whether for door-to-door needs or 'just to drive around'. This valuable test bed provides a landscape for several studies to improve the initial design of this PSS. Studies have looked at the design of the vehicle and how well the elderly can enter and exit it, or addressed open innovation in this care environment, or looked at how the IT systems support the organisation of the service. These studies and the positive responses

from participants and volunteers have led to an expansion of the Skewiel Mobiel PSS. The second example, Aevus, was a pilot study rather than a full test bed in October, during the Dutch Design Week, in Eindhoven. Four full-electric vehicles, driven by volunteers, offered mobility-on-demand transportation to clients of Zuidzorg, a local care provider. In contrast to the rural setting of Skewiel Mobiel, this study took place in a strictly urban context. Planning and tracking was also more advanced in this study.

Although it is still too early to draw conclusions from the examples described above and many workshops and new pilots are still in progress, we can report a few preliminary findings. We think that the elderly mobility solution we are testing here could be achieved with sustainable electric vehicles currently on the market. We've also identified some ways in which the interaction with the vehicles can be improved as well as recognised the value of refining the planning and tracking of trips. These issues can likely be resolved within this project and as technology no longer seems a limiting factor, we can shift some attention to the behavioural aspects of the project.

The research is now at a stage where multiple pilots are set up, in a multiple stakeholder design process, with different care institutions in three regions of the Netherlands. Without CRISP, it would not have been possible to study how to improve mobility of elderly through their direct involvement in pilots in real situations.

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  Industrial Design Engineering,
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· Project leader CRISP project Grey but Mobile

Great. So we now get what Product-Service Systems are: Barclays bikes, the Nespresso experience, Car sharing, Jawbone bracelets and Nike+. We don't have to argue the value of these systems. **But what's next? How to proceed? What does the world need? Researchers unite!**

A DEEP PLUNGE INTO
COLLABORATION

These researchers each shed light on collaboration when designing PSS: between partners, in the design team or in the organisation itself.

THE DESIGNER BECOMES A DESIGN ENTREPRENEUR

Maaike Kleinsmann

At first glance, designing a PSS does not look much different from designing a product. In both cases, the design teams have the same task: to create a desirable, feasible, and viable solution to the design problem. On closer inspection, however, it quickly becomes apparent that a true PSS requires much more than simply tacking a service on to a product. In response to these additional requirements, designers need to reconsider their role during development.

This starts early on, with the design itself. Product design problems are often termed 'wicked' problems, because both the problem and its solution are not fully understood at the start of the design project. During the design process, the problem and its solution co-evolve. The addition of a service component further complicates this co-evolvement process, as both the problem and solution space become wider, further increasing the problem's 'wickedness.' When dealing with this mutability of problem and solution, designers should actively seek opportunities within the problem and solution space by framing and reframing the design problem at hand.

Another change is that of the number of users involved. In product design, there is usually one clear end-user whose needs guide the designer's choices during development. In a PSS, however, many users needs are addressed. An illustration of this is the hightech romper suit developed at TU/e for premature babies in the Intensive Care Unit. It had to be designed to suit the baby, the therapist, the nurse, as well as make parents forget that their child is in hospital. As all users have different needs and wants, how they determine a solution's desirability also differs.

To ensure the solution creates value for all users, the PSS designer should be sensitive to their different needs and deal with their possibly conflicting desires.. One way to do this is through co-creation.

Another noticeable change is that the design team is also tasked with creating a viable and feasible system. Product design is often limited to one company, where a multidisciplinary team mutually create the product. With a PSS, this has expanded to a networked effort in which team members come from different companies and institutions. That the creation of such a team is often a long and difficult process has several reasons: the mutable nature of the design problem, the undefined scope of the design project, and the often considerable differences in the interests of potential team members. The team's composition is also dynamic in nature, as many of the different elements of the PSS have to be designed partly in parallel and partly in sequence.

What becomes apparent when comparing a multidisciplinary team to this dynamic and networked team is the actual and figurative distance between team members. Designers in these teams have to rely on teamwork and collaboration and are aided by their visualising skills and their ability to communicate with people from other knowledge fields.

Designers creating a PSS need to take on an entrepreneurial role, actively seeking opportunities, creating value for all users, and facilitating teamwork. It is from their design skills, their ability to frame and reframe a problem, co-create with stakeholders, and visually explore issues that these entrepreneurial skills naturally follow.

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· Member CRISP project Smart Textile Services

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CLIMBING UP THE VALUE CHAIN

Gijs illustrates how the design of PSS includes more and different users, more companies and institutions and moves up higher in the company value chain taking up an entrepreneurial role.

An inspirational test bed enables textile developers to understand the multi-disciplinary opportunities and challenges of creating Smart Textile Product Service Systems.

KNITTING THINGS TOGETHER

Martijn ten Bhömer

One major challenge in developing a PSS, is getting the production partners involved.

Martijn ten Bhömer's project for Smart Textile Services is a clear illustration of the designer's entrepreneurial approach. In it, he has teamed up with several local companies to develop a service that is designed, produced and distributed locally. Many of these companies are moving away from mass production towards smaller series and more innovative solutions. This also requires moving away from the vertical, hierarchical business style towards a more horizontal network of open innovation.

