Getting a GRIP on work-related stress:

Designing services with users and other committed stakeholders.

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Abstract: Can design improve services targeting work-related stress? This question is tackled in GRIP, a project that focuses on the role of design in the development of a product-service system (PSS) for work-related stress. In the case of PSS the control of designers over the process and impact of design is reduced due to less formalised planning and a higher level of co-creation by stakeholders. GRIP proposes new designs that are co-created with different stakeholders, and that address the potential causes and effects of work-related stress.

As active designers and design researchers, clearly our expertise is in design - not stress. Therefore, we collaborate with end users, companies, and stress and vitality consultancies, utilising each other's skills and resources to offer more effective solutions in tackling work-related stress. Our approach is formalised in the GRIP Service Model, which helps stakeholders to develop new PSS targeting work-related stress. This model allows committed partners to bring in their expertise, and to foresee and exploit their personal/commercial opportunities. Our unique approach to the design of PSS can be seen as a combination between a classical User Centred Design process, and a collaborative process of New Service Design.

While focusing on one specific case around work-related stress, we will share our experiences and discuss implications for the design of co-created multi-stakeholder PSS. In particular, we will discuss the Grip Service Model in terms of how it helps designers to strike a better balance between flexibility and control over the process and impact of their work.

Key words: (product) service design, role of the designer, (data) probes, co-creation, well-being

1. Introduction

Compared to traditional product design, the design of a product-service system (PSS) is characterised by less formalised planning, and a high-level of co-creation by multiple stakeholders. Thus, the design process needs to become more flexible, allowing for the co-creation of PSS by various stakeholders. In particular, designers need to become more sensitive to the needs and skills of co-creating service providers and users; both play vital roles in the exchanges that take place in a PSS. This article specifically addresses these issues with regard to stress at work. How does a designer of a PSS for managing work-related stress balance between flexibility and control? Total flexibility would make the planning of design process and outcome impossible, and therefore would make the role of designer redundant. On the other hand, total control is impossible as well, since too many stakeholders are involved.

The Dutch government funded the GRIP project, as part of a larger program (CRISP) focusing on the design of PSS. The aim of CRISP is to develop new markets for the creative industry by stimulating research on the role of design in industry. GRIP deals with flexibility versus control in the design of PSS for work-related stress [1]. The GRIP project is a collaboration between Philips Design, the Design Academy Eindhoven, and Delft & Eindhoven Universities of Technology. It starts from the premise that in the case of PSS, the control of designers over processes and outcomes is reduced. This paper presents our experiences within the project, and discusses the GRIP Service Model that was developed. The model proposes a new approach for designers to contribute to the development of effective PSS by striking a better balance between flexibility and control.

2. Emergence & development of the GRIP Service Model

2.1 Discovering new roles for designers and for data visualization in the development of PSS

The GRIP project started by putting together a team of designers (and design researchers) from the four institutions that participated, with different backgrounds and interests. It was necessary to tackle the issue of co-creation from the perspective of all the GRIP partners. A scoping session was organised, as a way to familiarise ourselves with each other and the topic. A number of invited experts presented a brief overview of the subject from a human, technological, and organisational perspective, followed by group case studies, and an early ideation session. This helped to highlight the different partners' aims, knowledge base, design process and possible project directions. The ideas ranged from stress coaching for teachers, to hooking students up to stress meters, or developing games and competition around stress.

It became obvious during the scoping session, and through initial literature and market research, that we are no experts in the field of work-related stress. Therefore, we invited industry experts in the above mentioned fields, and a worker with experience of burnout to an expert day. This day was an opportunity to explore the topic of stress at work, to gain and share knowledge with industry professionals, and to start building a network of expertise. Stress experts indicated that there is currently a lack of accessible tools that visualise the effects of stress. The main conclusion was that people need to be aware of their body signals or stress levels, but also need to be motivated, in control, responsible, and active to deal with stress. In addition, it became apparent that there is a strong taboo on discussing stress at work, and that the image of stress might be in need of 'rebranding'.

