

Prototyping PSS

Brian Gillespie discusses how Continuum deals with multichannel and multi-touchpoint prototyping — Page 32-35









Focus on experience

Els Polhuijs and Paul Elich explain how participating in CRISP projects aids KLM to be ready for the future — Page 46-51

Also in this iss<mark>ue</mark>

Robert Paauwe and Dries De Roeck, Jeroen van Geel, Luc Geurts, Sabine Wildevuur, and many others



Editorial note

We have to admit, what we had in mind was a 'no sweat' issue. A collection of enchanting pictures and great stories of prototypes, what could possibly go wrong? Instead of the easy job we had envisioned, it turned out to be hard work. We never expected there to be so much debate on the purpose and meaning of prototyping in research versus prototyping in practice. For CRISP, we were above all interested in the implications of prototyping PSSs and to what extent it is different from prototyping products. Our conclusion: prototyping, in the broadest sense of the word, is a hot topic. We're proud to say this magazine contains a great collection of the different views of scientists, practitioners, and industry. The article by Pieter Jan Stappers and John Flach provides an overview to open the discussion; subsequent articles display different perspectives on the changing role and future evolution of prototyping.

Jeroen van Erp, Christine De Lille & Marte den Hollander

Magazine team

We would like to thank the following people who have made this magazine possible:

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Colophon

See inside back cover for the full colophon.

Upcoming issues!

We have already scheduled two more issues! The next issue will be published in October 2014 and deals with designing for Wellbeing. If you are interested in contributing to that issue, please feel free to send a message to: c.s.h.delille@tudelft.nl

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TACKLING WORK-RELATED STRESS LUC GEURTS, AND OTHERS





PROTOTYPING AS A DIALOGUE BETWEEN STAKEHOLDERS SABINE WILDEVUUR





Being responsible for the involvement of the Netherlands Organisation for Scientific Research (NWO) in the creative industries, one of the top sectors of the Dutch government, it is an honour to introduce this third issue of the CRISP magazine, on prototyping.

As one of the consortium partners, NWO is actively involved in CRISP: a coherent programme bringing together the creative industries, universities and parties who use the results of CRISP. This cooperation has created a stimulating environment, resulting in many innovative solutions. Each of the eight projects has a different scope, ranging from robotics for health care to smart clothing and from transport for the elderly to new business models, but all have the same basis: looking at Product Service Systems. The knowledge gained in CRISP is vital for the further development of the creative industries in the Netherlands.

NWO faced a challenge when we were asked to include the creative industries as one of the top sectors. How would we unite the needs and ambitions of the economic research top sectors with those of fundamental scientific research? This can be particularly challenging in the creative industries because of its dynamic and highly innovative character, and the large number of companies involved, mostly SMEs. Research is key to fully achieve the potential of the creative industries in the future, and it is important for the sector to organise itself and articulate its needs in research. CLICK can be instrumental in that.

The creative industries are now an integral part of NWO policy. NWO is responsible for selecting the best research projects in competition. In 2012, we launched a first broad thematic call for proposals for the creative industries; a year later, the first 23 research projects funded by NWO started. In October 2013, NWO signed the Knowledge and Innovation Contract for all top sectors. In 2014 and 2015, NWO will further strengthen research in the creative industries by investing a total of 19.4 million euros in this sector, mostly through public-private partnerships. In addition, NWO will contribute to the research agendas of the networks in the creative industries through investments in scientific talent and curiosity-driven research. With KIEM, we published the first call and several others will soon follow. We look forward to the proposals we will receive.

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SHOW ME THE PROTOTYPE

GLOWSTEPS i-PE

Linda de Valk & Pepijn Rijnbout

THE KINDRED SPIRITS G-Motiv Susana Camara Leret & Maartje Kunen

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THE ACTIVE CUES

Hester Anderiesen

G-Motiv

WHAT REMAINS? G-Motiv Alessia Cadamuro



A WRISTBAND FOR RUNNERS CASD Steven Fokkinga

TWO LINES TO TELL OUR STORY...

Introducing Evolving Prototypes

The avocado line discusses new developments regarding prototyping products, for example, how new types of technology both enable and challenge designers to prototype. Introducing Prototyping PSS

 The pink line discusses how prototyping
 Product Service
 Systems differs
 from prototyping
 w products. PROTOTYPES OF THE PRODUCT

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IDEAS

Prototyping is a core activity of designing and prototypes are the vehicle for the designers' journey from concept to

product. Prototypes can generate knowledge. And because they allow people to experience a situation that did not exist before, prototypes can change the world. They can demonstrate a vision for the future, and open it up for research. They support validating claims, and reduce the likelihood that the product hits the user in unexpectedly painful ways. All in all, prototypes play a crucial role in developing an initial concept design to a fully grown product.

Prototypes in product development

In the manufacturing industry, a prototype traditionally refers to the first physical instantiation of a product before it is multiplied in mass production. However, it is more than simply a check whether the optimal construction, production method, and aesthetics have been chosen. Designers begin their prototyping using the initial holistic concept design of the future product or service. As they develop the concept further, they have to confront the world and flesh out the details. Along the way, they are likely to discover previously overlooked aspects. The act of developing a prototype, then, functions as a generator of knowledge.

Ceci n'est pas un... Photo album

This prototypes... Ways of organising images

Alarm clock Expressive ges control actions

STEPHAN WENSVEEN



Prototypes in design research

In the past two decades, (interaction) design researchers have been making this 'generator quality' explicit, using prototypes to enable, explore, demonstrate, and study possible future interactions. Interestingly enough, their prototypes were often mistaken as visions for products-to-be, rather than interactions-to-be. The research instrument is confused with a commercial product. This confusion may arise from shorthand indications like 'this is a prototype.' But nothing is just 'a prototype'. It is always a prototype of something (or possibly for something), the something for which it is the holistic foreshadow. In this way, prototypes are different from other valuable design artefacts, such as collages, storyboards, probes, sketches, and even walls filled with sticky notes. Unlike a collage, for instance, a prototype resembles the entire intended end result, whether it be a product, an experience, an interaction, or a service. Where appropriate, it is physical, three-dimensional and dynamic, and exhibits working interactions between the parts and their environment.

Prototypes in engineering

Designers' use of prototypes builds on a long history of engineering where progress is often made by creating successive successful instantiations, e.g., a bridge, cathedral, dike, or aeroplane. Machines of one sort or another are built to create a hitherto nonexistent situation in order to see whether a mechanism can work, to explore the new conditions, and to learn how to tune, tweak, modify, and reconsider the degrees of design



freedom involved. When prototyping to generate knowledge, their makers combine experimental methods (to evaluate them), measurement (to explore them), and reflective practice (to learn from developing them).

Two of the heroes of engineering are the Wright brothers, who, together with their less famous sister, developed the 'heavierthan-air flying machine', first successfully flown in 1903. Their most famous invention was 'wing warping,' changing the shape of the left and right wing in order to achieve a turn with an inward tilt, like a bird or a bicycle, but unlike a car or a boat. All their competitors were focusing on achieving lift-off, and tried to make 'flying boats' with a rudder that turned without tilting. Their work was closer to user-centred design than many realise. One key to their success was framing the problem of flight: not as one of pushing a plane from the ground and keeping it on a stable straight course, but of allowing a human to control movement with four degrees of freedom - three dimensions of turning and one of forward thrust.

Although a single idea may fuel a scientific presentation, it doesn't produce a working airplane. The Wrights had to explore flying, surmount not one but a whole series of technical challenges, try out potential solutions in 'live' conditions, and tweak and tune them. Along the way, they used and corrected the available scientific data, developed theories and principles, and filed patents, inventing not only the aeroplane but also the wind tunnel to study the effects of wing shapes. They supplemented their income by building and selling bicycles. It is not only Monty Python who noted that 'the bicycle repairmen' are heroes. Many of their innovations were strongly interconnected and

formed the core of their current fame, e.g., changing wing shapes and human control. Just to get their prototypes going, they also had to develop other things, such as the wind tunnels, a light-weight engine, and a catapult to launch the heavier prototypes. As many before and after them have found, making a working prototype forces you to confront the whole phenomenon, and several phenomena around it.

Functions of prototypes

The work of the Wright brothers illustrate the general functions of prototypes.

- Prototypes evoke a focused discussion in a team, because the phenomenon is 'on the table'. The Flyer helped to decide which theories, techniques, and tools contribute development toward the central goal and which didn't.
- Prototypes support the testing of a hypothesis. The demonstration of the Flyers proved their point beyond doubt.
- Prototypes force their makers to confront theories with each other, forcing the researcher to consider the overlaps of partial theories. The Wrights' prototypes united the ideas about getting a plane off the ground with those of making it turn and allowing a human pilot to control the movement.
- Prototypes confront the world, because the theory cannot hide in abstraction and isolation. The flight experiments required that they resolved all the problems, not only one, e.g., lift.
- Prototypes change the world, create a future, because in interventions it allows people to experience a situation, e.g., human-controlled flight, that did not exist before.

Each of these holds true for prototypes in general, both in practice and research. In many ways developing PSS these days is similar to developing flight at the end of the 19th century. We need to invoke and develop theory, dream up and instantiate possible futures, explore and study these, and solve many practical problems along the way. We also need collaborations between academics and practitioners. This time, we can not expect the 'bicycle repairmen' to do it all on their own.



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NEW CIRCLES KEEP POPPING UP

Froukje Sleeswijk Visser

Prototyping for PSSs brings new challenges: many different elements are connected and influence each other, offering endless opportunities for improvement. It is simply not possible to prototype an entire productservice system and be complete. **PSS** prototyping never ends...

As a designer and design research consultant, I have used various forms of prototyping in nearly every design project. For me, prototyping occurs together with user involvement; exploring and evaluating ideas with users, preferably in their everyday context and over time.

Prototyping can focus on the object (first sphere), its use (second sphere) and the context (third sphere). The second and third spheres in particular have received a great deal more attention in the last 20 years; user-centred design has brought a greater involvement of users to the product development process, through methods such as user research, prototyping, and co-creation. My prototyping activities mostly take place in the second and third sphere of prototyping.

Implications for product service systems prototyping

Prototyping is no longer limited to traditional product design. Design solutions often contain a combination of product and service elements, making them more complex. Solutions are systems of many elements, are less tangible, usually contain digital technologies, and consist of sequences of interactions over larger time spans. Where a product is static, a service is more dynamic. This is why services, from the user's point of view, are often described as journeys with multiple (online/ offline) touchpoints. These differences require us to consider prototypes and their usage in new ways. The broader application of prototyping poses a number of challenges, though. The division between instantiation of a product and the final product is less exact (think of infinite beta versions). At the same time, more diverse disciplines are involved in prototyping activities: disciplines that may not always understand the aim of prototyping and are confused by the unstable jargon.

Let me use an example from practice. A while back, we presented our customer experience insights to the board of a car rental company. The insights focused on a few important stages of the customer journey that needed attention.

To improve these stages, the company would need to change parts of their CRM IT system and take steps to become a more customercentric organisation. As changing the IT system wasn't a short term option, we suggested to start with a customer-centric employee programme. We would provide employees with customer research content, and the tools and training required to increase their customer centricity. Simultaneously, we would choose a few regions to locally prototype several small interventions with frontline staff. The interventions that proved successful would then be scaled up and implemented in other regions.

The board liked our proposal, but one of the managers said: 'But I don't want the prototyping part. I don't see the value of giving iPads to all frontline staff.' We looked at each other with raised eyebrows: who was talking about iPads? We didn't mention iPads in our presentation. When we talked about prototyping, we meant role playing with frontline staff and staging staff-client interactions to define new and more empathic staff behaviour towards customers. The manifestations of our proto-

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typing could lead to a different behavioural protocol for the staff that come into contact with clients. It could, however, also be the introduction of an additional touch point (e.g., sending an extra text message to give extra confirmation) or a different organisation around one of the touch points.

We hadn't talked about physical designs, new individual touchpoints, or technologies or 'iPads'. When the manager heard 'prototyping,' though, all he could think about was technical stuff, in this case: iPads with new applications.

This example illustrates that many people still have a rather traditional understanding of prototyping, an understanding which only addresses the first 'object' sphere. I would recommend everyone who is involved in prototyping activities to make explicit what exactly you want to prototype and with what aim.