A 'normal' service design project often begins by making a clear blueprint of everything that the service in the end ought to have. With that blueprint, you start looking for partners who can deliver the individual parts of the service and try to draw them into your big plan. In this bottom-up approach, though, you start from the knowledge and facilities partners have and together examine how these can be combined in separate design directions. Unlike a pre-made blueprint that gets filled in during development, it is instead a process that you go through with the partners and something that develops over time.

Although there is no blueprint, this does not mean that the process in unstructured. Martijn's project follows a Growth Plan that consists of three phases. The first phase, the Incubation phase, revolves around creativity, innovation and exploration. Each stakeholder brings their current knowledge, facilities and innovation potential into a test bed used to create inspiring prototypes, combining textiles and electronics. These prototypes are typically one-offs to be 'tested' with one person.

Successful products move to the second phase, the Nursery phase. This phase tests the concepts, examines the implications of scaling up, and together with the partners explores the business opportunities. Several prototypes are made and evaluated with 10 participants. In the final Adoption phase, the industrial partners take the prototypes of the concepts for further testing and to explore the manufacturing requirements and business implications.

A clear benefit of this approach is the sense of shared ownership. The only way to bring multiple partners together with their different ways of working and thinking is when they feel that they own the project. Instead of it being 'my' project where partners participate in, it is going to be 'our' project.

Prototypes are vital in creating this shared ownership, because partners can see how their own expertise is used in the project. A typical Incubation phase prototype was the 'audio fabric', a smart textile that when touched would play a piece of music through a mobile phone. It was shown during a meeting with Admar Schoonen, an embedded systems engineer from Metatronics. The prototype's unfinished look enabled him to see how the touch sensitive fabric was combined with the electronic components. It also illustrated how the fabric incorporated pressure sensitivity, something that could also be applied in other curved surfaces.

An example of the Nursery phase is the prototype used in discussions with Huub Waulthers, the knitting expert from TextielMuseum TextielLab. It consisted of stretch-sensitive fabric made interactive by connecting it to a light source. The knitting expert could examine the relation between the knit and the interactivity and offer suggestions of how they could improve it with his knowledge of available production techniques.

Martijn's research is now at a stage where concepts are transitioning towards the Adoption phase.

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YOU MAKE THE RULES!

Prototypes are used for many different purposes during the design process. Martijn uses it as a boundary object in the conversation with different stakeholders. Pepijn uses prototypes to create knowledge on open-ended play. Through building prototypes of possible solutions, knowledge is created.

BREAK DOWN THE SILOS

Christine   De Lille

As designers, we are often not aware of the implications — and potential ramifications — PSSs can have on an organisation. When designing a PSS, we often only think about the design of the PSS itself, just as we would when designing a product.

In traditional engineering environments, a client approaches a manufacturer with a list of specifications. This company has a clear understanding of what their machines can produce, and consequently they manufacture and deliver the products. We can still see this traditional approach in the case of the textile industry and Martijn . Textile companies think along with their clients and are used to producing yarns and woven goods based on the specifications given. The top figure right illustrates the main concerns of these traditional textile companies.

In the case of a Smart Textile Service, what the company is asked to manufacture is often only a single element within a larger picture. This collaborative approach has become common practice in CRISP projects and other PSSs, however it still presents quite a few challenges for many traditional companies. In Martijn's case, for instance, the textile industry not only has to deal with incorporating smartness, in the form of sensors and electronic circuits, which are all new to them, but they also have to work with an electronic designer, a supplier, a media designer and a healthcare institution. In order to do this successfully, textile manufacturers have to be involved in the design process at an earlier stage, where they not only deal with the client's specifications, but are also confronted with the entire scope of the project. The bottom figure right shows how a company has to restructure itself to implement a PSS.

In Martijn's case, the textile manufacturer is no longer alone; the healthcare institution is also involved and needs to know what touch points their users will have with the smart textile services. It may also be necessary to change the internal structure of companies delivering the smart textile service and this in turn might require the company to change their infrastructure, the ICT systems and educate their staff.