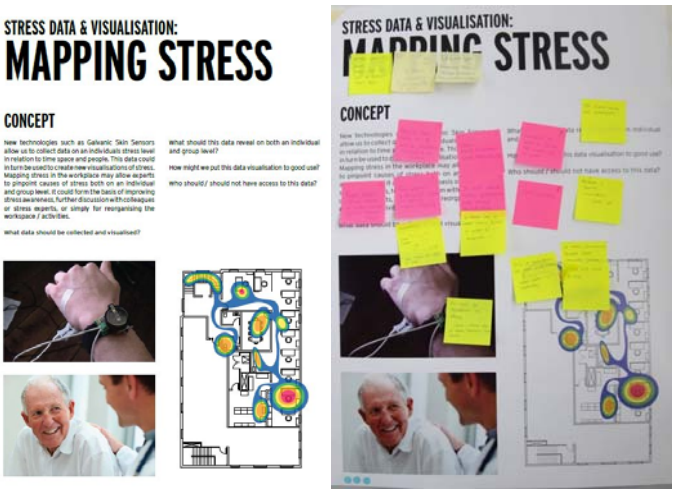

Figure 1: Sample concept based on data collection and visualisation presented and evaluated in the expert day

The expert day allowed us to present some initial ideas. GRIP had access to technologies such as measuring heart rate variability and galvanic skin response. Some concepts were developed on the basis of this principle. One of the concepts proposed the use of technology to collect stress data from individuals in order to create visualisations of stress in space and time (see Figure 1). Mapping stress in the workplace may allow experts to pinpoint causes of stress on an individual and group level. It could form the basis to improve stress awareness, further discussion with colleagues or stress experts, or simply for reorganising the workspace or activities.

Another lesson learned was the role of communication when presenting early-stage ideas to non-designers. The relatively high quality of our concept visualizations made clear to the experts what we could offer them, but at the same time it led them to think that they were merely testing or validating prototypes. The importance of using preliminary, unfinished thoughts and visuals as tools for co-creation has been addressed within the field of user-centred design. With rougher representations of the intended design 'the user sees the design is incomplete and open to change, and is drawn into the design conversation' [6, p.102]. Nielsen points at saving time and money when using early designs instead of final designs in user evaluations, enabling multiple iterations [11]. You might say that these principles could equally be applied to expert evaluations, and thus that we over-used our own design expertise at this occasion.

To further clarify the roles and expertise that designers could offer to external parties, we created the GRIP Service Model (see Figure 2). This model describes the role of designers in the design and development of new PSS centred on work-related stress. Approaching companies directly, the service proposes the collection and presentation of stress data, leading to the co-creation of tools and design solutions. Note that we follow the advice from the systems development literature (e.g., [14]), and more recent adaptations of product development models (e.g., [3]) by making the model cyclical. Thus, the development of PSS is an evolutionary, iterative process, where design can bring in ideas, concepts and tools for incremental improvements on a system.

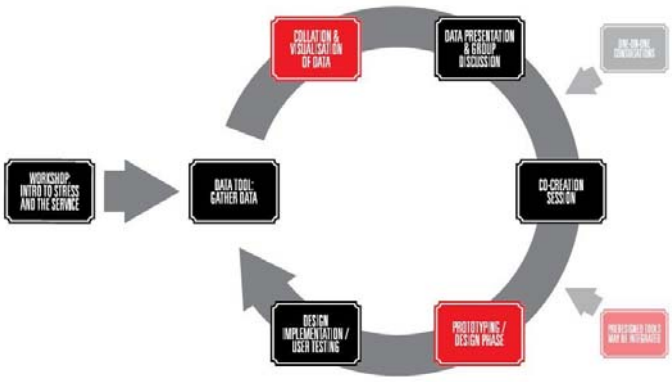

Figure 2: GRIP Service Model v1, depicting GRIP designers as the core of the service

Whenever you are trying to change user behaviour, there is a crucial role for data (raising awareness, proofing effectiveness of solutions, etc.). There is a lot of knowledge available from domain experts that designers should not or cannot compete against. Instead, this knowledge can serve as a continuous inspiration to the design process. In our first, tentative version we positioned design as the driving force behind the development of a PSS. This view is shared with many approaches to user centered design, where design is centred on understanding the needs and activities of users, and guarding carefully that that insight is translated into a product for these users (e.g., [6,11]). However, our position was to change: throughout the project, the GRIP Service Model went though

several iterations. Only the main changes will be discussed here, therefore not all version of the model will be described.