Where a traditional product design consists of one object, a product-service system can consist of several objects, each again surrounded by 'use' and 'context' spheres. It is a complex total entity. Many elements are connected to PSSs, each creating another issue that can be explored/evaluated through prototyping activities, addressing different spheres around the objects or combination of objects. In the car rental case, for example, the prototyping activity could be to try out different behaviour towards customers and measure its effects over two weeks. The prototyping activity would then be an evaluation of a new protocol for staff to communicate to customers, and its use would be evaluated based on customer satisfaction rates (the use and context sphere around the desk counter object). In conclusion, prototyping in the process of designing PSSs creates interesting challenges:

1 Combinations of elements

PSSs address many different elements: elements in the front-end, back-end, individual touchpoints, or even combinations of touchpoints, all of them surrounded by use and context spheres.

2 Visualisations

The majority of PSSs prototyping activities seem to take place in the 'use' and 'context' sphere to get to grip on how people will use and experience the different touchpoints of the complex PSSs we design. This is quite different from the traditional prototyping in the 'object' sphere and requires different type of visualisations and mock-up types.

3 Shared understanding

Complex systems are often designed by multidisciplinary teams using different jargon and methodologies. People often underestimate the importance of being able to determine and find consensus on what exactly will be prototyped and for what purpose.

4 Always evolving

Prototyping for PSSs never ends. It is simply not possible to prototype the entire system in all spheres, while you're also attempting to prototype how it is experienced at the same time.

A little lesson about prototyping

In traditional product design, prototyping is used for two goals: either to explore or evaluate (part of) a concept. Prototyping always consists of simulations leading to an intended end result, as explained by Pieter Jan Stappers and John M. Flach. The prototyping activity can focus on the technical feasibility (is the material/construction strong enough?), the aesthetics (does it look or feel nice?), the usability and interface (is it easy or even pleasurable to interact with and use the product?), the experience (would this product evoke intended experiences?) or a combination of these aspects.

Prototyping a car as a product addresses, for example: (1) the technical feasibility (e.g., the construction of the motor), (2) the aesthetics (e.g., the looks of the car), (3) usability (e.g., the dashboard) and (4) the experience of using it (e.g., feeling of freedom when driving).

Generally, these aspects fit in three prototyping domains. Prototyping activities can focus on the object (technology, aesthetics), its use (interactions and interface), and the context in which it is used (what role does it play in people's everyday lives).





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SELEMCA PROJECT - CRISP Magazine #3

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

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Tools and toys for prototy

Robert Paauwe

Traditionally, designers explain interaction with products through pictures, storyboards or video stories. As products become more intelligent and experiential, these means of expression no longer suffice. **Connected products require new ways to prototype interaction.** Prototyping used to be so much easier. If you were making a chair, all you needed to prototype was a workshop and some materials. But we all know that that is no longer the only thing designers do; these days, designers instead look at a new type of products: connected products. Described in a functional way, these products typically use a digital network as part of their functionality, connect to the world in one or more ways (e.g., using sensors), send the gathered data to a digital processing unit, and, after processing, an appropriate response is given by the system or other products connected to the same network, resulting in complex interactions between users, other products, and other related services.

A much more memorable description of connected products is, for example, a silly, niche product that reminds you to water your plants. The first commercially available product that did just that was Botanicalls, quickly followed by other similar products (e.g., Plant Link, Parrot Flower Power, Koubachi, Fliwer, Bitponics, and Growguard); niches rarely stay niches for long. All of these products offer a combination of sensors (for moisture, light, and temperature) and a way to connect to the internet, either through Wi-Fi, Ethernet, or via Bluetooth. The data received about the condition of the plant is sent over the network, stored somewhere and analysed using algorithms. The moment the moisture sensors detect that a plant is low on water, the system sends the user a notification (e.g., SMS, email, or in an app).

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TACKLING WORK-RELATED STRESS

For the adaptive relaxation space, the team decided to employ Philip's knowledge and expertise of new technologies to develop 'make' prototypes. This level of fidelity allowed testing the prototype with health care organisations.



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ping connected products

& Dries de Roeck

These 'Internet of Things' products increasingly make use of general platforms to link devices, products, and other services. Consider, for instance, the If This Then That (IFTTT) web-service that enables users to create their own reminders: "if the online weather service indicates that it might rain, send me a text message reminding me to take an umbrella to work". With easier access to technology and spurred on by the market potential, designers increasingly pick up the conception and design of such products. But digital systems are an integral part of a connected product, which makes them technologically complex and often highly experiential. Traditional methods for explaining interactions with a connected product (pictures, storyboards, or video stories) rarely show how the interaction really works, or how it is experienced. How, for instance, do you show someone that a product radiates heat when close relatives think of each other? If you want to experience the intended interaction, you need to be able to actually feel the heat.

Designers are now looking for new methods and technologies to prototype connected products because if they were to take the same approach to prototyping as before, they would end up with half a prototype; an empty shell. Industrial designers, though, do not necessarily have a strong background in creating digital systems, and the electronic nature and interconnectedness of these products often complicates the concept creation and prototyping process.

DIGITAL PROTOTYPES ARE NOT FINAL PRODUCTS



We think that, to fill that shell with technology, industrial designers need to overcome two barriers: electrical engineering and computer programming.

There are two paths we need to consider to overcome these barriers. You either 'fake it or you make it'. Making the interaction can often be a time-consuming process and may not be sensible for every situation. You don't, for instance, need to demonstrate technology that has been around for decades. Faking technology, on the other hand, is fast and loose, but usually only appropriate to demonstrate an interaction principle. Do your users, for instance, really understand the interface you designed?

One way to fake technology for a connected world is by using prebuilt platforms, such as Dwengo blocks, Makey Makey, MilCandy, Modkit and Tinkerkit. These toys for interactive prototyping make it easy to construct a functional system and are typically primarily visual or tangible. They allow for quick sketching of user experiences and exploring interaction alternatives. They require very little

DESIGN BRIEF

Create an internet-connected system that tells people how healthy their plants are and when they should water them.

WHAT QUESTION DO YOU HAVE?

1 — DISCOVER

What type of interaction will I use between product and user? Do I use an auditory, visual or olfactory alerting system?

2 — DEFINE CONCEPT

I still have several ideas in my head, but I am not sure which combination of interaction elements work best together.

3 — SET UP PROTOTYPE

After deciding upon the interaction elements, I need to know how I can actually make it work technically.

4 — DEVELOP PROTOTYPE

I now have separate things working, but I don't have a fully functional system. Also, my prototype still looks like a mess.

5 — IMPLEMENT

I want to make my product ready for large-scale production.

MAKE IT OR FAKE IT? TOOL OR TOY?

1 — DISCOVER

Fake it! Set up a Wizard-of-Oz test that fakes the interaction and is capable of rapidly capturing user feedback. Most likely, you will not need tools or toys at all!

2 — DEFINE CONCEPT

Fake it! Use a toy in order to set up semi-functioning prototypes to test interactivity. Regard this type of testing as an 'enhanced' Wizard-of-Oz test.

3 — SET UP PROTOTYPE

Make it! Use code examples and create a patchwork of code in order to identify what components you need.

4 — DEVELOP PROTOTYPE

Make it! Carefully analyse your hardware and code and only use code you need. Make sure you understand everything you coded. Use variables that can be used to fine-tune the designed interaction.

5 — IMPLEMENT

Rewrite all code created in a robust programming langue (tools). Create custom printed circuit boards for your hardware and use final concepts. Most likely, you will partner with a development team at this phase.



TUYS ARE GREAT SYSTEMS FOR FAKING TECHNIOLOGY

2 — DEFINE CONCEPT







FINAL PROTOTYPE!

STILL NEEDS REDUCTION IN SCALE, BETTER AESTHETIC QUALITIES AND CODE OPTIMISATION knowledge of how a digital system actually works and are easy to learn. These toys are great systems for (partially) faking technology or the interaction. The drawback is, however, that these systems are often unable to capture the subtlety needed to design an interactive system. This makes them very helpful during a very early exploration phase, as part of a cardboard prototype.

In contrast to toys, tools are based on the idea that, to develop an interactive system, the designer needs to understand the underlying principles of such a system. Tools operate at a level closer to the technology (e.g., Arduino, Processing, Python, Raspberry Pi, Xively). Consider, for instance, programming the behaviour of an LED. With a toy, you might only be able to choose from a specific set of behaviours. With a tool, on the other hand, you can manipulate the light with precision. Tools allow designers to control every little detail of the intended interaction, capture the full potential of a system, and design the interaction exactly as they intended.

Why, then, would you not always use tools instead of toys? The drawback of using such specialised tools is that they are typically less appealing (i.e., textual and non-graphic), difficult to learn, and often require a specific type of knowledge. To adopt a tool,

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a designer needs to fully grasp why it can be useful, and it is often not clear at the beginning what you can achieve with tools in the end.

How then do you choose between the two? How, for instance, would you choose whether to make or fake a prototype for the internet connected plant pot? The table (see page 14) gives an overview of steps in the design process and shows how tools and toys could be used within each step. Tools and toys operate at different levels of abstraction. Toys are at a high abstraction level, which makes them easy to learn but limited in power. Tools, however, operate at a lower abstraction level, making them harder to learn, but ultimately offering greater power.

It is very hard to say which is better: tools or toys. Both have their strengths and weaknesses in different phases of the design process. The designer should consider the insights required and choose the type of tool or toy that is most appropriate. When designing a connected product: Consider where you are in the design process. An early phase in the design process usually require quick iterations, whereas later on, it is more about validation of the concept as a whole.

Decide which aspects of the product should be experiential. When you create an interactive prototype, first consider the main reason you are building it in the first place. Aim for the maximal achievable result, but don't overdo it.

Recognise the limitations of technology. Do not let technical limitations limit your creativity, but also understand the material you are working with. Build prototypes to stretch the limitations, both in creativity and technology!

Realise that digital prototypes are not final products. Just like a sketch on paper, or a cardboard model, prototypes that include digital elements should be regarded as unfinished things. Although computers might give you the idea that everything should function 'right' and look 'good', when it comes to interactive prototyping, this doesn't always apply.

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rapid co-

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vation with creation & Marie Perez

IFA, Berlin 2013: Smart Air Purifier, HomeCooker neXt, GrandBaristo Avanti. Three Philips PSSs with somethingin common: the smart connection was developed through rapid co-creation, a methodology to bring digital innovations to the market in the 'blink of an eye'.

> Rapid co-creation is based on the principles of lean innovation. It was developed by Philips Design to facilitate high pace, parallel prototyping, and cross-silo collaboration orchestrated by design professionals. The core moment is the hackathon week: five days during which a motivated team of designers, business people, engineers, developers, and innovation experts lock themselves in an inspiringworkshop space to translate cutting-edge digital opportunities into user, business, and technology hypotheses for validation with lead users. There is no right or wrong way to go; any output is a learning prototype to gather user feedback for the next iteration. For Grand-Baristo Avanti, the dream team settled in the Saeco headquarter in Italy, just a flight of steps away from the factory floor. In five days, the team would melt different work cultures and inject digital transformation into the traditional world of industrial manufacturing, accelerating an innovation process that would normally take six months.

This compression of development time is made possible through parallel prototyping. For the HomeCooker neXt, sub-teams with reflected in their work. the appropriate expertise worked concurrently and iteratively on multiple artefacts in three domains: the user (customer journey map, user profiles, storyboard, user experience flow, and user interface), the business (stakeholder value map, value creation principles, business modelling), and the technology (technology architecture, hardware, connectivity, front-end and back-end software, data, and platform). Coordination is in the hands of the team leader — usually a design professional or a digital innovation specialist. He/she restlessly walks from one sub-team to another to align prototypes, keep the focus on the common goal, facilitate relevant one-to-one interactions, and motivate the troops during twice daily plenary meetings and team-building activities.

Since the hackathon's bottom line is determined by high spirits, the five days should be immersive, playful, and energising. For the HomeCooker neXt, for instance, the team engaged in joint cooking sessions. Using their own prototypes to cook their meals proved a compelling way to immerse

themselves in the user experience, which subsequently stuck more vividly in their minds and was

Hackathon after hackathon. Philips has learnt that preparation is essential to get things done in such a short time. For the Smart Air Purifier, the project leader and selected team members scheduled several preparatory meetings to discuss the technological and market domain, define key objectives, assign roles and responsibilities, and set a tight but feasible agenda. With everyone absorbing this information beforehand, the hackathon team could start prototyping on day one.

On the fourth day, everything is put together into a final PSS prototype to be tested by potential users on the fifth and last hackathon day. The user test's outcome is the starting point for post-hackathon iterations aimed at upgrading the prototype to a 'minimum viable product:' a set of PSS requirements to be submitted for stakeholder approval for full-scale development. Since keeping the momentum is essential, iterations and team meetings remain frequent in the post-hackathon phase. →

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Proto Reflect **Business** User Idea Refr Technology

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PRODUCTS AS THE MARKETS PROTOTYPES







User testing (during and after the hackathon) is also a joint deal, since long term project leader who can it is jointly set up, administered and analysed by design professionals and market intelligence specialists. In this way, qualitative (e.g., ethnography, observation) and quantitative (e.g., market analytics, surveys) methodologies are continuously combined to provide thorough support with respect to the market potential of the evolving prototype.