At the deepest level, companies who work together to deliver PSSs often need to undergo a major transition during which the company's culture has to become more user-centred, moving away from manufacturing specification based products towards service delivery. This type of change is often difficult to implement, so designers may have to look beyond merely designing the PSS, and consider how best to support organisations facing this transition. A first step that these organisations can take is to understand and experience what PSSs are.
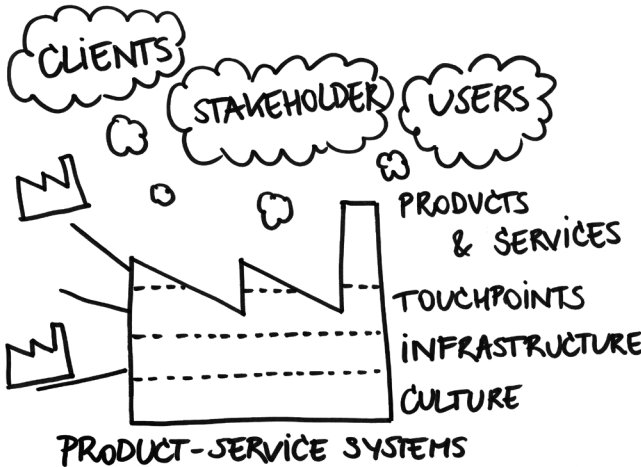
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· Postdoctoral researcher at Delft university of Technology, Product Innovation Management, Enabling organisations to change with design thinking
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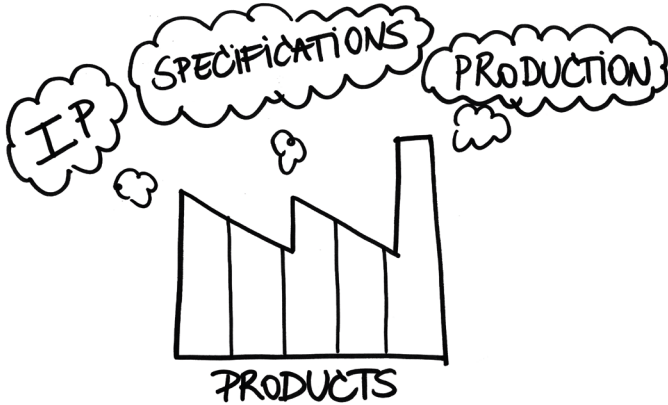
...I DIDN'T REALISE WE WOULD ALSO HAVE TO CHANGE THE ICT SYSTEMS!
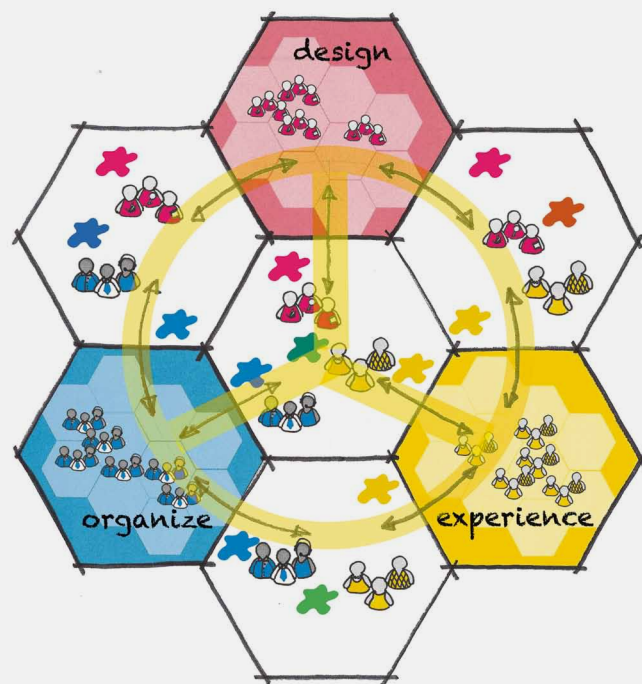
This project is developing a framework of tools, techniques and methods that improves conceptualisation and communication between all those involved in designing PSS, across industries.

CROSSING BOUNDARIES

Developing framework which maps all interactions between stakeholders.

Lilian Henze

In the PSS 101 project, we look at innovation in heterogeneous networks. These networks are made up of connections between people with considerable differences in knowledge, practice, values, and even passion, to name but a few characteristics. As a result, certain boundaries emerge that make interactions difficult. As people cross, move, or even remove these boundaries, they are more likely to end up with product-service systems that add value to both users and providers. As the aim of our project is to create a framework of tools for networked PSS development, I was curious to see whether I could find a way to cross these boundaries.

In trying to better understand networked innovation, I came across Bruno Latour's ideas . In his Actor Network Theory, he argues that, although the focus is often put on people and their connections in networked collaboration, objects and their links have an equally strong influence on collaboration. These objects can be seen as Boundary Objects; they facilitate interactions between people by establishing a shared context. In this way, most tools that designers create and use can be considered boundary objects. One obvious example of such a boundary object is the use of visualisations by designers. The pictures on the right show examples of such a visualisations.

In an early attempt, we tried to understand PSS development by visualising the collaboration networks of designers, organisations, and users. During one of the workshops we realised, however, that there were some disadvantages to this initial framework. In discussions with industry partners and academics, we came to the conclusion that the visualisation of the initial framework was too abstract to help decide which specific tools to use during PSS development. We also learned that the tools should be more specific and have to show a clear relation to the boundary to be crossed.

I used the insights gained from the workshops to develop the next version of the framework depicted on the left, which maps all interactions in PSS development. The yellow circle is the starting point, as it brings together all interactions in a user-centred design approach. By describing all the interactions and the people and objects involved, this map clarifies where boundaries may emerge and where tools can be used.

Designers can use this map as a boundary object at a project level to understand all the stakeholders and find the right tools for collaboration. Academics can use the tool to discuss the role of design (and design education) in creating and using tools for networked collaboration in PSS development.

This sketch serves as a first prototype that will be used during the "canvas on tour" workshops with our professional partners to develop it further. In a way, discussing tools commonly used in the design of product-service systems can itself be considered a metatool or even a boundary object.

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· Owner at P5 consultants, professionals in Human-Centred Design
· Member CRISP project PSS101

A map as boundary object to understand all the stakeholders and find the right tools for collaboration at a project level.