2.2 Redefining the role of designers and data while collaborating in the development of new PSS

We were keen to extend our network and knowledge, and we continued to exchange knowledge with experts. The experts strengthened our belief that the use of data visualisations could act as a driver for change in the workplace. We also learned that stress interventions are more successful when embedded in a group or organisation, and that the aim of GRIP must be to empower people within their work context. We started to understand that it was wrong to position design as the driving force behind the service. Instead, we should position ourselves in direct collaboration with stakeholders within the existing stress landscape, and define a more modest and flexible role for design. With this in mind, our project question changed into: How can design become more adaptive to the needs and insights of existing work-related stress services (created by psychologists, stress coaches, occupational health officers, etc.), and successfully suggest improvements upon them? Note that this insight is similar to claims made in the area of service design, where it has been stated that design should not lead in the creation of new services, but, instead, be content with a supportive role for communities of providers and users who are in a process of social innovation (e.g. [7,10]).

In the GRIP project, it became a more explicit goal to exploit our design expertise by connecting to existing stress services. The following stakeholders were defined as potential clients for our service model: stress experts, service providers (for example technology providers), companies and end-users (being workers). Some stages were added to the beginning and some to the design cycle, to better reflect the co-creation and inspiration from various stakeholders. After some iterations, we came to a revised version of our GRIP service model (v3, see Figure 3). In model v3 we envision that all stakeholders have a role to play in each stage of the cycle, albeit that the roles may differ from stage to stage, and cycle to cycle. Design can sometimes play a leading (controlling) role, but often it will have to show its flexibility, and adapt to the needs and insights coming from socially aware experts and users. The revised model thus adopted a more entrepreneurial spirit, where designers are seen as working flexibly with other experts on new propositions to tackle stress.

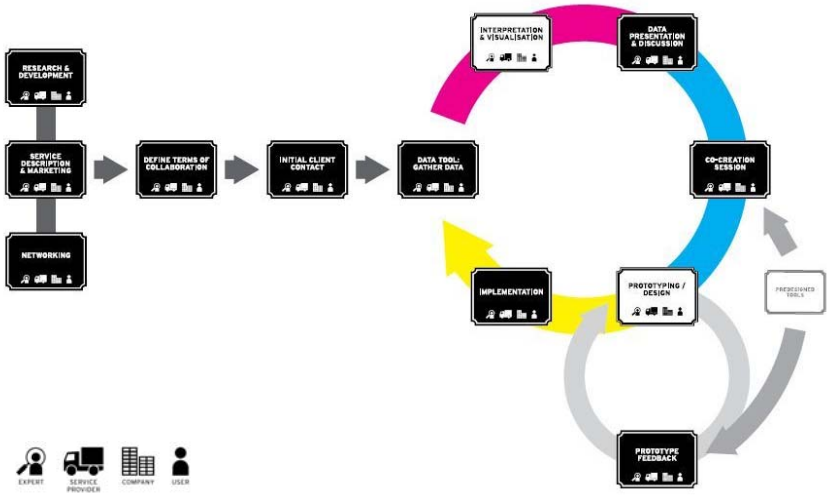

Figure 3: GRIP Service Model v3, depicting 4 stakeholders as enablers of the service through icons (i.e. stress experts, service providers, companies, and end-users); service stages: analysis (magenta), design (cyan), and implementation (yellow)