At the end of the day, rapid co-creation offers several advantages, especially with regards to the collaboration between design professionals and business stakeholders. By working side by side on different materialisations of a PSS prototype, they develop trust in reciprocal expertise and understanding of each other's languages and priorities. Additionally, the experimental setting of the hackathon helps business stakeholders to progressively embrace innovative ideas they may have not considered as viable at the beginning. For example, for a business like coffee, the idea of transforming their revenue model from selling highend espresso machines to selling PSSs (the GrandBaristo Avanti) had too many unknown factors for them to feel confident to originally commit to. During the hackathon, the limited scale and investments required by rapid prototypes, the 'hands-on' working style, the possibility for realistic user tests, and the team empathy turned an impossible idea into an irresistible innovation path in the eyes of risksavvy business stakeholders.

To sum up, rapid co-creation increases business participants' sense of ownership and commitment, both of which are essential to take digital innovations to the market. In practice, the transition from a rapid co-creation prototype to the market still presents some challenges; once a minimum viable product is defined in a fast track hackathon, keeping the speed and momentum in a larger and processdriven development team is a task the business still needs to adjust to. Also, when the project is handed over to a different team (i.e., the development team), keeping the continuity with the original 'learn-

ings' requires an investment in a work across teams and over time.

Since Philips is increasingly integrating rapid co-creation in its innovation practices, the next challenge is to explore its potential in broader directions. Could rapid co-creation engage business stakeholders in pursuing more sustainable and conscious solutions? For instance, the Smart Air Purifier, developed for the Chinese market, is advanced as a connected product, but is still based on an industrial economy paradigm, driven by product ownership. What would the solution look like if it was aimed at solving air quality as a collective issue and with a systemic approach? Can rapid co-creation enable a more strategic perspective on PSS innovation and bridge the long term with the short term? Can rapid co-creation reduce managerial resistance to radical innovation? Can rapid co-creation facilitate innovation collaboration in PSS ecosystems? Could you come up with an answer to these questions in five days?

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IN SEARCH OF SYNERGY & CROSSOVERS

Sharing knowledge, findings and experiences within the CRISP network

The CRISP projects are running smoothly and now the time has come to seize the opportunity to leverage the overall program and capitalise those project gems that have a high crossover potential. In a vibrant workshop, armed with a set of eight 'key pictures and guetac' representatives from all presents projects and the

Executive Board brought their experiences to the set. They identified insights (which sometimes led to passionate discussions) and cross links, considered next steps and discovered new opportunities to improve the coherence of the programme as a whole and, as such, enhance its output.

The wide range of topics that surfaced during the workshop illustrates the complexity of this research programme. The topics were clustered and developed into five committed follow-up events to reap even more from the programme and further enhance both its outcome and the collaboration. PhD internships in peer projects are already being organised and a PSS 101 workshop on harvesting networked collaboration insights is in preparation.



PSS 101 PROJECT — CRISP Magazine #3

This project is developing a framework of tools, techniques, and methods to improve the conceptualisation and communication between all those involved in designing PSSs.

In the coming years, the workforce will be fed by a new generation which has grown up surrounded by highly interactive tools and applications. This first generation of digital natives is accustomed to new, more expressive and natural ways of digital interaction, available everywhere, including in their office.

Exact is a leading software company that makes business software solutions for small and medium-sized enterprises (SMEs). The company has a good track record of serving entrepreneurs in managing and administrating their business for almost 30 years. Exact has noticed that a new generation of start-ups is quickly emerging as a new group of customers. Eight years ago, ExactOnline was launched as business software in the Cloud, anticipating new start-ups desire to use the Internet to manage their business. However, in determining their new development strategy, they noticed that people's experience with digital equipment has changed rapidly, but that the interactions offered by business software have not. Office solutions, even accessible via the Internet, are still dominated by text or point-and-click input, even though new styles of interaction are visibly emerging in smartphones, tablets, and games devices.

Exact is aware that in the coming years, the workforce will be fed by a new generation which has been surrounded with highly interactive tools, applications and technologies, such as smart phones, multitouch tablets, and more recently, with smart watches and interactive glasses. This first generation of digital natives, or 'Generation Y', was born somewhere between 1980 and 2000, and is accustomed to new, more expressive, and natural ways of interacting with their tools. This is especially clear to see in the games they play, using gestures on the Nintendo Wii and the Microsoft Kinect. They are used to these new styles of interaction, use them intensively in their home lives, and expect them to be available in their office. Exact recognised that the

PROTOTYPING GENERATION Y INTERACTIONS

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Wei Liu, Gert Pasman & Jenneke Taal-Fokker

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next generation of office software should fit this next generation of office workers, and started the 'Generation Y interactions' research project, on which Wei Liu conducted his PhD research.

Making the Office Catch Up

New ways of interacting have already found wide adoption in our home and social lives, but not so much at the office. Although many office applications have seen a sometimes dramatic increase in functionality, how we interact with these functionalities has evolved much more slowly. This is why most office work is still performed with the ubiquitous, almost 40-year old, set-up of keyboard, display and mouse. This set-up —often referred to as WIMP: windows, icons, menus and pointer— only supports limited actions, such as keyboard tapping and mouse clicking. Integration of highly engaging interactions such as in games, smart phones, and tablets in office situations is much slower than in home situations.

As a partner in the PSS 101 project, Exact tries to understand these new styles of interaction, to be able to design and develop new product service systems. They want to innovate and are looking for answers on how office workers can do business using new ways of working, both in an office and in a home environment. Any interaction with Exact products and services should be intuitive and engaging: "bookkeeping, but not in the bookkeeping way."

Interaction Qualities and Interactive Prototyping

In a series of contextual interviews with office workers, six key interaction qualities (instant, expressive, playful, collaborative, responsive and flexible) were identified as embodying a style of interaction labelled as 'Generation Y'. In follow-up interviews, we explored how office workers experienced and judged these key interaction qualities in their home and the office situations, in order to develop interaction design guidelines for designers. In the interviews, participants were given a set of typical activities, such as making an appointment or sending a short message on a scale-response board, for both the home and work situations. The figures show an example of a board for the quality 'responsive'. After these were placed, participants explained why they placed some activities at higher and others at lower values in the two situations. These explanations provided a basis for further refining our definition of the qualities. Interactive prototypes were then made to explore the forms of the interaction qualities. We developed the YPhone prototype to demonstrate the interaction qualities with new ways of working, e.g., pushing down hard on a contact to convey an urgent mood while calling.

The prototype was demonstrated, evaluated, and discussed at a series of venues, with respondents trying out scenarios such as placing an urgent call, or relaying an incoming message. Our findings, and those in a parallel series of student exercises, indicate that the interaction qualities can provide guidance when designing interactions that fit in well with the Generation Y type of interactions from home. Building interactive prototypes played an important part in the exploration. Considering all the techniques used in design process, ranging from sketching, storyboarding to play-acting, the most important technique is the completion of a working prototype in which all the 'finesses' are worked out. In prototypes, designers integrate different aspects from theory and practice. Moreover, when users touch and operate the interactive prototypes and become immersed in the experience, they do not only imagine an envisioned experience but react to a more complete, embodied, experience.

DESIGN VISION – CRISP Magazine #3

'Mass field prototyping will become the norm', states Jeroen van Geel, creative director of Oak & Morrow in this article. Oak and Morrow is a strategic design studio that empowers people and brands through the creation of interactive products and services.

The stakes are high, the time pressure even higher. The period of endless exploration and iteration before product launch has ended; a new era has begun: one where continuous improvement is the norm. We are entering a world where every interaction is feedback. and each product a prototype.

PRN PROTO

Jeroen

The end of prototyping as we know it

Prototyping is a great way to learn how our designs will hold up in the real world. By continually improving and exploring, we move towards the perfect design. Browsing the web, you'll find many stories of these processes where design studios created hundreds of prototypes before launching their award-winning products. But in a world where products and markets are becoming more complex, things are changing. The time to market has shortened dramatically and the ways people interact with products are changing at an even higher rate.

Continuous cycles in the digital realm

The digital world moved towards a continuous state of improvement several years ago. The first step was introducing usability testing; put 5 or 8 people behind a prototype of a website and give them tasks in order to learn from their behaviour. Over the years, this form of testing and prototyping has been perfected.

But why test a prototype with five people if you can also launch it worldwide with the click of a button? Why not let thousands UCTS HE ETS VPES

van Geel

or millions of people use the product and provide constant feedback? Current technology makes this possible. Tools such as Google Analytics give exact feedback on the way people behave on a website. You can relate this to the country they come from, the time of day they are most active, and the devices they prefer to use. This has led to multivariate testing: the ability to test different versions of a webpage or individual elements. By showing 50% of the visitors version A and 50% version B, you can, over time, see which version is the most effective. Companies such as Facebook, Amazon, Zappos, and Google do this continuously. Their core processes are built around this state of continuous improvement and this can, over time, totally change the focus of a product, one improvement after another. Beyond the small functional improvements of existing products, many companies are also launching entirely new products and services in this way. In November 2013, Facebook launched a read-it-later service to take on Instapaper. It was launched to a selection of their mobile users, and on the basis of its success they will decide whether it will be improved on continuously from now on, or whether it will be 'killed'.

And there came the smart objects

All the previous examples are software-only, which makes it easy to argue that digital prototyping is easier or totally different from physical product prototyping. This would end the entire discussion and keep

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CLIFFORD IS

Awake on his back

Normal skin temperature

CLIFFORD'S BREATHING



it two separate worlds, but I don't believe that's the case. We are in the middle of a revolution. After years of promises, we are now finally in the era of smart objects: objects where the worlds of physical and digital product design are perfectly merged. Examples are Nike+, Google Glass, Philips Hue, Nest ... even a smartphone.

The minimum viable product

These smart objects are so interaction-intensive that it is impossible to design the perfect end-product up front. Instead, companies seek to create a minimum viable product (MVP), where a product is good enough to be launched but not yet considered done. Platforms such as Kickstarter.com are great ways to see whether you've reached the status of MVP. If you don't get enough support, you can work on the next prototype you want to bring to the market. And, after it is launched, you can start improving it.

Companies should recognise that many of the smart objects are not part of a new market, but are, instead, causing a revolution within existing markets. Take the Pebble watch (a watch that is an enhancement of your mobile phone) and Oculus Rift (a VR headset). Both were launched as an MVP via Kickstarter. They got support from early adopters who were willing to buy a product they knew would be improved in the near future and, in exchange, they own a first generation and are recognised as pioneers by friends. You may have seen this happen with people who owned the first iPhone, and now it is happening with people who own the first Pebble watch. The same goes for digital, with the people who own a low Twitter id# or those who were the first Bitcoin miners. Companies should recognise that many of the smart objects are not part of a new market, but are, instead, causing a revolution within existing markets. They are supported by strong believers who are willing to help the company and products succeed, in exchange for recognition and maybe even a share in the profits. This does not only apply to small, fledgling companies. Intel collaborated with Rest Devices to create prototypes, such as the Mimo Baby Monitor (a smart device that gives feedback on the status of your sleeping baby), that were immediately for sale, much quicker than traditional products. In February, Google announced Project ARA, a modular smartphone with swappable parts that can be constantly improved. It is based on the Phonebloks concept by Dutch designer Dave Hakkens. Another initiative by Google is Google Glass whose first generation was launched to the US market via a sign-up programme, allowing anyone to own one and help Google improve their hardware and software for a



WE ARE ENTERING A WORLD WHERE EVERY INTERACTION IS FEEDBACK AND EACH PRODUCT A PROTOTYPE

next generation based upon their learnings. The second generation is much better, but many are proud to own a 'first gen' and to be among the happy few.

Internal prototyping will remain; the core concept of an idea must be explored first. As soon as it takes shape, though, it can be validated on the market with multiple ideas at a time. Mass field prototyping will become the norm, and new generations of consumers will get used to this state of continuous improving. It is said that markets are conversations (see 'The Cluetrain Manifesto') and this is true for both the digital and the physical world. The excuse that the digital world is better suited for this way of working no longer suffices. People will race around to see who will be best at discovering the successful cases, the first generation objects will be their trophies. Companies willing to join this dance with the market will not be punished for failures, but celebrated for their continuous search for perfection.