Boundary objects can take many different shapes, ranging from making a sketch together to using puppets and small prototypes.
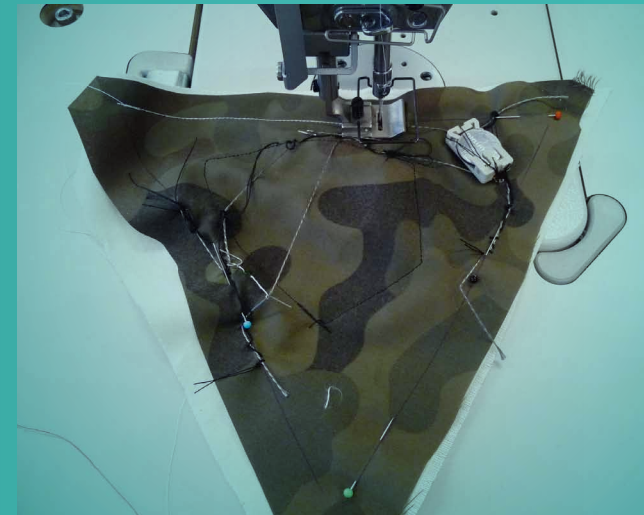
Boundary objects facilitate interactions between people. Images and physical objects are tools designers create and use to establish a shared context.
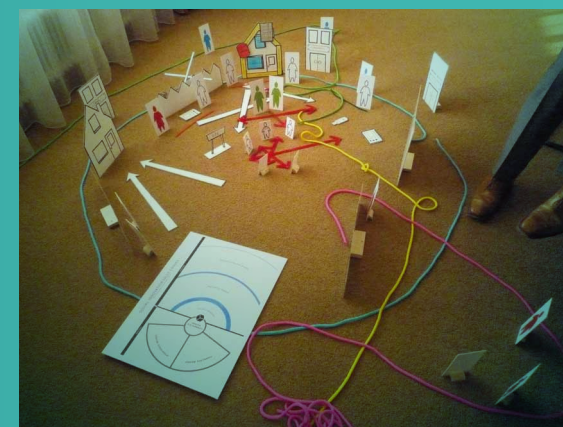
LOW–HANGING FRUIT

Making use of early research results in a workshop for practice.

Marie de Vos

Impatient to gain some early insights from the PSS101 project, the industry partners organised a "low-hanging fruit" workshop to pick some early results. This workshop resulted in two areas to explore further: value models and tools for communication.

One way to get to grips with the complexity common in multiple stakeholder projects is te production of stakeholder maps. These maps give an overview of everyone involved in the project and the relationships between them. We noticed, however that besides knowing who is involved, it is at least as important to know why they are involved. This is vital information as what stakeholders are trying to achieve within the project influences their behaviour and decisions.

Thus it is valuable to visualise the value of stakeholder relations and interactions in both the current situation and possible future scenarios. The parties involved use this visualisation to evaluate and discuss possible opportunities for the future. Earlier approaches to represent the values between relations were often too complex. We are currently exploring how to make such a value model more accessible.

In complex projects, communication is crucial but it is often difficult, even within a single company, to communicate across 'silos' of different disciplines. As the complexity increases, with people from different backgrounds, different companies, differing organisational cultures, different languages, all placed in a network of shifting interests, the necessity for effective communication becomes ever greater. Difficult though communication

may be, there is great value in differences of interpretation, as these offer a better understanding of each other's position. The question then becomes how and where to find a shared language to help discuss these interpretations. One tool which could be of value is the visual language of film. STBY has successfully used film in many multi-stakeholder projects with large, often global, organisations using an approach called 'Design Documentaries'. These films inform and inspire multidisciplinary teams with stories from the everyday lives of those who will later use or deliver the PSS that these teams are working on. Several PSS101 industry partners are interested in this approach because they see the value of filmed stories in communication between stakeholders and disciplines, but have difficulties using film effectively in PSS development.

The benefits of the experiments in these areas are twofold. On the one hand, they provide industry partners with tools to work and experiment with, at least two years before the final framework will be ready to use. On the other hand, our experiments are of great value to the scientific partners, who can incorporate them in the development of the framework: everyone benefits!

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LOOKING FORWARD TO THE NEXT STEP

Jeroen van Erp

How to deal with cross-media retail strategies, multi-channel publishing challenges, smart sex toys and intelligent lawn mowers?

JEROEN VAN ERP — *1959*

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· Member of the Dutch
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  (the Association of Dutch Designers)
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  Wim Crouwel Institute
· Board member of the
  Design & Emotion Society

This magazine is packed with fascinating and inspiring theories, insights, principles, frameworks, models and opinions, all related to product-service systems; all work I'm really proud of. At the same time, it leads to an interesting question: will this be enough to develop those meaningful experiences we are all aiming for? Will this be the right basis for solving problems like how to deal with cross-media retail strategies, multi-channel publishing challenges, smart sex toys and intelligent lawn mowers? It will probably raise some eyebrows, but from my point of view as a design practitioner, the only honest answer is: in your wildest dreams.