The first half of the model shows initial, preparatory stages that are essential before entering the actual design cycle. The three stages ‘Research & Development’, ‘Service Description & Marketing’ and ‘Networking’ are performed continuously throughout the project. Before actually collaborating with potential partners or stakeholders, we must define the terms of collaboration amongst all stakeholders. The second half is an iterative design cycle, consisting of 3 different segments, namely analysis (magenta), design (cyan), and implementation (yellow). The white stages signify where designers take the lead role since that is where our expertise lies. The cycle starts with the collection of client data, leading to the interpretation and visualisation of the data by the GRIP team. This is used in group discussions that highlight issues relating to stress. After raising stress awareness, the next stage is to co-create design solutions, instigating real prototypes and actual implementation of solutions. Subsequent iterations of the cycle allow for testing the effectiveness of existing design solutions while generating new ones. With our service model any one of the four defined stakeholders may act as client. Therefore, what we offer is essentially a bespoke PSS adapting to the data needs of a diverse set of clients. We are in discussion with several potential partners to identify their specific needs, adjusting our GRIP service to address the unique demands of each and every potential client of the PSS.

We presented a workshop at the Global Service Design Network Conference in 2011. This was an opportunity to share our process with a mix of experts from service design, business and academia. Groups of participants were mixed into multi-stakeholder collaborations and asked to develop a service model focusing on one of the stakeholders as a client. Creating a service aimed at a client other than the end user was something of a challenge for the participants; some were used to focusing primarily on the end-user. However, when asked to consider the impact of data upon their service, the groups discovered the benefit of data collection and presentation, revealing hidden issues and offering the potential for new, evidence based design solutions that would assist a diverse set of stakeholders.

2.3 Emphasizing the flexibility of the roles and outcomes of design in the development of new PSS

A difficulty encountered with model v3 informed the main changes from GRIP service model v3 to v6. ‘Define Terms of Collaboration’ was positioned outside of the iterative cycle in v3. Originally, we believed that it was important to start on clearly defined terms before going into the actual design cycle with clients; as if it was a gate that needed to be taken before moving on to the next stage [3]. After presenting our ideas to Donald Norman, he suggested to move this negotiation phase into the iterative design cycle itself. By placing this activity closer to the actual design work, it becomes clear that this could be regarded as an activity of reframing the problem together with (or for) the client. In addition, the activity becomes subject to a new review after each cycle. This is in line with the idea of co-evolution of the problem and the solution space in design (see e.g., [4]), and the notion that the framing of problems and solutions in initial and ongoing business ventures often follows a ‘logic of design’ [15]. Thus, we changed into the view that the definition of the data (and thus the terms of collaboration) should be seen as a design activity, and should be depicted as a (white) design stage in our service model.

The three different phases in v6 of the GRIP Service Model (see Figure 4) emphasize the different roles of design (for analysis, research and support). This makes it clear that design can serve different purposes. Depending on the situation, designers can stay involved throughout the entire cycle, or only offer a specific part of the cycle. We see the GRIP Service Model as a flexible process that evolves over time. Depending on the needs of the client and users, after data gathering or co-creation they might come to the conclusion that they do not need

any more design inputs, so design's involvement might end at that particular stage (for example, data collection and visualisations together can be a separate solution of the design process). Furthermore, in v6 of the GRIP model 'Data Presentation and Discussion' is no longer regarded to be apart from co-creation. There is a need for design representations of data for discussion with clients, and as inputs for co-creation this encompasses 'Visualizing Data Probes'. They are considered probes, because, following Dunne [5] they are used for study (of stakeholder values) during Co-creation, and not as straightforward plans for new PSS that could be commercialized by clients. As such, it can be seen as a form of research, where the designer not only supports, but also challenges stakeholders. Following this design for research stage, comes design for support. The original design for implementation (for prototyping) in v3 has changed into design for support in v6. In this way, it better reflects the flexible role of designers in service and PSS development, where prototyping is seen within a wider perspective of providing support of social-technical processes.