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PING PSS HEORY THE PEUTIC E OF TICE

Hollander



Some things can easier be resolved in practice than in theory. This might be an explanation for the fact that prototyping PSSs, though described lively in a growing pile of books, is still a bit of an untrodden path in scientific literature.

Growing up is about extending your control on the world. Children embrace undefined toys for endless possibilities of openended play; adults prefer a clear set of rules to avoid uncertainty and play Patience on their phones. Prototyping can be scary because it is always a step in the dark, it is about trying something new. You may reduce the risks, but if you try to take away all that is risky, you might never get to the actual prototyping part. When it comes to prototyping, especially for PSSs, there is value in approaching it not as a scientific experiment, but as play.

"Just do it"

There is a risk in approaching prototyping too seriously. 'Better is the enemy of good' has never been more true than for prototyping. A first-time-right mentality not only kills creativity and momentum, it reduces learning opportunity. Prototypers shouldn't be perfectionists, because if you want to put too much (functionality, aesthetics etc) into a single prototype, you risk ending up with failure. Prototyping is about being flexible, about benefitting from coincidence and serendipity, and about defining the boundaries to

create a 'play zone' where unexpected things can happen, and, hopefully, do happen. Prototyping is not fully rational. It is also about dreaming and about maximising imagination with minimal means.

This elusive side of prototyping is familiar to anyone who has ever made a prototype. It is always there, in one variation or another. As he tries out a new shoe design, the experienced shoe designer still feels an addictive tension, wondering whether it will all fall into place. Will material and pattern together equal more than the sum of the parts and become a fresh, original, convincing new shoe? Amplified, this same elusiveness resonates in feelings of incompetence, uncertainty and being lost when staging a new emergency escape system in a building: "What are we doing here? What on earth will this lead to?"

The dependency on the 'magic' generally grows with the complexity of the prototype. Product prototyping already puts significant demands on technology and imagination; the concurrent prototyping of both products and their embedding in a context of service features such as behaviour and multi-touchpoint interaction just makes the problem too tangled for us to solve in a theoretical way. Practitioners can deal with that (they deal with many things they don't understand), but it gives researchers a hard time. This might be an explanation for the fact that prototyping PSS, though lively described in a growing pile of books, is still a bit of an untrodden path in scientific literature.

The proof of the pudding

As a practitioner. I do not claim to know more about the matter than a specialised researcher. I do think, though, that some things can be resolved more easily in practice than in theory. For me, prototyping PSS is the embodiment of 'research by design,' something that practitioners are doing all the time! They tackle wicked problems every day. How else can a car-sharing concept, a GPS guidance system, or, for that matter, iPod and iTunes be developed? Nobody at the time knew it was going to be called PSS prototyping, but they held co-creative sessions to test paper beta versions, used personas in scenario storyboards and desktop walkthroughs, tried storytelling, staging and role playing ... and it worked.

That is why I love CRISP. It's easy to see this programme as one big PSS prototype. Everybody — designer, researcher, industry partner plays their role wonderfully. New products and other touchpoints — papers, review sessions, this magazine — emerge. A large network is being formed, strengthened, optimised, and we all benefit. We are learning by doing, from each other, from our interactions. And unexpected, great things happen.



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DESIGN VISION — CRISP Magazine #3

Provotypes should be visible enough to create ongoing moments for reflection and be unobstructive enough to blend in the daily practice. That is one of the conclusions of Laurens Boer, Jacob Buur and Jared Donovan in this article.

T TENSIONS TRIAL CONTEXT TX3TND3 TX3TND3

Laurens Boer, Jared

What industrial organisations think people do and what people actually do are often two very different things. But exactly this tension can be a source of innovation: how can we give form to insights about what people do, to deliberately challenge industries' conceptions, and inspire new product and service development?

Why prototype concepts when underlying conceptions are faulty?

What industrial organisations think people do and what people actually do are often two very different things. But it is exactly this tension that can be a source of innovation, opening up an interesting opportunity for design: how can we give form to insights about what people do, to deliberately challenge industries' conceptions, and inspire new product and service development?

Addressing tensions...

The tensions between what industrial organizations think people do and what people actually do are often hard to talk about in industrial processes of new product and service development. As design reserachers in these processes it's tempting to make industry eyebrows frown once and to avoid subsequent discussions about these tensions. However, we see especially these difficult discussions and reflections as a source for innovation. It's therefore worthwhile to look for ways in which findings from the field can be represented to support these discussions. Three common used formats are ethnographies, bullet points, and storytelling. The choice and use of each format is likely to influence the extent to which the represented findings are reflected upon. Ethnographies can capture research about groups of people in great detail, but are often perceived by industrialists as long and boring. A more graspable format is bullet points, but these are often ambiguous and misleading as they don't capture the nuances of a finding. Telling stories about human actions can potentially be an appropriate in-between format, but stakeholders might get 'lost in translation' or might feel offended when these stories become tense. We looked for another way to discuss 'hard to talk about' findings from the field, and came up with provocative prototypes: provotypes.

Donovan & Jacob Buur

...through high-fidelity prototypes

The longer a particular interpretation of the world seems to work, the more convinced we are that that particular view is the 'right' one. To change these conceptions, nudging them in a different direction, can pose a challenge. High-fidelity prototypes can play an important role in supporting critical reflection on conceptions. Prototypes can be experienced over a period of time and can create new meanings in interaction. By providing first hand experiences, they can initiate a stakeholder discussion on deeper issues, such as broader problems within their practices: their values, beliefs, potentially even assumptions, and their desires for the future. High-fidelity prototypes can work especially well when bringing these deeper issues to light because their quality suggests that they have a well thought-through use value and underlying design philosophy, and therefore are likely to be taken more seriously.

Provotypes: experiencing the taken-for-granted

Provotyping is a particular method of prototyping, whose deliberate aim is to foreground deeper issues and hidden conceptions. Provotypes transform ethnographic topics that are difficult to talk about into concrete things that can be experienced over time. These tensions between use and industrial context can potentially be teased out after reflecting on the provotype with other stakeholders. As provotypes can be employed in the early stages of innovation projects, these discussions and potentially 'nudged' conceptions about use-context could then inspire a human-centred new product development, or the design of new Product Service Systems.

Provoking the building industry...

The building industry is an interesting sector when we consider Product Service Systems and provotyping. Their primary concern is the construction of the building itself, and not the people who have to live in the building. In an R&D project with five companies in the building industry, we explored the potential of provotyping. What these companies had in common was their interest in the field of 'indoor climate'; for example, we worked together with a ventilation manufacturer and a rooftop window constructor. This project sought to create knowledge about people's experience and understanding of indoor climate comfort, in order to open up new development directions. As design researchers, we tried to better understand tensions between use context and industrial context by engaging both building residents





and project partners. We gathered ethnographic material from different contexts and explored it together with the industrial partners in workshops. We were able to identify a number of themes which captured the tensions between the different contexts. For example, although the building industry often describes indoor climate in values (e.g., degrees Celsius and percentage relative humidity), we found that people experience indoor climate as a holistic thing, indoor climate wasn't something to be understood, but instead something to relate to in context. Our industrial partners mostly saw building residents as passive receivers of indoor climate, however the ethnographic study revealed that people are actually quite active in shaping their indoor climate. These 'tensions' formed the background for the design of a range of provotypes to support and guide discussions surrounding these tensions, and to explore potential development directions. Each provotype addressed a single tension, but by developing a range of provotypes, a wider range of tensions could be discussed and analysed. the same time for a period of one month. They moved across differ-

...with a sensitive aunt

An example of a provotype is the 'Sensitive Aunt'. This provotype aimed to provoke reflection on a recurring conception of the project partners: that building residents would benefit from receiving recommendations based on local measurements to improve their indoor climate. This was seemingly at odds with the ethnographic finding that indoor climate experiences are often time and context-dependent. As such, are local measurements enough to provide relevant recommendations for indoor climate improvement? To address this tension, we devised a provotype that provides recommendations based on measurements of temperature, CO2 concentrations, and ambient light intensity. When

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two triangular shaped buttons were pressed simultaneously, a text display showed a recommendation on how to improve the indoor climate. These recommendations were randomly selected from one of three groups: compelling advice, social advice, and persuasive advice. For compelling advice, guidelines were phrased in such a way that people felt that they had to be followed; social advice was phrased to encourage other people in the room to join in problem solving; and persuasive advice was formulated as suggestions. In our formulation of the advice, we consciously played with exaggeration and humour, to stir sense-making and provoke dialogue. We also purposely did not show the actual measurements: this highlighted the notion that recommendations come with a certain 'authoritarian' thinking, and the underlying argumentation does not always seem to be transparent.

Five 'Sensitive Aunts' were placed at each of the industry partners at ent internal departments, for example human resources or sales, to stimulate dialogue across different interests. This provoked quite a range of reflections across the departments. The recommendations were experienced as laughable, inaccurate, unneeded, yet also 'calibratable', and, on rare moments, even executable. The experiences with the Sensitive Aunt made the project partners reconsider what it actually means to receive recommendations. Several attitudes, desires and social interactions are at play for building residents, some of which might not be satisfied with 'authoritarian' and straightforward recommendations. These experiences showed the project team the importance of contextual information and individual indoor climate preferences, and resulted in changes in the language used in the ensuing meetings. For example, when discussing 'improving' indoor climate practices, the terms used by the partners shifted from 'teaching people what to do' towards 'supporting individuals in their practices'. As the provotypes were employed at the start of a development process, they left room to reframe conceptions.

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The design direction that was pursued then became a more socialtechnical support system instead of a detached control system. This improved the fit between the developed concepts for the envisioned system and its intended use context.

Designing provocations

By exploring provotypes in the Indoor Climate project, we learned some lessons for the design of provotypes. Firstly, they should provide ongoing stimuli that move in and out of attention over time. Provotypes should be visible enough to create ongoing moments for reflection, but be unobtrusive enough to blend in the daily practice. Secondly, providing handles to explore the workings of the provotype stimulates ongoing engagement to learn about the ethnographic finding it addresses. Engagement seems to increase when the functionality of the provotype remains slightly mysterious. For example, how the Sensitive Aunt worked was not obvious to our industrial partners, and when combined with the type of language used, provoked ongoing use and reflections.

Prototyping industry itself?

Provotypes challenge the idea that high-fidelity artefacts can only be employed in later stages of a development project. They also suggest that, if underlying conceptions are faulty, prototypes are not necessarily prototyping desirable concepts. Perhaps we can view provotypes as being deliberately created disturbances that 'aim to miss'. But that is exactly where we see their power. By deploying them within industry, manufacturers can experience, on a daily and local basis, what their preconceptions might mean in light of new product development. These first-hand experiences can instigate a human-centred product and service development, and, perhaps more importantly, challenge the underlying human-centred conceptions. set of developed provotypes in the ndoor Climate project



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IP-E PROJECT — CRISP Magazine #3

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

Using prototypes for design research requires a different attitude. The prototypes themselves can also be used differently. Here are some of our learnings on using prototypes for research.

Things we learned and t

<mark>Marco Rozen</mark>daal

In industry, prototypes serve to support quick decision making on how to best deliver on a client's demands, by exploring the use of or the experience evoked by a design concept during its creation. They can either be low-fidelity, simple static mock-ups, or high-fidelity, fully functional interactive prototypes. In research, prototypes can serve as 'physical hypotheses' which need to be empirically validated and with which we can generate new research questions. In the I-PE project, we measure children's playing experiences: quick measurements help children to intuitively express their experiences. We use prototypes to explore how interactive media products can help achieve that goal.

We have developed two apps, each of which captures children's playing experiences in radically different ways. With the INEA-Photo app, children take a picture of an interesting moment in their play activity. They then describe their experience with two keywords, highlight in the picture what caused the experience, and answer a few simple questions. The INEA-Mirror app, our second prototype, mimics experiences in the real world with an animated virtual puppet in a make-believe world.

The puppet can express six types of experiences and, for each experience, children can choose one of four animations, each expressing a different quality. For social experiences, for example, the puppet can express feeling unique, lonely, cosy, or bullied.

Currently, two years after this project started, we want to share with you what we have learned. If you use prototypes in field studies in your research project to understand how interactive mechanisms are experienced, consider the following:

To understand actual use in real environments, choose high-fidelity prototypes

Both of our apps needed to be high-fidelity prototypes of interactive media products: fully interactive and robust, capturing real user data and detailed in their aesthetics. It would have been impossible to explore the experience capturing process with low-fidelity prototypes such as mock-ups. We needed high-fidelity prototypes to understand which interactive mechanisms work best to capture children's experiences and to explore how children use the prototypes in real play environments.