There is an obvious reason for this: the starting point of most research projects is the ideal world in which we, as designers, can influence each parameter of the experience, where product and service are developed simultaneously, are intertwined, but originate from a single, solid idea, concept or strategy. Unfortunately, it is only occasionally that a new and groundbreaking product-system is launched from scratch. In real life, a large part of a designer's work is dependent on what our clients want. These clients are often (major) companies, governmental organisations or government-related institutes with an ongoing business. In real life, designers are confronted with fragmented organisations, budgets, timelines, targets and often a deep fear of 'changing the game'. Implementation of new multi-touchpoint systems have a great impact on an organisation, and demands vision, faith and perseverance.

Research is driven by many types of questions. In CRISP, when it comes to PSS, we never argue about the 'why' question. Much of our excellent and relevant research work explores 'what' topics — and believe me, there is still a lot more to explore down that avenue. I think, however, that the next big challenge will be getting to grips with an important 'how' question. How can we work in and how can we help our clients to become new and sustainable organisations, to match the dynamic product-service systems they offer their consumers? With CRISP, we have taken the first step to answering this question and making our wildest dreams come true…

THE ONLY HONEST ANSWER IS: IN YOUR WILDEST DREAMS

COMBINING ACADEMIA & INDUSTRY

Bas Raijmakers

Both the results of our work and how we work together is innovative. Almost two years into CRISP, half way on a journey with more than 60 organisations, what we might achieve is becoming clear.

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· Owner and creative director at STBY
· Member CRISP Programme Committee

Outcomes include exciting pilot projects, unusual collaborations and new knowledge, all things you would expect a high-profile innovation programme to deliver. But there is also something else we have started to explore and prototype: where is the most exciting stuff happening, and, how can that be nurtured and leveraged?

One challenge is that consortium collaborations between academia and industry are often deemed difficult. The familiar stereotype suggests a disconnect between 'slow' academia and 'fast' industry. Or: academia focuses on knowledge creation and industry focuses on earning money. Although there is some truth in these stereotypes, why wouldn't we use these differences to our advantage? Why get bogged down by them? Aren't we all generally people who appreciate the differences and the opportunities they offer?

Innovation programmes' best results are created by industry and academia together. (Creative) industries take the lead in real life, and often do so intuitively as an integral part of a project. This works well because the innovation is contextualised with and for the people who will actually use the results: employees and customers or citizens. The real world environment, however, rarely allows for the kind of extensive reflection that would broaden the use of an innovative approach or result. The next project is often already knocking on the door. As a result, the innovative knowledge created remains hidden in the heads of the people involved.

This knowledge should fly! This is where the CRISP community can build on the unique skills and strengths of academics. Academic design researchers can take the work of the pioneers through a few more iterations. They can thoroughly reflect on what has been done and explore further, looking for a way to express the knowledge that is inside the work of the industry pioneers. This is, however, by no means a step-1-step-2 process; the two efforts should be intertwined and not in some 'nifty' project management way but through a community endeavour. In addition, to make the knowledge accessible to (creative) industry, it also needs to be communicated in ways that fit everyday industry practices and engages the creative spirits involved. The format of academic papers and journals, although essential for academics to build their reputation in academia, simply won't do. This doesn't mean that the knowledge needs to be dumbed down, it just needs to be more engaging: for instance, through workshops in which designers from academia and industry alike can do something with that knowledge.

The key to achieving these symbiotic collaborations lies not only in our work's innovative results, but also in how we work. At Design Academy Eindhoven, we have achieved this by setting up an entirely new design research group for CRISP, partly built on the idea of benefitting from differences between academia and creative industries. The academy participates in six of the total of eight CRISP projects with Research Associates, a new academic role in Dutch innovation programmes. The Research Associates are all professional designers who have graduated, often several years ago, from Design Academy Eindhoven and work on CRISP projects part-time in addition to running their own studio. As such, they have one leg in academia and one in the creative industries, while collaborating with both. It might not be an easy position, but it is definitely one that helps explore, understand, and prototype new ways of working together as industry and academia in innovation programmes. Look, for instance, at the work of Johny Wray, who built a speculative eavesdropper for airline passengers and crew as a result of exploring new interactions between them in an academic paper. Or Susana Cámara Leret's efforts to design 'smell webs' together with a creative fragrance company and care organisation to address addictions, whilst reflecting on the strengths of, as a designer, being in between so much expertise. These creative, collaborative academic journeys will help us all to figure out how to reach the common goal of the CRISP community: strengthen the economy and society by making them more creative.

INNOVATIVE KNOWLEDGE SHOULD FLY!

CASD

Foundational project
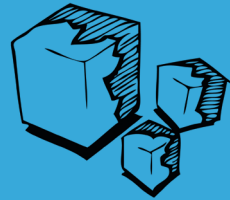
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Using the strategic role of design to strengthen the competitive position of Product Service Systems and industrial design providers.

Competitive Advantage through Strategic Design (CASD) is about achieving effective strategic design thinking that enhances the competitive position of Product Service Systems and industrial design providers. Product Service Systems (PSS) can help companies achieve competitive advantage. To realize effective PSS, companies should integrate design thinking in their innovation process. Design thinking is characterized as a creative, user–centred and vision based approach—rather than being technology or marketing driven. Design thinking becomes strategic if it is adopted in the fuzzy front end of innovation where oppor-tunities are identified and ideas are generated, or when it informs strategic decision making at later stages. Strategic design thinking can help firms to realize (a portfolio of) PSS combinations that are recognizable, legitimate and coherent for customers.