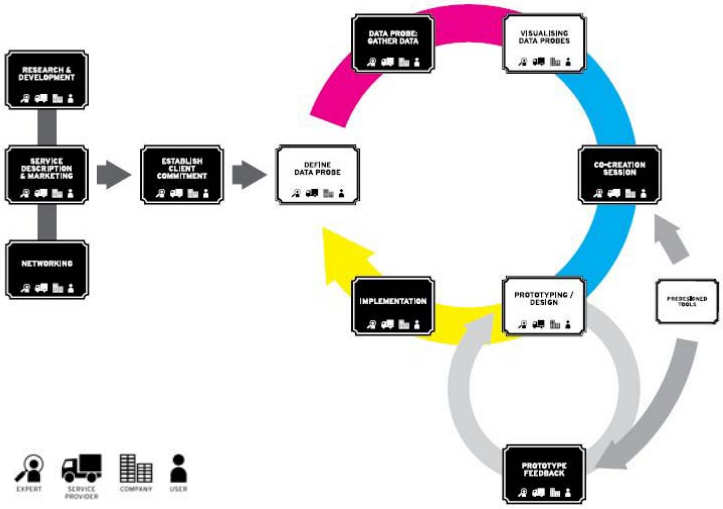

Figure 4: GRIP Service Model v6, depicting the 3 stages design for analysis (reframing; magenta), design for research (probing; cyan), design for support (prototyping; yellow), where designers (white) and all stakeholders (black) alternate in taking up a central role.

The iterative nature of the design process is not explicitly shown in the GRIP service model, to keep it visually simple. Nevertheless, it is possible to evaluate the design proposal at several decision points, or to reject the proposal, do a step back, or continue to the following stage of the design process (following [13]). By offering more clearly defined stages where design takes a leading role, our model is currently serving us to our satisfaction. The clarity about the potential contribution of design, and of potential short-cuts and opt-outs stimulates clients at the beginning of the process to engage with us.

3. Keeping a GRIP on work related stress: applying the GRIP Service Model

3.1 Design for analysis: Reframing work related stress

The GRIP Service Model is used to highlight GRIP's strengths, aims and deliverables, including what internal and external partners can expect to receive for their input. We used the model, for example, when we partnered with a mental health institution in Eindhoven (GGZE), to co-develop a PSS targeting work-related stress. In negotiating the collaboration with this institution, the GRIP team were invited to 'pitch' the project, including the Service Model, to several departments within the organisation to obtain the correct departmental match. As the

first step within the cycle of our Service Model, we came face-to-face with workers in their environment to spot potential problems or causes of stress that we could target and monitor. It was agreed with the department of Ambulant Care that we could shadow several GGZE employees during a working day to observe the overall organisation's culture of stress. Taking notes, and recording and shooting video, it was important to observe everything, from client meetings and lunch breaks (or lack thereof), to how caregivers organise their own schedules or how they break the rules to help their clients. Key findings of the GGZE contextual research were: Caregivers claim that their GGZE clients give energy; Productivity is crucial, but seen as limiting opportunities to help GGZE clients; Inefficient planning and communication (switching locations and activities, no-show clients); There are large individual differences in work strategy and perceived obstacles/difficulties.

We held a workshop with Ambulant Care management to present our insights, compare experiences, discuss potential areas for further research and co-create potential data probes and design solutions. To facilitate this discussion we developed an Experience Flow (see sample Figure 5), listing the main employee quotes, activities, and positive, negative or neutral observations. The information was categorised into a theme (blue) or activity (red) to pinpoint moments during the day that we could discuss in further detail. Some of our observations were familiar to GGZE management, but the fresh way of visualising and presenting these stories helped nurture an open dialogue with our partners. We could thus shed new light on potential causes of stress within the organisation, which in turn led to new, more targeted insights.

Figure 5: Samples of GRIP Experience Flow on the basis of contextual research. 'Off-site client meeting' (blue) is one of the 9 activities that were distinguished and 'environment' (red) is one of the 3 themes.