Acknowledgements

Our prototypes and field studies would not have been possible without the help of Shapers (interaction design—3D animation), KlevR sound design, Alt-N (software development) and NEMO Science center (public participation).

hink you should know too

& Arnold Vermeeren

A series of prototypes allows exploration and validation

We used the apps for both validation and generative purposes. For example, we built the Mirror app on the hypothesis that different animations can communicate different types of experiences. We then empirically validated how well the animations communicated the intended experiences. We also explored how children match animations to their own experiences. This allowed us to generate new hypotheses on how children use the app. In a subsequent prototype, these hypotheses can be implemented and validated.



High-fidelity prototyping in a research project entails significant resources

In our research project, the intended deliverables were defined in terms of publication results, which limited the time and budget for prototyping. We initially also underestimated the time and costs involved in prototyping. The design and production of each high-fidelity prototype took about six months and entailed significant costs as we had to involve external parties to create the animations and the sounds, as well as implement the software.

DESIGNING PROTOTYPES REQUIRES AN ATTITUDE DIFFERENT FROM THAT OF USING PROTOTYPES IN RESEARCH



Prototyping in research means juggling opposing attitudes

Designing prototypes requires an attitude different from that of using prototypes in research. This difference can sometimes feel like a conflict: designing demands an involved and positive attitude towards the prototype; research, on the other hand, calls for a more distanced and critical attitude. Learning to choose between these opposing attitudes is essential, but can be challenging.

Prototypes generate visibility and enthusiasm across different communities

As concrete and tangible manifestations, our prototypes generated visibility and enthusiasm across different communities. It allowed us to do field-studies at the NEMO Science center and led to a demonstration of the Mirrorapp at one of the CRISP events. By publishing the Mirror app in the App Store, we hope to further engage with the design community so that we can explore the app's value in practice.



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GRIP PROJECT — CRISP Magazine #3

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

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Co-creating an adaptive relaxation space

T E

Luc Geurts, Helle Ullerup, Evelien van de Garde, Federico Trevia & Adam Henriksson

crisp magazine #3

Imagine a calming space that adapts to whoever's inside it, breathes as they do, and changes shape and sound to fit their needs. This unique concept prototype, developed at Philips with a team of experts and academics, aims to reduce work-related stress by altering behaviour to encourage mindfulness.

At least half of all working days lost are lost due to stress, and the effect this has on individuals, the businesses they work for, and the healthcare systems that care for them, is immense. Philips has been exploring work-related stress for some time, and the 'adaptive relaxation space' is the latest concept in this area.

"Stress is both a taboo subject and a vague field, for which there aren't many clear solutions," explains Luc Geurts, Creative Director at Philips Design Innovation and the project lead from Philips. "We wanted to use design to change people's behaviour to help them become more aware of stress and how to deal with it."



Ideation workshop co-creating concepts with project partners and students.



The concept was the result of a collaboration between Philips, the Design Academy Eindhoven, Delft University of Technology (TU Delft) and Eindhoven University of Technology (TU/e), as part of the GRIP project of CRISP (Creative Industry Scientific Programme). Together with input from numerous design students, and the constant involvement of a network of stress experts, this project demonstrates the value of co-creation and what can be achieved.

"I'd never worked with designers before", notes Hans van Os, relaxation expert. "What struck me was their open minds. Unlike some other people, they listen and absorb as much as possible without judgment or qualification, then they come back with great new ideas."



Mock-up of the relaxation space with paper curtains, animated lighting and sound.

Gathering insights

To gather essential insights from the field, the project team initially worked closely with experts in mental health and well-being, as well as people who had experienced burnout through stress at work. Insights were then gathered from healthcare workers, a group that the stress experts highlighted as being particularly susceptible to stress. It was concluded that the team wanted to design something that enabled the stressed person to reflect and retrieve a sense of control over their situation without requiring too much decision making, which in itself can be stressful.



Build-up of the adaptive relaxation space at the ExperienceLab (floor provided by Interface).

AT LEAST HALF OF ALL LOST WORKING DAYS ARE LOST DUE TO STRESS

Designing ideas

In the first creative phase, students from the TU/e were challenged to devise products or services that could help people cope with work-related stress. From almost 50 ideas, the team grouped the stronger ones into three key themes: paced breathing (which explores physical or digital products which help people re-establish a connection between their mind and body); personal balance (where devices monitor a person's stress levels and then suggest activities to help recharge their emotional battery); and ambient experience (in which reactive environments help the person stay more mindfula in order to cope with stress).

Fast-pace concept prototyping and evaluation

With valuable feedback from experts and healthcare workers on all ideas, the team started with a 'pressure cooker week' of prototyping in a few fast-paced days. During that week, new insights were applied and ideas were filtered into one concept, through ideations and quick experimentations. Different elements from the three themes were combined, but the main structure was based on Philips Ambient Experience. At the end of the week, a quick, rough mock-up was made, using basic furniture, a Philips LivingColors lamp, and a mobile app with guided meditation. Philips colleagues were invited to give initial feedback, and despite its rough-andready appearance, people already seemed impressed with the idea.

The key findings from this phase were that the space should be an attractive and inviting place to retreat to, and not be stigmatising. It should not resemble the workplace but be 'nature inspired', in the sounds, colours and most of all the behaviour of the space, aiming to promote calmness and trigger mindfulness.

ExperienceLab

Based on these findings, the team built the final experience prototype in the Philips ExperienceLab in Eindhoven, for evaluation with the working community of Philips and other experts. The concept was iterated a second time, and the idea of adaptive curtains was added to cater for the expressed need of personalisation. To discuss this with experts, a low-fidelity scale model was initially made. Then, to experiment with dimensions and behaviour, a full-scale mock-up was constructed using paper curtains, animated lighting and sound speakers to simulate the experience. Once again, experts and Philips colleagues were invited to give their feedback.

The relaxation space that was finally created has been designed to have an inviting and relaxing ambiance and offer users intuitive control over their surroundings, to help them alleviate stress and promote mindfulness. As people explore, they create their own individual space. Sensors control an ambient soundscape from four speakers around the area to help users pace their breathing. Dynamic Philips hue lights create soothing colours that slowly glow brighter then dimmer. In addition to the soothing ceiling lights, other light objects can be used in the space, pulsing at the same pace.



Soldering and wiring the pressure sensitive floor using 64 sensors.

Depending on individual preferences, people can either lie down or sit down to relax, using comfortable furniture or cushions. People can practice their own preferred relaxation techniques, such as paced breathing, mindfulness, meditation and even power-napping. An informal evaluation within the working community of Philips and 23 experts from various fields indicated that the space is well suited to support or even speed up the relaxation process. This was particularly noted by people experienced in yoga and meditation.

"Before I tried the space, I had all kinds of questions about how it would work and why", says Erik Kuijpers, responsible for research and innovation at mental healthcare institution GGzE. "But after I experienced it, those questions went away, it's quite wonderful."

The adaptive relaxation space concept is initially geared to reducing workplace stress for overstretched professions, such as teachers and healthcare workers. At this stage of the project, the prototype is a vehicle for learning and is ready for take-up for further user evaluations by interested parties. "The collaborative process was at the core of the project," says Luc Geurts. "As designers, we thrive on the passion of other people, who all contribute to finding the best solutions."

S EXTERNAL LINKS

BACKGROUND INFORMATION

Movie http://bit.ly/1fBZtIH

Philips http://philips.to/1eVjsIA



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DESIGN VISION - CRISP Magazine 4

What can you actually learn from prototyping? How do you ensure you are not expecting more than you should expect? Why is it important to prototype early in the process and why should you prototype often? In the article, Brian Gillespie, principal at Continuum innovation, explains how prototyping became part of the company's DNA.

Brian

Over the years, Continuum moved from product prototyping towards prototyping PSSs. We started prototyping simple scenarios in single channels and learned integrating them to **gradually build both the complexity and fidelity of the experiences as the design process progresses.**

Prototyping at Continuum

Prototyping and testing have always been a fundamental element of the design process, even though how and when they are carried out can differ considerably from team to team and project to project. At Continuum, they're in our DNA. This year, we are celebrating 30 years in business. In that time, we have grown from a focus on product design and medical devices to a multi-disciplinary design team of designers, engineers, and strategists creating stand-alone and integrated products, services, environments, and communications, serving clients from our studios in Boston, Los Angeles, Milan, and Shanghai.

With product design in our roots, it is not surprising that, for many years, we have developed a very sophisticated model shop that supports our design teams in the creation of physical prototypes through every stage of the design process. With the growth of the broad multi-disciplinary nature of our work, prototyping now extends beyond the physical shop, as every practitioner at Continuum creates prototypes in the course of their design. Our teams are now facing the challenge of innovating the way prototyping is incorporated into the design of a wide range of multi-touchpoint experiences that incorporate products, services, environments, and the people that inhabit and interact with and between them. From the design of the total banking experience to retail sales environments, digital is becoming the glue that binds this connected world, and service design the methods that can integrate them. In order to prepare a point of view on prototyping, I sat down and chatted with Richard Ciccarelli, who leads the activities of the Continuum model shop, and with my colleague Bill Gastrock, a senior digital designer in our service design team. Rich and Bill have partnered on a number of projects that reflect this growing need for integrated physical and digital prototyping. Together, we discussed currents trends, practices, and challenges in experiential prototyping.

LENGES PERIENTIAL OTOTYPING

Lessons learned

For years, Continuum's model shop has played a huge role in driving successful product design initiatives, from consumer non-durables to advanced medical equipment. The image of the evolution of proto-types for the original One Laptop per Child project sums up the shop's approach perfectly. Rich and Bill have identified a number of lessons learned over time in the shop that are probably familiar to all designers. We can regard these long-learned lessons as a foundation for our evolving approach to prototyping, necessitated by the more complex and connected world we live in and design for.

We have learned that it is important to prototype early and prototype often. We make sure that the fidelity of our prototypes evolves as we move through the design process from strategy to design development, from concept models to appearance models.

We have learned that a flexible prototype model can be adjusted 'on the fly' in testing, to support co-creation with our testers. A while ago, for instance, Bill created a model to test a new grooming device which had two moveable parts. When testers gave feedback regarding these parts, it took seconds to shift their location on the model. and this allowed the team to prototype and test, there and then, what was essentially a new model.

We know that it is important to be clear about what you can actually learn from your prototype, that you are not expecting more than you should expect from its limited scope. We also know that imbuing a prototype with more character than should reasonably be expected at that stage in the design process can often cause confusion, and potentially provide incomplete or even incorrect information.

Emerging prototyping strategies

We have learned these lessons in supporting the design of products. Over the past few years, as Continuum's service design practice has matured, our digital and environments teams been active drivers in the evolution of our approach to prototyping. With the growth of our digital shop and the role digital plays in providing experiences that integrate product, service, and environment, it has become a more complex and multi-faceted activity. The lessons from our physical world experience are still fundamentally reliable, but the complexity of the relationships between the various elements of the experience means that the strategy for prototyping requires new methods in order to succeed.

The growth of the service design practice at Continuum and the associated tools and methods have provided the foundation for our emerging prototyping strategies. Personas, customer journeys and multi-platform service blueprints are central to this. Mapping the elements of the customer journey over time and through multiple contexts or touchpoints that consist of integrated digital and physical product, services, and environments not only provides the blueprint for the complete customer experience, but also the blueprint for our prototyping strategies. When prototyping teams use the blueprint to map the key scenarios identified as being most valuable to customers and the business, they can determine which aspects of the platforms they are responsible for that may need to be prototyped. This allows prototyping of both aspects of the individual touchpoints and the experience across touchpoints, which gives valuable learning on how integrated, consistent, and seamless the experience is. The lessons learned from product prototyping come into play here, in that prototyping can start with simple scenarios in single channels before being integrated with others, thereby gradually building both the →



complexity and fidelity of the experiences as the design process progresses. Recent work that we have completed for Audi, BBVA, and Holiday Inn provide diverse examples of this multi-platform experiential prototyping. Early in the design process for each of these projects, Rich and the model shop team created full-scale models of the service environments which served as the foundation for the overall integrated service experience. These models can be created quite quickly at a low cost, and they allow our design teams to work collaboratively with our client teams, to act out our service scenarios. All of these models are typically a simple white shade because, as we mentioned in our lessons learned, their neutrality conveys the fact that the design is provisional, in progress, and open to change.