PROJECT PARTNERS

p3

THINKING BEYOND THE BOX

p4

INTRODUCING DESIGNERS TO THE BOARD

p5

CLIMBING UP THE VALUE CHAIN

p30

PSS... WHAT!?

p6

RECALIBRATING OUR PROFESSIONAL COMPASS
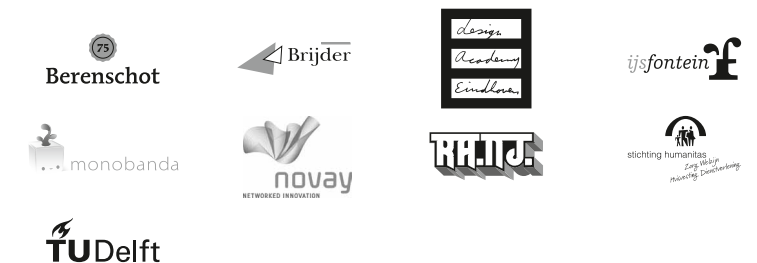
G–MOTIV

Foundational project

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Designing motivation. Changing human behaviour using game–elements. Achieving lasting change is difficult; people are often poorly motivated to change their status quo.

Designing Motivation—Changing Human Behaviour Using Game-Elements (G–MOTIV) is about researching and applying new approaches to behavioural change based on motivation by using game elements. We will conduct research on the motivational effect of game elements in changing behaviour. Our multidisciplinary team of scientists and designers will work on developing intelligent PSS prototypes in the fields of health care and human resources, resulting in structural behavioural change. Achieving lasting change is difficult; people are often poorly motivated to change their status quo! In the domains of healthcare and human resources, this resistance leads to large financial costs for society and reorganisation costs for companies. Currently, people are 'helped' to change using therapy, training and coaching, however these often only result in short–term effects.

PROJECT PARTNERS

p8

YOU ARE THE CONTROLLER

p9

TALKING SCENTS

GREY BUT MOBILE

Test bed project

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Improving care–related mobility services for the elderly supporting them to live independently and stay social connected.

Enhanced Care Service through Improved Mobility for Elderly People (Grey But Mobile) is about improving care–related mobility services for the elderly supporting independent living and social connectivity. Importantly, the quantitative and qualitative effects of these proposed services have to contribute to the improved health of the elderly as well as to the economic efficiency of care.

Today, elderly live in their homes longer, predominantly because of improved home care. For reasons of efficiency and costs, this is considered a good development, but it has a downside too. Elderly often live alone and solitude is regarded to be a main cause of health problems. Keeping elderly socially connected and involved, requires them to remain mobile. However, current mobility solutions do not cater specifically for this group.

PROJECT PARTNERS

p4

GREY BUT MOBILE

GRIP

Foundational project
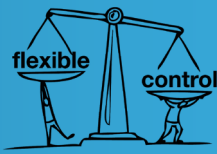
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When they design a PSS, designers try to find a balance between flexibility and control to create effective and socially responsible value for users and other stakeholders.

Flexibility versus control in the design of Product–Service Systems (Grip) is about how designers achieve a balance between flexibility and control when designing PSS, leading to the creation of effective and socially responsible value for users and other stakeholders.

When designing from a system perspective, the creative control of design is structurally lower than in product design. The designers have to deal with complex, dynamic environments and need to negotiate decisions with a range of stakeholders. The PSS development process is less formalized and is characterized by a high level of co-creation and co-production. Designers need to strike the right balance between flexibility and control when working together with other creators, whilst remaining sensitive to the needs of development partners and end-users.

PROJECT PARTNERS

p32

THE BEAUTY OF STRESS

I-PE

Test bed project

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Anne Nigten The Patching Zone
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The Patching Zone

With the design of Intelligent Play Environments, playful persuasion encourages social and physical play to promote well-being.

Intelligent Play Environments to stimulate social and physical activities (I-PE) is about the development of an 'inspirational test bed' to develop fundamental knowledge, insights and guidelines for the design of intelligent, playful environments. This includes playful persuasion, emergent behaviour and interaction opportunities that stimulate social and physical play of various user groups. PSS concepts will be used as vehicles of research, further developing our design philosophy for social and active play.

People are simply not active enough: children are not physically active and risk obesity and isolation; the elderly run the risk of losing their social networks. These societal issues need to be tackled for the benefit of these and other groups. This project will build on the foundations laid by Intelligent Playgrounds, a project started to encourage children to become more active—physically and socially.

PROJECT PARTNERS

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KOMPAN

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Sports and Technology

THE PATCHING ZONE

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PSS 101

Foundational project

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This project is developing a framework of tools, techniques and methods that improves conceptualisation and communication between all those involved in designing PSS, across industries.

Methods for Conceptualizing Product Service Networks (PSS 101) is about developing a framework of methods, techniques and tools that improves conceptualization and communication between all those involved in design and development, across industries.

Products are no longer just products, Services not only services. Take Océ; once they used to sell printers.. and now they 'support document management across different departments.' Exact, well known for its Financial and Administrative software, now produces business service systems for SMEs, enabling them to integrally support and manage their business, including relationship management. This type of thinking requires new design and development structures, moving people out of their traditional compartments, meeting the needs of an often diverse and evolving group of end-users. Product Service Systems (PSS) are designed in highly dynamic network environments, mixing people and parties, models, interests and goals.