Potential directions for further exploration were identified. Three stress data collection probes were developed: a manual registration of breathing patterns, a GRIP-booklet to collect various stress measurements, and a public relaxation measure (see Figure 6). First, the manual registration of breathing pattern was inspired by various expert presentations, existing technologies such as emWave (http://www.heartmathstore.com/) and stresseraser (http://stresseraser.com/), and the book by O'Hare & Blase [12]. Participants registered their breathing for a period of 2 minutes by drawing a wave pattern on a paper roll (see left side Figure 6 for visual instruction and outcome of 2 breathing registrations). Secondly, the GRIP-booklet of stress measurements (see middle Figure 6) was inspired by diaries as often used in cultural probes studies [9]. Each page of the GRIP booklet consisted of: date and time of the registration, a comment field, the Self-Assessment Manikin ([2]; positive-negative valence, high-low arousal and low-high dominance), the six item State Trait Anxiety Index [8], and a field to enter the result of the

Azumio Stress Check (http://www.azumio.com/apps/stress-check/). Participants were asked to complete a page 3 times a day. Thirdly, the public relaxation measure asked questions concerning relaxation at work (see right side Figure 6). As a reward for their response participants were offered a little gift (e.g. candy, herbal tea). The relaxation measure encompassed reading a question and giving an answer by putting an ice stick in the appropriate vase. If no predefined answer was applicable a post-it note could be used to write down an answer. Data was gathered by 12 GGZE employees for a period of 8 days. The manual breathing registration resulted in 31 measurements by 10 participants. All 12 participants used the GRIP booklet, resulting in a total of 105 evaluation moments (the frequency of registrations per participant ranged from 2 to 17). The public relaxation measure resulted in a total of 59 responses. Note that other GGZE employees besides the 12 who were actively involved in the study were also using this probe.

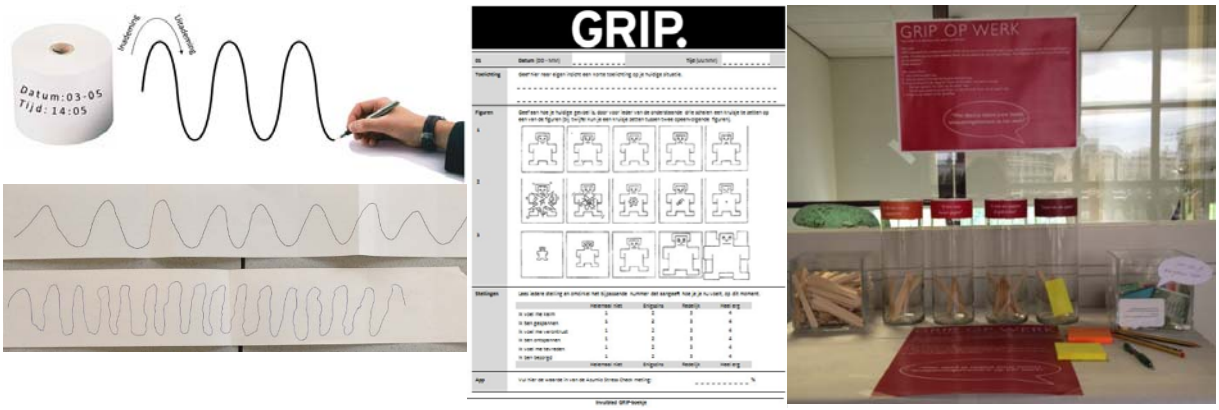

Figure 6: GRIP Data Probes. Left: Instruction and samples of manual breathing registration (upward line when inhaling, downward when exhaling); Middle: GRIP-booklet: date & time, comment, Self-Assessment Manikin, State Trait Anxiety Index, Azumio Stress Check. Right: Public relaxation measure used in canteen of GGZE.