Audi asked us to envision the future customer experience of car dealerships. We created a full-scale, 10,000 square feet showroom model and integrated various digital touchpoints from touchscreen table monitors to point-of-car tablet apps, which together captured a vision for how sales staff would engage with customers and the new showroom environment. Bill is a seasoned expert in the use of digital projections to create simulations and experiences. Digital projections on certain surfaces allowed us to expand the visual landscape of our prototype without actually creating a physical model, and enabled us to project potential alternatives. With the service blueprint, we could script walk-throughs and customer-facing scenarios that demonstrated the design intent. With the prototype, senior managers from Audi experienced the vision in a to-scale environment, which helped in business planning and decision-making. Digital projection of a different sort helped us imagine many alternative treatments for the Holiday Inn lobby experience.

 $\begin{array}{c} \text{CRISP}\,\text{magazine}\,\#\mathbf{3}\\ \mathbf{34} \end{array}$

For this project, apart from building a to-scale foamcore model, we had an augmented reality application that enabled a virtual walkthrough of the envisioned space. This provided incredible flexibility, and allowed designers to play with light and materials variations before making decisions on what aspects of the experience should be explored further, in detailed appearance models. In addition, the service strategy drove both what was created and how it was tested. In this development and evaluation effort, we considered guest needs, staffing ratios, operations, hotel infrastructure, and service scripts.

The flexibility of the prototype experience allowed Holiday Inn to quickly view alternatives and, in doing so, make decisions on the impact of materials decisions on overall costs and budgets. From the physical model perspective, when we tested the foam model of the lobby with Holiday Inn employees, a bartender noted that the bar was too wide for him to reach the glasses. The beauty of the foamcore and its flexible nature meant the model could be altered right there by simply cutting the bar down to a useable size. A video of Rich and the design team in the process of setting up the full-scale model of the lobby experience can be viewed here: https://vimeo.com/82577401.

Continuum worked with Spanish bank BBVA to help them envision the banking experience of the future. The customer-centric experience looked at all touchpoints through which customers might interact with the bank. Rich and the team created a series of prototypes, increasing in fidelity as the design unfolded from strategy to implementation This included a full-size, 11,000-square-foot mockup of a bank lobby constructed entirely out of foam that paved the way for changes in BBVA branches. The final series of prototypes that reflected a fully built out version of the bank were shipped from our studio in Boston and installed at BBVA's headquarters in Madrid. BBVA management could evaluate the service experience with different



bank customers, with diverse needs, which could be addressed by the various digital, environmental, and human touchpoints before committing to an expensive build out, which is now underway.

Conclusion

All of these initiatives were underpinned by the service design strategy, which places customers at the core of the experience, and without which a strategy for experiential prototyping could not have been established. The service blueprint identifies the key aspects of the multi-channel experience and allows the design team to envision a series of ideal journeys that cross channels and integrate products, services and environments. This in turn informs the experiential prototyping strategy and the resulting uses for which the prototype is put, from testing with customers all the way to business planning. Because this connected world of ours is continually evolving, there is still much for design teams to look forward to in evolving their own prototyping practices. If you are one of those fascinated by this dynamic aspect of our design process, don't hesitate to reach out and continue the conversation.



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WE CREATED A FULL-SCALE, 10,000 SQUARE FEET SHOWROOM MODEL

NEW CIRCLES KEEP POPPING UP

Brian Gillespie illustrates how organisations prototype multichannel and multi touchpoint PSSs, dealing with the different spheres of 'objects', 'use' and 'context' as discussed by Froukje Sleeswijk Visser.



STS PROJECT — CRISP Magazine #3

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



OF PROTOTYPING

Oscar Tomico & Stephan Wensveen





In the inspirational test bed of Smart Textile Services, prototyping is not just a step: it drives the process. It is not simply a tool or technique, but the test bed's foundation. The Smart Textile Services (STS) test-bed is a platform of methods, tools, materials, partners, and prototypes where the creative high-technology and textile industries can explore the opportunities and challenges of joining their expertise towards designing smart textile services. Within this test bed, prototyping has become a craft that is intimately linked to the expression and the creation of culture. This craft and the outcomes are the foundations of both a creative culture as well as an appreciative community of Smart Textile Services.

The growth plan of an inspirational test bed helps textile developers to understand the multi-disciplinary opportunities and challenges in creating Smart-Textile Product Service Systems. In the first CRISP magazine, Martijn ten Bhömer described the Incubation, Nursery and Adoption phases, in which his prototypes start as one-offs tested with one person, to scaling up and testing multiple versions or square meters, to the final phase of Adoption. The partners in his project, De Wever (elderly care provider), Metatronics (developer of intelligent products) and the Textiel-Museum TextielLab are involved in every phase through

their expertise and interest. One of the main purposes of prototyping in these first two phases is creating a sense of shared ownership. Each new prototype becomes the embodiment of the knowledge available in the project at that point, and the accumulation of previous design decisions. As such, we do not continue using an existing prototype but, with each iteration, we build an entirely new one. Each new prototype opens up the design process for new discussions and new expertise, while previous knowledge remains stored in the older prototypes.

The regular co-creation of prototypes with partners also means that these prototypes are regularly evaluated with them and their end-users. Validating aspects of feasibility, desirability and viability by the various disciplines becomes a constant throughout the process. In discussing the prototypes, each partner expresses what they find important and their set of explicit and implicit criteria. While this is not always an easy, happy process, it has proven →

PROTOTYPING BUILDS A CREATIVE AND APPRECIATIVE CULTURE

vital in creating shared ownership. phase of development and what If the knowledge available from partners is no longer sufficient, we involve external specialists with complementary expertise. For instance, after multiple iterations, Ten Bhömer's latest prototyping activity for Vigour needed more refinement and complexity. Fashion designer Paulien van Dongen was asked to make the prototypes more wearable and fashionable. while Lisa Vork (TU/e) worked on the iPad application that reads and stores the sensor data and returns auditive feedback.

Prototyping becomes a craft

Prototyping drives both the process and the culture within STS, and so much energy and time is spent on it that people are bound to become attached, personally and emotionally, to what they make. We don't see this as a bad thing. The technique of prototyping becomes a craft where the designer's pleasure and frustration of engaging with the material are strong motivators. This craft then also links innovative aspects of the prototype to the personal identities of the people involved. The craft of prototyping at STS also has public aspects, as it connects the skilled use of its community resources to the aesthetic sensibilities of the community. We see craft qualities1 such as storytelling and local weaving production in TexTales, a concept that combines augmented reality, a woven blanket, and a storytelling application. All these qualities create a culture through what is made and shown in the projects.

The personal and emotional connection to the prototype can, however, also become too strong. It can make it more difficult to decide when to go to the next

the right time is to risk commercial success, or, as was the case with a TexTales prototype, failure in the form of a Kickstarter project. How do you decide when to stop the development of prototypes for Vigour as part of the design process, and when to stop as part of the research process?

The test bed's bottom-up approach, together with the engagement with the physical material introduces another challenge. The approach has led to products that are highly developed with service components and a market that are both underdeveloped. The product alone is not enough to experience the full product service system. We are now experimenting with acting out scenarios with the product, exploring the system in context, and making videos of these explorations for analysis and communication. For example, Vigour was explored in an early phase with therapists, managers, and clients of De Wever in their rehabilitation setting. We learned that the service should offer training videos and training sessions. The recordings of these tests were also used to show the textile producers the role of their textile in the resulting service.

Prototyping builds a creative culture

One of the main goals of the STS test bed is to create a new creative culture of Smart Textile Services that brings together the existing cultures of textile, high technology, and services. Instead of aiming for short-term scientific or commercial success, a nationally funded program such as CRISP allows us to focus on a slower, more sustainable innovation to create a foundation for future

THE PLEASURE **DF** MATERIAL ENGAGEMENT IS A **STRONG MOTIVATOR**







success. Prototypes are made, shown, and re-made to spread and share our approach, our knowledge, and the opportunities of the new materials.

More developed product prototypes are also used as demonstrators of the potential of Smart Textile Services. They attract new creative partners who were not involved in the project when CRISP started. This attraction is twofold: on the one hand, creatives are attracted by what they can get from the new opportunities, but also by what they can bring to these new opportunities, and seeing how their skills can improve the look-and-feel, the role or the implementation of the prototype. Exposing the prototypes through different media and means attracts these new members to the creative culture of Smart Textile Services. These prototypes build a strong foundation of design students who can design with smart textiles, and also attract top designers such as Borre Akkersdijk, Paulien van Dongen, and Eunjeong Jeon.

Prototyping builds an appreciative community

The effect of this culture of prototyping is more than simply attracting creative partners. By showing the prototypes at events, for example, DDW, DesignHuis, Beijing Design Week 2013, FastCoDesign and on other blogs, we also build an appreciative community. People in this larger community will not necessarily create the next Smart Textile Service, but they do appreciate the results and efforts for society. In the second CRISP magazine, José Teunissen showed how STS demonstrated the innovative

potential of the textile industry, and how the large and broad network it built resulted in the CLICK/NWO research project 'Crafting Wearables'. Demonstrating the prototypes through exhibitions, videos and stories in local, national and international media also built up societal awareness and appreciation of what smart textiles services could mean. While prototyping shapes the creative culture of STS, it will be society, including that culture, which will shape the future of smart textile services.



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what do you fab? SERVICES IS THER

Karianne Rygh, Cynthia Hathaway & Danielle Arets

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When it comes to innovation, Japan is still a leading country and a great inspiration. New business models challenge the traditional relations between retail stores and consumers, and thereby alter the role of designers. Instead of the creative lead, designers become moderators between customers, industry, and society.

In January, a Design Academy delegation conducted an exchange with Keio University FSC in Tokyo and the Kyoto Institute of Technology. Their aim was to disseminate CRISP knowledge on PSS at Kyoto University and to investigate the rise of Fablabs in Japan in relation to the new CRISP research project Incubator 2.5.

Fablabs are rapidly increasing in popularity. They first appeared in universities, offering students cheap and flexible access to 3D fabrication technology, but are now also entering the consumer market. A clear example of this democratisation of technology is the FabCafé, a coffee shop equipped with a laser cutter and 3D printing machine. Customers can socialise at the café but can also produce prototypes and exchange knowledge during monthly events and workshops.

カスタマイズ エ房

Towards prosumer labs, a new PSS model

The FabCafé is run by Loftwork Inc., and generates revenue by offering the space and the machines to the public. According to Daijiro Minzuno, a design researcher at Keio University and one of the frontrunners of Fablabs in Japan,

the FabCafé is a perfect way for companies to explore customer interactions with their machines, what products they are making, and in what context these customers can best be supported. The FabCafé seems to be the perfect test bed for fabrication technology developers searching for new sustainable PSS in a highly competitive market.

The transition from retail outlet to prosumer lab is rapidly transforming the retail sector in Japan. At Muji, one of the largest design department stores, consumers can find staff and devices on every floor to customise their goods using digital printers and laser cutters. As a brand, Muji embraces the idea that the final design should be open to change. The design of their objects are simplistic to support personalisation. With the introduction of on-site digital manufacturing, Muji embraces a new and growing customer-base which is no longer passive but rather pro-consuming.

わたしの思い出

In the Do-It-Yourself sector, stores are also beginning to integrate digital manufacturing as a service. We witnessed this when we visited a giant department store called Tokyu Hands. It's a maker's paradise, consisting of eleven floors of themed departments, supplying all sorts of materials and tools for all makers, whether hobbyist or professional amateur. Tokyu Hands offers in-house consultation and production services combined with expert advice and fablab facilities to customise store-bought materials. These services are transforming the traditional model of a supply store into a productive facility of knowledge; the retail store is slowly becoming a sort of universal makers studio.

Meta designers and in-between-consumers

These retail facilities seem to confirm the growth of the professional amateur, as well as that of a growing number of skilled amateurs who are developing into semi-professionals. This rise in the semi-professional is important, as their expertise is applied to various communities and sectors, especially during times of economic recession. Daijiro wants to insert FabLabs into poorer communities and elderly care facilities where budget cuts have forced the government to ask people with special needs to be more self-sufficient. The Fablabs could help democratise the tools and techniques needed to economically empower those who want to market a new or existing skill.

This also changes the role of designers. Instead of the creative lead, they become moderators between customers, industry, and society, seeking to make productions that translate well culturally, environmentally and economically, in an era of 'design by everyone'.

Although Fablabs offer much to consumers, they also help businesses and the creative industry explore new and sustainable services for the prosumer. As witnessed in the FabCafé, industries can connect to the potential of skilled customers and immediately spark a professional dialogue through the things customers are producing and exploring. This dialogue could lead to new business strategies and configurations in relation to the new economy of prosumers, and expand the model of business-to-business to include business-to-semi-professional. 在さを考え アイデアを IRSELFJ なく、使う 頂品です。 **1) 良品**

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SELEMCA PROJECT — CRISP Magazine #3

Waag Society has a connecting role within CRISP, they support the different partners in collaborating through making physical artifacts with their infrastructure and expertise.