PROJECT PARTNERS

connect·innovate

Design Academy Eindhoven

= exact
And it all comes together.

océ

..STBY...

zuid zorg Vertrouwd Dichtbij

TUDelft
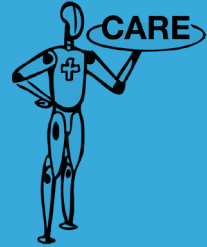
SELEMCA

Test bed project

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Humanising care-droids using creative technological solutions to supplement and replace existing care-services.

Services of Electro-mechanical Care Agencies (SELEMCA) is about establishing a trans-disciplinary design theory of human-android interaction by investigating the human affective system, emotion regulation, and creativity.

The increasing demand for care services for the elderly and those with mental health disorders cannot be solved by productivity improvements alone. Many of this group are hospitalized or residents of care centres and nursing homes. This target group requires intensive care-giving, administrative care, as well as physical, cognitive and psychological support.

A new approach is the use of creative technological solutions to supplement and replace existing care-services. These solutions include agents, robots, ambient and virtual worlds; mechanotronic robots that we call Caredroids—PSS systems that create a better fit between carer and patient. Services of Electro-mechanical Care Agencies (SELEMCA) envisage 3 types of Caredroids, each providing a different service: medical questionnaire and form filling help; matchmaker between carer and patient; and lastly, a robot care deliverer, for example for exercise, medicine coaching and virtual therapy.
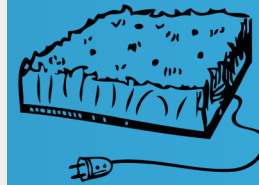
PROJECT PARTNERS

STS

Test bed project

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Frank Boon Metatronics
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Loet van Kimmenade
Contactgroep Textiel
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Maaike Kleinsmann TU Delft
Isjah Koppejan Waag Society
Frank Kresin Waag Society
Kristi Kuusk TU/e
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Geert Langereis TU/e
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An inspirational test bed enables textile developers to understand the multi-disciplinary opportunities and challenges of creating Smart Textile Product Service Systems.

Designing and Selling 'Soft Product'—'Valuable Service' systems (Smart Textile Services) is about the development of successful methods, platforms, guiding principles and the business models required to understand the multi-disciplinary opportunities and challenges of creating Smart Textile Product Service Systems.

Innovation in the form of the combination of soft materials with high technology has led to the development of so-called Smart Textiles. These are of strategic importance for the European textile industry to sustain their competitive edge and to counter threats from low-labour cost producers. Smart Textiles can conduct light, heat or currents; i.e. the textile becomes an interactive product and can now become part of larger product service systems (PSS). This opens up a vast field of opportunities for textile developers and product and service designers to combine their disciplines in the application areas of well being and life style.