3.2 Design for research: Probing work related stress

A workshop was organised with stress experts on data visualisation. Furthermore, interviews were planned with individual participants to discuss the use of the 3 probes, the actual outcomes, and the resulting visualisations. It is outside of the scope of this paper to discuss all of the insights that were obtained. Nevertheless, we discovered individual differences; in terms of preferences of using specific data probes, and in actual stress measurements, i.e. level of stress. For some people the mere reflection on the personal situation was sufficient (the comment field turned out to be very useful), whereas others were in need of the data being visualised and interpreted for them. Some people indicated to want evidence of the data probe before using it, whereas others where open to using it without any evidence or explanation. It became clear that extreme scores and deviations are potentially interesting and easy to investigate in more detail. Furthermore, in order for self-assessment to become successful there needs to be motivation, but also some sort of routine (i.e. fixed times during the day; every time you return to your desk, at the start of a team meeting).

While managing the design research part, it was difficult to align expectations and schedules from internal and external partners. Thus, we were forced to work and collaborate in a more flexible way, and this turned out to be much more successful. To provide one example: a more flexible approach was needed when we were trying to organise a co-creation workshop with the data probe participants. It seemed impossible to organise such a workshop in a way that sufficient GGZE employees could participate. Instead of organising the workshop at a

fixed timeslot, we chose to have a more flexible setup of a free walk-in session, allowing more control for the GGZE employees. The walk-in session turned into a big success. We reached far more employees (>20) than we had hoped to reach with the original workshop. Many employees stayed longer than they initially intended, because they were inspired by the GRIP ideas presented to them and were interested to share their thoughts and contribute to the eventual design.

3.3 Design for support: Prototyping work-related stress solutions

On the basis of various co-creation events with stakeholders, the multitude of ideas and probes were eventually reduced to 3 directions for prototypes of work-related stress solutions: Personal Balance, Paced Breathing and Ambient Experience (see Figures 7-9). Over 25 prototypes have been made in total, both by students of Eindhoven University of Technology and by Philips Design. Below we present a selection of these prototypes, aimed at making work-related stress less of a taboo topic for people, encouraging people to treat stress in a more light-hearted fashion, while respecting that people differ in what might help them. Note that there are overlapping elements between the prototypes, since all of them require monitoring some kind of parameter (physiological stress levels, consecutive working times, keyboard hits, emotions etc.).

The Personal Balance solutions are aiming to help people by providing insight into this measured parameter (two examples of this direction are shown in Figure 7). Both are personal well-being solutions that help a person to see their daily stress and the way they cope with it. By giving feedback of previous stress events and the current stress level, a person gets motivated to recuperate, by going for a walk, or relaxing for a while.

Figure 7. Example Personal Balance TU/e student projects: Little Devil by Rhys Duindam; Reco – smartphone relaxation coach app by Christoph Lukkien

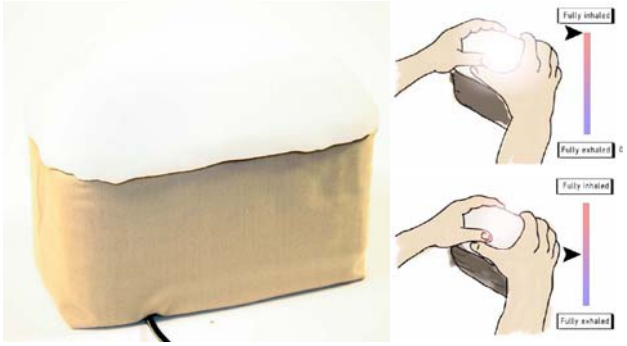

Figure 8. Example Paced Breathing TU/e student project: Rhythm Pad prototype and visualisation of use by Sergej Lojko

The Paced Breathing solutions are centred on helping people to regulate their breathing rhythm and consequently to influence other relevant parameters (see Figure 8 for an example). Paced breathing is intended to

re-establish an optimal connection between the mind and the body. People are sometimes not aware of their mental state while at work. As tension goes up, the head is overflowing with things that need attention or require decision-making. People get disconnected from thoughts, feelings and bodily responses, and unaware of their well-being.