ROTOTYPING SA DIALOGUE **MEEN** STAKEHOLDER Sabine Wildevuur

At Waag Society, prototyping is at the core of our strategy; organising countless sessions with hundreds of institutions and thousands of users, the institute has gained a deep understanding of how prototyping and Fablabs can become a part of public

engagement strategies.

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Prototyping as a dialogue

Waag Society has twenty years of experience in developing creative, user-centred technologies for social innovation. By this, we refer to new strategies, concepts, ideas, and organisations that seek to provide solutions for major societal challenges ranging from employment and education to health care, community involvement and environmental problems. It can be based on 'creative research', which aims to involve a variety of stakeholders in co-creative acts. Over time, we have experimented with new forms and practices, collaborated with a rich variety of institutions and people, and built numerous prototypes. Prototyping is central to our 'Users as Designers'- methodology (Van Dijk D, 2011). According to its principles, technology can be of great value, but only when it is designed and developed together with its users, and answers their specific requirements and demands. Prototyping enables the different stakeholders to shape their ideation and concept development together. It is not a single stage in a project, but a process, an iterative dialogue between all stakeholders. It occurs both in high-end industrial labs and/ or small-scale crafts places, as well as in Fablabs and public maker guilds, and is increasingly becoming a part of public engagement strategies.

Prototyping as glue

Social innovation is kindled by a network-driven paradigm of innovation and creativity, and mobilised by the innovation capacities of everyone in society, whatever their social role or function. Social innovation involves bringing people together who work in different disciplines, for example, people from commerce, creative industries, knowledge institutes, government, and civil society. Prototyping is one way to 'glue' these domains together.

In addition to using prototyping as a means to evaluate functionalities and user experiences, in user sessions, expert panels, and user groups, we also use prototyping to communicate and exchange knowledge and learn from each other. We aim to involve a variety of stakeholders in co-creative acts, sharing our creativity and creating something collectively. Working in multidisciplinary teams helps us see how we can use technology in new ways when designing new social applications, services, and systems. The design team members all have specific areas of knowledge, but they share broad interests. By being open to new developments, the team absorbs external knowledge, finds new questions, and is able to create new solutions. To achieve this, attitude is crucial: the desire to learn, the will to explore your own boundaries, to listen to your intuition, and to deal creatively with new knowledge.

When designers and stakeholders work together using this design philosophy, they all take on multiple roles throughout the design process. They are both maker and expert, materialising ideas and making and exploring early solutions through prototyping in iterative steps. The user is the expert on his own life and experience, and the designer is the trained disruptive force. The user is triggered by the designer's ideas, and feeds the designer with more suggestions and feedback on the usability and experience of the prototype. Next, the user becomes the integrator and introduces the prototype into his/ her own environment, defining new strategies and routines around the novel application. The designer then takes on the role of interpreter, using these new insights to evaluate and enhance the prototype and service even further.







Prototyping the layers of a PSS

Within CRISP, prototyping has become an important tool to bridge the gap between different disciplines and between the creative industry and universities. The Fablab turned out to be an ideal working space, meeting point and platform for discussion for both the creative industry and universities, since (rapid) prototyping elicits new questions from all involved and serves as an entry point for a dialogue with users and other stakeholders. For example, on the 6th of March 2013, Waag Society, Design Academy Eindhoven, and Keio University SFC from Tokyo organised a CRISP-wide workshop at de Waag in Amsterdam. During this workshop, Daijiro Mizuno, assistant professor at Keio University SFC at the faculty of Environment and Information Studies, offered a tool to tackle the issue of coherence when developing a PSS. The tool allows designers to zoom in and out on the different levels of Product Service Systems. The starting point was a model to explore a PSS on four levels: personal, social, national, and global. The model is based upon the concept of the Power of Ten, the famous Eames film that shows how the small and the large are always connected. By zooming in and out on these levels, and jumping from one layer to another, the tool fosters a holistic approach. Dajiro Mizuno compared designing a Product Service System to preparing a Japanese tea ceremony. "The tea ceremony is not about tea or cake. It's about the whole protocol. The cups, the kimono, the paintings, the cake: it's all designed and adjusted to the season to make the whole process of tea-making more engaging."

Throughout the day the Fablab was used to develop food-related Product Service Systems, using food as a topic and as prototyping material. Participants gathered ingredients and used them to physically represent their concepts, showing the connections between the four indicated levels. The prototyping helped the participants to create coherence between the products and the services, and to develop a narrative where the pieces fit together at every level.

TO LEARN FROM EACH OTHER



A CONCENTRIC BALANCE

In CRISP #2, Karianne Rygh makes use of visual maps and boundary objects to facilitate collaboration among stakeholders. Waag instead makes use of prototypes.

Bridging the gap through prototyping

On December 18 2013, Waag Society organised the Careful Design (a) Waag Open Space event. It sought to bring together creative entrepreneurs and academics, share knowledge on related projects, and to start a discussion on the role and implementation of the presented prototypes. Several prototypes in the field of healthcare were shown from both inside and outside CRISP. Participants shared their knowledge with the public, mainly SMEs and researchers active in COM-MIT, a public-private research community that seeks to solve grand challenges in information and communication science, aiming to shape tomorrow's society. Showing the prototypes (both early stage and quite developed) fuelled the discussion on the potential of Product Service Systems in society. Participants discussed several CRISP prototypes such as Tactile Dialogues (a smart-textile pillow containing sensors and vibrating motors) and Active Cues (a table developed for people with dementia to stimulate them through images projected on the table) and could also compare them with related prototypes made by other researchers. Gijs Huisman, from University of Twente, presented his work on a tactile sleeve for social touch, developed together with Aduen Darriba Frederiks from Amsterdam University of Applied Sciences, within the COMMIT research programme. The prototype raised questions like: can you mediate social touch through tactile sensors? Can you express emotions through textiles? Mickael Boulay, from Waag Society, demonstrated his work (in progress), about the translation of presence into movement through an installation, visualising connectedness in a subtle way.

The event provided a platform for discussing questions like: For whom is the prototype of added value? Can social needs be fulfilled by digital interaction? Who is willing to pay for it? Prototyping in this sense serves not only to bridge the gap between different stakeholders, but also between different networks, always with the aim of reaching the full potential of PSS.

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DESIGNING A PSS IS LIKE PREPARING A JAPANESE TEA CEREMONY SABINE WILDEVUUR

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Guest researcher at

CASD PROJECT — CRISP Magazine #3

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

A BALANCING AT 30,000

Els Polhuijs & Paul Elich interviewed by Jeroen van Erp

Some five years ago, we discovered that there was no connection between the crew and our actual product. KLM wants to provide that inspirational journey, but how do you then move down from a vision towards delivering it?





Somewhere on the eastern outskirts of Schiphol Airport, a square grey building houses the Inflight Services department of KLM. It's the back office of the in-flight experience of the Dutch national airlines. The interview takes place in a room with a bright view on the landing strips of Schiphol: we can think of worse places to work.

KLM is one of the industry partners within CRISP and involved in the CASD project, that uses the strategic role of design to strengthen the competitive position of companies (see also page 54). High time for us to have a cup of coffee with our national aviation pride and joy. Paul Elich is Executive Vice President Infl ight Services and responsible for the entire in-fl ight experience of the KLM passenger. Els Polhuijs is Vice President Cabin Infl ight Management, and responsible for products and services on board.

What are the major challenges your sector is facing and how can research help in that respect?

"That all depends on the scope," explains Paul Elich. "If you look at the aviation industry in its entirety, then sustainability is the primary challenge. You want flying to remain socially acceptable. If you look at our domain, for everything that has to do with in-flight services, our major challenge is to remain distinctive in a world that is rapidly commoditising. You look for those factors that make a traveller note: 'you did that really well'. As KLM, we are not going to win that battle by being the largest in the world or the cheapest. You really have to search for other means to remain futureproof, which for us means looking for ways to develop a long-term relation with travellers."

"We began in a time when everything was regulated by the government," Els Polhuis adds. "We had a strong monopoly, in which KLM received preferential treatment when it came to landing rights, compared to its competitors. As all those advantages are quickly disappearing, we have suddenly been confronted with the unfamiliar field of competition. To deal with that new reality in the short term, your only options are cutting costs and being responsive, instead of exploring your ability to differentiate. Research can help us better understand how we can create value during the journey in a way unique to the DNA of KLM." →

Talking about research, within a company, you work with different horizons. What is your take on this?

"Each month, you present your financial results to your financial stakeholders," says Paul. "That horizon is always within sight. The difficult thing is, that that horizon can have a certain pull, which can tempt you to limit the range of the other horizons, even though the lead time of matters on those horizons are often much longer. The time that passes between ordering a plane and its delivery is eight years, so you have to have a crystal clear picture of what you want and who you want to be by then. This means that you have to anticipate what is going to happen several years from now and make the right choices."

"For the in-flight service," Els adds "we chose to remain close to our strengths and use them to determine our direction. The in-flight experience is a sum of several elements: the product, the crew, communication, all these things."

How do you then connect your DNA to those new developments?

"I think that a part of our strength comes from that we, as Dutch people, can effortlessly think and work internationally," says Paul. "We have noticed that, as a Dutch company, we can really connect with our customer. This means that you find as much value as you can in that connection and make that connection a major part of your business proposition. And then, if we have to choose between showers on board with golden taps or a way to make the most of the abilities of our people, we would choose the latter because that is where our strength lies."

Could you give an example of such an innovation?

Paul jumps in, "we have recently given iPads to the cabin crew. The innovation lies not so much in the iPad itself, but in the ability to quickly adjust the information and communication so that our people can truly work from their own abilities, especially when we apply this to how they connect with people."

INNOVATION WAS SOMETHING WE OUTSOURCED. WE NOW WANT TO LEARN AND WE PREFER TO DO IT THROUGH **CO-CREATION**

We have all been there, a longhaul flight for work or holiday that at some point seems to fail us. The seat seems to be getting smaller, or your legs longer; the person next to you has taken it upon himself to tell you his life story, or seems to be in a coma, confining you to your seat; the entertainment system has long lost its novelty, and they have just run out of the one thing you wanted on the menu...

If we stopped to think for a second about what we would do differently, we would arrive at a utopian For inspiration, let's look at the ideal infeasible for any airline. We would have more space, gourmet food, ideal people surrounding us; and, hell, why not a spa, a walk-in bar and some shops. Let's just suppose that, far in the future, flying is like a transatlantic cruise where we can all kick back in the sauna and work out in the gym. Even then, we would still find that the service at some point would fail us. Not because the service is bad, but because services are not fixed things that can be controlled like products can, they are more like stories.

For 18 months, I worked with KLM passengers and cabin crew to arrive at a new strategy. Important ingredients of this strategy were storytelling and narratives. We discovered through both positive and negative stories and experiences that, in all cases, something went wrong. The difference was that for the positive experiences, the problem was resolved, either by the cabin crew or by fellow passengers. Almost always, this had something to do with communication and interactions with fellow

people. It was not necessarily the cabin crew or the products that were important, but the relationships and connections between frontline staff, passengers, and the supporting technologies. The prototyping effort therefore should focus on these connections.

IN-FL

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So how might an international airline company such as KLM prototype services? How can they prototype such intangible connections?

theatre. Not the stage but the rehearsal room. Rehearsal is not about repeating something until it is perfect; rehearsal is trying out alternatives, to see what works and experience how it feels.

Many designers and managers struggle to communicate effectively with multi-disciplinary professionals because of a certain gap between their very different ways of working. The front liners may be unaccustomed to thinking or working strategically, may be uncomfortable speaking to senior management, and may not have the skills of expression, draftsmanship or abstraction often required to participate in service design workshops. Narratives can help bridge this gap, as storytelling can cross multiple disciplines and can be easily understood. With the KLM European cabin crew panel, we used narratives to make iterations of predominantly bad experiences they had experienced. In this instance, through storyboarding, the cabin crew quickly discovered, thanks to the iterations and com-

LIGHT TYPING

parison with how others dealt with
certain experiences, that there
were more effective ways for them
to interact with passengers. Fur-
thermore, once they began shar-
ing stories, the cabin crew taught
each other unique techniques that
had worked well for them.Both of these prototyping
processes brought to light
new directions to explore. For
instance, we uncovered that
trying to design cocoons around
people in economy class to avoi
negative interactions is not the
best strategy. This in turn gave

In the same way that film directors look to their actors to propose different ways of acting out a scene, or even alter what their character says, service designers can empower frontline staff to do the same. This concept and approach matches KLM's policy of encouraging cabin crew to act upon their own empathy in the moments of service delivery, and by using narratives they can fine-tune, explore, and share different strategies. As part of the KLM case study, we tested this idea of prototyping service narratives further at the 'Service Design in Tourism' conference. Given only an hour, participants working from their own bad experiences of long-haul flights were asked to overcome or alter the negative moment in their stories by using props commonly found on a long-haul flight: a scrap heap challenge meets roleplay exercise.