To develop these complex PSS solutions, manufacturers need to move away from their current fragmented, slow or non-existent knowledge exchange methods and team up with relevant partners. Initial investment in this field has led to the design and development of an inspirational test-bed, called 'Wearable Senses' at TU/e.
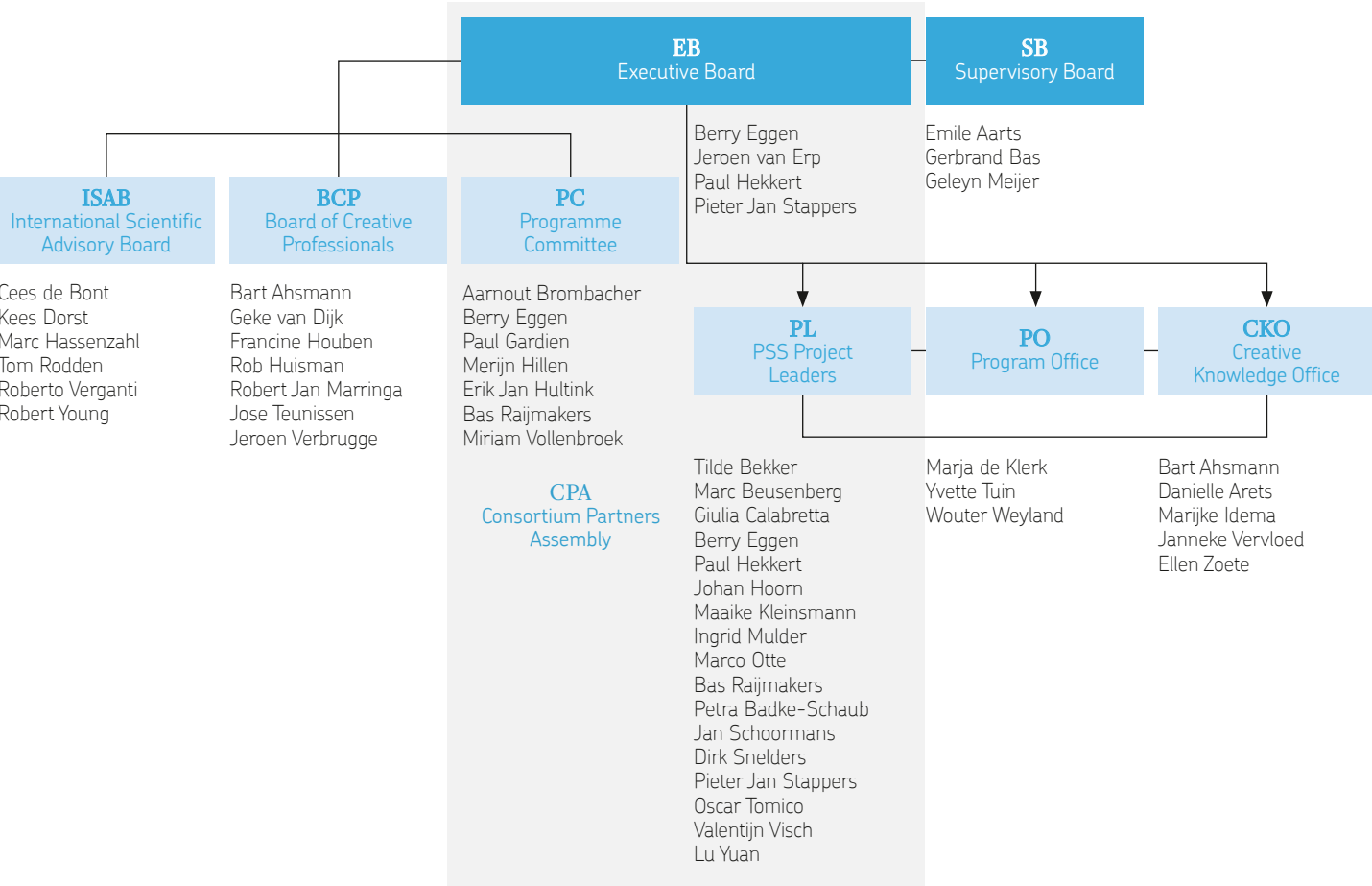
PROJECT PARTNERS
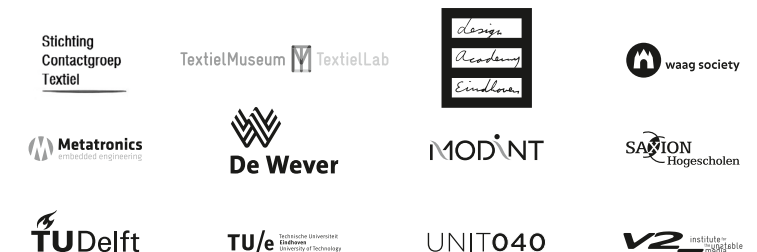
GOVERNANCE

For an effective and efficient governance structure, CRISP implemented functions as:

Responsibilities and liabilities for monitoring, financial, programmatic and operational management; Decision making among involved organisations; Internal and external review mechanisms, evaluation and monitoring. With the requirements of:
— Flexibility in execution
— Giving the creative industry influence on results and interaction
— Clear access point for main external stakeholders

This has been realized by a governance structure as shown, with the bodies:

Executive Board for operational management of the programme
Supervisory Board for strategic decision-making
Programme Office for operational support
Creative Knowledge Office for knowledge dissemination and programme communication
Program Committee for evaluation of the projects' results

International Scientific Advisory Board for engaging and retrieving feedback of leading scientific representatives
Board of Creative Professionals for engaging and retrieving feedback of leading creative industry representatives
Eight PSS projects with their respective project leaders, responsible for the actual research and the **Consortium Parties Assembly** as a community for all participants, anchored in a Consortium Agreement.

EB
Executive Board
Berry Eggen
Jeroen van Erp
Paul Hekkert
Pieter Jan Stappers

SB
Supervisory Board
Emile Aarts
Gerbrand Bas
Geleyn Meijer

ISAB
International Scientific Advisory Board
Cees de Bont
Kees Dorst
Marc Hassenzahl
Tom Rodden
Roberto Verganti
Robert Young

BCP
Board of Creative Professionals
Bart Ahsmann
Geke van Dijk
Francine Houben
Rob Huisman
Robert Jan Marringa
Jose Teunissen
Jeroen Verbrugge

PC
Programme Committee
Aarnout Brombacher
Berry Eggen
Paul Gardien
Merijn Hillen
Erik Jan Hultink
Bas Raijmakers
Miriam Vollenbroek

CPA
Consortium Partners Assembly

PL
PSS Project Leaders
Tilde Bekker
Marc Beusenberg
Giulia Calabretta
Berry Eggen
Paul Hekkert
Johan Hoorn
Maaike Kleinsmann
Ingrid Mulder
Marco Otte
Bas Raijmakers
Petra Badke-Schaub
Jan Schoormans
Dirk Snelders
Pieter Jan Stappers
Oscar Tomico
Valentijn Visch
Lu Yuan

PO
Program Office
Marja de Klerk
Yvette Tuin
Wouter Weyland

CKO
Creative Knowledge Office
Bart Ahsmann
Danielle Arets
Marijke Idema
Janneke Vervloed
Ellen Zoete

Ministry of Education, Culture and Science

N*W*O
Netherlands Organisation for Scientific Research
Chemical & Physical Sciences Division

COLOPHON

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SCIENTIFIC PROGRAMME

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