Finally, the Ambient Experience solutions are based on reactive environments that provide a more public (and thus social) type of feedback to people (see Figure 9). By tickling the senses and offering different types of mental triggers, an environment can stimulate you to become more aware of your body and mind. Subtle fragrances, sounds, haptics and visuals can be (sub)conscious cues for people in the environment to take a moment for themselves, and nudge people into different norms and values about relaxation at work.

Figure 9. Example Ambient Experience TU/e student project: Fragrant Breaks Reminder by Sherry Wang

Our main industry partner (Philips Design) is currently building and evaluating a prototype that is informed by insights from all three directions, in collaboration with multiple experts. It has chosen a flexible approach for the development of the prototype, based on the experience in the GRIP project. Original plans and milestones of Philips Design were sometimes adapted to fit with the schedules and locations of the other stakeholders involved. We cannot disclose the activities of our industry partner, except for the fact that its efforts are a powerful push towards repositioning work-related stress, following some of the prototypes we discussed above.

4. Conclusion

GRIP is a data led service using data collection as a tool to create awareness about balancing stress at work. Key to this service is the visual (sensory) interpretation of data to facilitate a discussion amongst workers and other relevant stakeholders regarding the causes and effects of stress at work. These insights feed into a co-creation session between workers, the GRIP team and external partners, and ultimately lead to the creation of bespoke design solutions, fitting each unique working environment. Having completed a full cycle of the GRIP Service Model, one of the main observations is that a PSS targeting work-related stress should be centred on creating a positive working environment, where employees take responsibility for their own working situation. The biggest potential of a PSS for stress is a service that empowers workers and enables them to help themselves.

This unique approach to PSS design can be seen as a combination between classical User Centered Design, and a collaborative process of New Service Design. The cyclical nature of the design process is illustrated by arrows in the GRIP Service Model. The GRIP service runs on a continual feedback loop of design for analysis (reframing), research (probing) and support (prototyping). The service provided by GRIP focuses mostly on a first cycle of analysis, research and support, with the company, employees and/or other stakeholders gradually taking on greater

responsibility in subsequent cycles. The flexible and iterative nature of the design process is not explicitly shown in the GRIP service model. Nevertheless, when applying the GRIP Service Model in practice it is possible to repeat or skip stages in the design. Within a specific service cycle, it might not be necessary to go past one of the stages.

The GRIP service is essentially a network of experts, with the GRIP team facilitating the service by managing the whole process. In addition, the team can take a hands-on approach in the specific design phases for analysis, research and support (i.e. the white boxes in GRIP Service Model). However, there is much more flexibility to incorporate the expertise from other fields than design into the GRIP Service Model, especially when compared to methods for new product design or earlier versions of the model. The more flexible approach also translates into the iterative nature of our design process. This has led to new insights into the capacity of design to support experts and users in how they understand and act upon excessive levels of stress at work. We have come to realize that whenever you are trying to change behaviour, there is a crucial role for data (e.g. raising awareness, proofing effectiveness of solutions). However, as designers we should not attempt to compete against the available knowledge from domain experts. On the contrary: through running the GRIP Service Model we aim to give domain experts a crucial role throughout the development process. And, by focusing on data visualisation, design expertise can still be built up in the GRIP Model, next to the existing expertise coming from other disciplines.

Employing a blend of network, skills and knowledge, the GRIP service aims to probe, and co-create high quality solutions that can be implemented by the companies, workers and/or other stakeholders. GRIP endorsed experts (Psychologists, Fitness Coaches, Management Consultants etc.) are ready to be called upon if and when these stakeholders express the need for consultation during data collection, co-creation or implementation. As the number of completed design cycles within the GRIP Project grows, the number of solutions on offer and their effectiveness increases due to the constant feedback loop embedded within the service through data. Businesses are not only encouraged to share their experiences and solutions within their own company but also with others in the GRIP community. By acting together we can exchange knowledge and find the social support that is needed to change the culture of stress within many work settings. In addition, the model we propose can be beneficial to stakeholders with public, private and/or mixed interests, thus seeking the greatest possible impact on the well-being of people at work.

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