What resulted was a series of narratives and crudely made props which actually did not really solve any of their problems, but hinted at the breaking points of the service interactions. This approach highlighted when technology could be beneficial and in what context; it also made clear the role that people play in not just being service users, but also in the way they behave as service providers.

processes brought to light new directions to explore. For instance, we uncovered that trying to design cocoons around people in economy class to avoid best strategy. This in turn gave rise to the idea to design for more social interactions between passengers—which consequently could be connected to the brand values of KLM. The KLM service design managers found strategic value in this opportunity to move both down and up between brand values and people's experiences, while they were designing and prototyping services.



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Self employed design-orientated researcher Member CRISP project CASD "By the way," says Els, "we developed this idea in cocreation with our people. We co-create the content with a group of fifty people, and they become so enthusiastic that they almost automatically become ambassadors of the idea, which furthers our goal of using the strength of our people. At the end of the day, we would like passengers to leave our plane with more energy than when they boarded our plane. We want to know all there is to know about that, and that is where CRISP comes in.

Some five years ago, we discovered that there was no connection between the crew and the actual product. KLM wants to provide that inspirational journey, but how do you then move down to deciding about snacks? We took a closer look at our DNA and defined several core values that express our ambition while they, at the same time, remain close to our nature. We ended up with three core values: Dutch, storytelling, and energy. That last one was the most difficult, but we had the feeling that it was also where we had most to gain. It's a broad topic: it can describe the lighting, the food, but can also relate to our crew. If the crew are filled with energy, the average energy level of the entire plane at an altitude of 30 000 ft will also increase."

What is your experience with KLM and research? You are a partner in CRISP, how is that going?

"Originally speaking, we are a technological company," says Paul. "A large part of our people have a technical background, and aviation began as a technologically-focused business. In a short time, we have changed this to become a more service-oriented business, which means that other people have joined us, with different roles and responsibilities. We now look at the customer's perspective, something which will quickly lead you to the experiential. It is not for nothing that we have a journey of inspiration in our tagline. That's all about emotions! This transition from a technological company to a service-oriented one also means that we are talking to different parties. Fifteen years ago, it would be unthinkable that we would be talking directly to the creative industry at this level. Instead, you would be talking to the trolley manufacturer, or even to Boeing. To have a conversation about what kind of experience you would like to offer your customers was not done. Something that these days is quite common." Els adds, "What you see happen now is that other departments, such as engineering and maintenance, are joining in the conversation, asking questions like 'if this is the goal, then what can we do within these boundaries?' You need both: on the one hand, the party that ensures safety and standard procedures, and on the other, those that look for new services. It is a balancing act, about which you want to develop a better understanding. How best to go about this?"

Paul admits, "We mostly develop knowledge with external parties. Innovation is not our core business. It used to happen through our products and was something we outsourced. We are now working together with others. We want to learn and we prefer to do it through co-creation. We can provide a vision of what we think we can offer and where we want to be five to ten years from now. We take that notion and look for parties who can help us with that."

What do you think the aviation world will look like in fifteen years? How will you de-commoditise your product? By using an experiential aspect?

"By then, we will have long passed the in-flight experience alone," says Paul, "and it is much more. You will need to manage all the contact moments. The first time you are likely to see a face or hear a voice of KLM is the moment you board, which is completely different from what it is now. By then, nearly everything will be self-service, even boarding." Els joins in, "The only chance of survival for us in ten years' time is creating a lasting sense of brand loyalty. You want people to feel moved, even when they have only flown with KLM once."

What is the talk, within KLM, about product-service systems? "In a way," suggests Paul, "it is our core business. On the one hand, we have the hard product; on the other hand, our people. We measure all kinds of things and have discovered that when the customer's appreciation of the crew increases with, for example, 1 per cent, that the effect of recommendations increases enormously. It is completely different from, say, luggage that does not arrive one time. Our people are the halo effect for our product."

He continues, "What we want is that people who get off our plane at the least have the same energy level as they had when they boarded. That has quite a number of implications. One thing is obvious, our crew play a tremendous part in achieving that goal. For us to achieve that, we need certain insights. What do we need for the crew to maintain their energy? CRISP has given us many new insights. Where does the crew's energy level drop and where does it increase? On the basis of such insights, we can determine what makes them tick. We are now mapping all these aspects. What desired mood are we aiming for? That mood will be different during the flight than within the crew lodge. There you are much more focused on having a complete overview, aimed at yourself. When you are on the plane, you have to focus on the passenger."

We're currently working on ideas about CRISP 2.0. Would KLM be interested in joining us again?

Paul Elich, with a big laugh, "Of course, let's have a talk about it when you have shaped your ideas."



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Workshop to find out the roles objects play in the interactions between people on long-haul flights.



DESIGNING FOR NEW PARADIGMS

Many companies are dealing with challenges presented by competitors and current society. Both Philips and KLM collaborate with CRISP to explore how they can make use of PSSs use of prototypes.



TOP TEAM CREATIVE INDUSTRY – *CRISP Magazine* #3

The top team of the creative industry was chosen by the cabinet and includes entrepreneurs, a government representative, and representatives from knowledge institutions. Each top sector has a top team which advises the government at a strategic level.



Looking back and looking ahead: what have we accomplished and where we are headed.

Marieke Rietbergen



SWARM

The Top sector Creative Industry consists of many different organisations that collaborate in the action plans discussed here. The Swarm in CRISP #2 magazine provides an overview of the Top Sector.



The Dutch government works together with companies and knowledge institutions to strengthen the economy through innovation. In 2011, nine top sectors, among which the creative industry, were identified to strengthen the Dutch economy. The creative industry is an umbrella term for Design, Architecture, Fashion, Gaming, Media & Entertainment, Music & Dance, and Film.

Each top sector has a top team that, together with the sector, have expressed their ambition: in 2020, the Netherlands will have grown to be the most creative economy of Europe. Together with industry and knowledge institutions, the government strives to improve the conditions in order to allow this to happen: stimulating knowledge development and innovation, strengthening export, improving financial opportunities for start-ups and growing companies, and ensuring that people are developing 21st-century skills through education.

Now, 2.5 years later, the top team has taken stock of what has been achieved for the creative industry, and which challenges lie ahead.

STRENGTHENED CREATIVE INDUSTRY'S SELF-AWARENESS

Looking back, we can see that the creative industry's self-awareness has increased significantly, as has the awareness that creativity and speed of innovation are indispensable in the knowledge economy. Creative companies drive innovation and provide solutions for societal, economic, and practical challenges in areas such as healthcare, security, and energy. In addition, the approaches used in the creative industry are vital in a world that is moving faster and becoming more complex.

with the top team, the Dutch House of Representatives asked the Minister of Economic Affairs to look into the hurdles experienced when start-up companies apply for early phase funding. The Minister is currently looking into ways to lower these barriers. An experiment on ambitious entrepreneurship in the Dance sector has been given financial support. In the coming year, the Ministry will study how current funding measures for innovation can be broadened so that they can also be used for non-technological innovation.



INTERNATIONALISATION Boundless creative capital

The internationalisation agenda aims to increase export by growing the international recognition of Dutch creative companies. In 2013, the top team, together with the Council, determined that Dutch creative companies should be present at the Hannover Messe, the World Design Capital 2014 in Cape Town, and SxSW in Austin (USA). In the coming years, the sector, together with other top sectors, will develop long-term relations with nearby markets. When country delegations visit the Netherlands, we will be able to demonstrate ourvalue.



HUMAN CAPITAL Talent for the Creative Industry

With the Human Capital Agenda, the creative industry has taken its first steps towards developing an ambitious entrepreneurial culture in which (future) professional (creative) entrepreneurs and businesses grow in revenue, personnel, etc. Two universities of applied sciences are currently establishing Centres of Expertise. These centres are important for the execution of practice-based research and for strengthening the connection between education and the job market. In the coming year, the top team and the sector, intend to improve the role of creativity in education.



CROSSOVER AND THE VALUE OF CREATION New promising forms of

Commissioning and Crossovers

Creative companies are of great value in solving societal, practical, and strategic challenges in other sectors. These so-called crossovers between the creative and other industries offer the Netherlands great opportunities for renewal. In the coming years, the top sectors Energy, Life Science & Health, and the Creative Industry aim to stimulate collaboration between businesses.

WHEN WILL IT BE SUCCESSFUL?

The finishing line, to be the most creative economy of Europe by 2020, is not yet in sight. That is why it is now time to double our efforts. The top sector approach provides several opportunities for creative entrepreneurs who want to grow their company and who understand that the development of (new) knowledge and alliances are essential. Entrepreneurs and researchers will still have to do the work, but the top sector approach can serve as an accelerator to ensure that the sector grows and flourishes.



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The current creative industry top team Barbera Wolfensberger (standard bearer and CEO FHV BBDO) Erik Huizer (academic standard bearer, Professor at Utrecht University) Marjan Hammersma (Director General Media and Creative Industry, Ministry of OCW) Jeroen van Erp (Founder and Creative director of Fabrique) Désirée Majoor (Vice-Chairman, Utrecht school of the Arts

5 AGENDAS AND 5 ACTION PLANS

To strengthen the top sector, the government has established five agendas which the top team, together with the sector, have developed into action plans.



KNOWLEDGE AND INNOVATION A vital knowledge infrastructure for the creative industry

In the past two years, the knowledge and innovation network ClickNL was founded. The network gives the creative industry a place where people who are interested in research relevant to the creative industry can meet. Public and private funds are now available for research: €21.1 million for 2014 and €20.8 million for 2015. With this knowledge, creative companies can renew, improve, and validate their methods, services, and products. This year, ClickNL is supporting the development of the matic research and innovation programmes that can be applied for by companies and knowledge institutions.



CONDITIONS AND FUNDING Access to capital for the creative industry

One of the goals of the conditions agenda is to improve the creative industry's access to startup and growth funding. After conversations







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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 realise effective PSS, companies should integrate design thinking in their innovation process. Design thinking is characterised 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 opportunities are identified and ideas are generated, or when it informs strategic decision making at later stages. Strategic design thinking can help firms to realise (a portfolio of) PSS combinations that are recognizable, legitimate and coherent for customers.

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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 behaviour.

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 guo! 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.

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GREY BUT MORII F

Test bed project





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Improving care-related mobility services for the elderly supporting them to live independently and stav 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 guantitative and gualitative 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.

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

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 formalised and is characterised by a high level of co-creation and co-production. This raises questions like how tight should the designer's grip on the processes and outcomes of design be, when working together with end-users and other partners in PSS development?

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Intelligent Play Environments are those in which a playful persuasion approach encourages social and physical play, which in turn can contribute to wellbeing. Such environments may counter part of the trend that children are not physically active and risk obesity and isolation.

The Intelligent Play Environments project (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 design research includes playful persuasion, emergent behaviour and interaction opportunities that stimulate social and physical play of various user groups. The project examines how an environment should be designed to sense players' behaviour and create appealing play opportunities. Furthermore, a tool is under development to measure the user experience. The interaction opportunities are designed in an open-ended manner to encourage players to interpret the possibilities in their own manner and improvise during play. Also, a decentralised approach has been taken to examine whether we can design a play environment that adjusts to changes in the play context, such as number of players and, or the configuration of play objects.

PSS concepts will be used as vehicles of research, further developing our design philosophy for social and active play. Different play designs have been developed which support various forms of play, for example fantasy play and social and physical play. Furthermore, the design approach has been applied to other application domains, such as way-finding in an amusement park or a hospital.

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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 conceptualisation 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





SELEMCA

Test bed project





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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 hospitalised 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 guestionnaire and form filling help; matchmaker between carer and patient; and lastly, a robot care deliverer, for example for exercise, medicine coaching and virtual therapy.

Humanising care-droids using creative technological

PROJECT PARTNERS





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Contactgroep Textiel

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 multidisciplinary 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 realised 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.



(i) GENERAL INFO

CRISP

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The next issue is expected in September 2014. If you are interested in contributing, please feel free to send a message to: c.s.h.delille@tudelft.nl

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COLOPHON

Crisp #3

Fake it / Make it

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