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**SHIFTING FROM LIVING LABS TO EXPERIENTIAL DESIGN LANDSCAPES (EDL)**

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**Abstract**

Innovative interventions are often needed to disrupt current situations, creating new opportunities for sustainable growth. The size and amount of computing power we carry with us is increasing every day and thus provides new opportunities for designing disruptive and radical innovative intelligent products, systems and related services that enable people to change their lives, to change (transform) society and move towards substantial and sustainable solutions. Designing for these types of transformation however is not easy. Firstly, in the new technological opportunities lie also the dangers of fully aiming at ‘the how’ (technological means) and totally overlooking ‘the why’ (human values, meaning etc.). Secondly, creating these type of transformations on a societal level often needs a long process with a high degree of structural uncertainty. It is difficult to predict whether new concepts will lead to sustainable behavioural change and for instance an active and healthy lifestyle. For industry it is therefore very unappealing and difficult to try to create and introduce these radical and disruptive innovations without a solid basis of evidence. Over the last years Living Labs have been promoted to involve customers directly in product development to validate products in a near-everyday-living environment. In spite of its successes, for the class of intelligent products and systems this method has failed. In response to this we proposed the Experiential Design Landscape (EDL) for developing and testing new radical innovative concepts in everyday life with citizens towards sustainable transformation. Since ambient assisted living is moving more and more towards intelligent systems, products and services, we are developing the EDL method to be used e.g. for ambient assisted living. This paper describes the EDL method in comparison with living labs and shows example projects using the EDL method.

**1. Introduction**

Our society is faced with a number of major challenges, which include the aging society, healthy living, the economic recession, safety and attaining a sustainable level of energy and material consumption in light of the available resources. Brand and Rocchi [16] propose to tackle these societal challenges and move towards a sustainable world by accomplishing a paradigm shift towards a transformation economy, where stakeholders work together on designing local solutions for local issues, that stem from our large global issues. Solutions to the big collective issues, leading to e.g. true sustainability and well-being, typically require behaviour change

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on a societal as well as an individual level, where the collective is even more important than the individual. We believe that involving all stakeholders including citizens (or people, clients, users, consumers, depending on the frame of reference one takes) and aiming at individual / societal behaviour change, require that we move into the wild during the development process. This move into the wild is necessary since these complex societal challenges cannot be solved by small incremental solutions that are developed behind the drawing board, but they require more disruptive innovative solutions to realise behaviour change on a societal level. With disruptive we mean the absence of a well-established frame of reference for people or the market. Not only the product as such is new, but it also enables the creation of radical new meaning for the user, the market and society. And due to this disruptive character, we cannot predict this meaning nor any behaviour change; we have to explore it in the wild, in the everyday context with all stakeholders involved. Therefore, we propose the Experiential Design Landscape (EDL) [1] for developing and testing new radical innovative concepts in everyday life with citizens towards sustainable transformation.

2. From Living Labs to EDL

Over the last years Living Labs have been promoted to involve customers directly in product development to validate products in a near-everyday-living environment [2]. In spite of its successes, for the class of intelligent products and systems this method has failed. Living labs generally serve the purpose of analysing propositions largely known to the user in a well-defined context, whereas an EDL incorporates the entire design process up to launching ‘production-ready’ products and services in context. Moreover, during the creation phase, the user is still unaware of what patterns will emerge in the future. Whereas in living labs users (and designers) are in most cases far more focused on what is happening in the interaction between an individual and a product.

Many other attempts besides Living Labs have been made to involve customers directly in product creation, validation and innovation via co-creation [3][4], empathic design [5] and participatory design [6]. While these methods work for developing products and systems tailored towards users’ (functional) needs, they do not accommodate processes where the value, meaning and impact of the design solutions can change and get redefined during prolonged use. Intelligent products and systems have the ability to adapt to individual users and situations, often over a longer period of time. As a consequence it is likely that also users will adapt themselves to these products and systems.

As a second consequence the diversity of product-market combinations can grow to the level of individual user/product(system) combinations while, in the meantime, all kinds of, often unpredicted, usage patterns may emerge. In a lab or field setting users do not get the freedom or time to try the new proposals freely and long enough to evolve these types of behaviour. This difference in nature between lab and/or field settings and the Experiential Design Landscape is depicted in figure 1.
An Experiential Design Landscape (EDL) is an infrastructure that is created to stimulate the creation of new, disruptive propositions in a (semi-)open environment where these new propositions are used as probes to facilitate new and emerging behaviour. In this environment designers can involve people into the development of new products or systems by allowing them to use the concepts in their everyday living environment. In parallel the environment and the probes enable detailed analysis of the emerging data and behaviour patterns as a source of inspiration for designers of future products, systems and services.

In order to design for an EDL a different approach to design is needed, in which envisioning the change in society is one of the main drivers of design in combination with exploring in the everyday context in collaboration with users. For this we use the Reflective Transformative Design Process [7], a method to create intelligent products, systems and related services that aim for societal transformation.

In the Experiential Design Landscape designers set up 'Experiential Probes' (EP) to gain a first person perspective, to understand people in the EDL and give them the means to create meaning in interaction. Further on in this paper we will explain what these experiential probes are and how they work. Doing so we use three examples of experiential probes that were built and set out for a minimum of three weeks. The probes were designed for a more active and/or healthy lifestyle, in whatever way this was envisioned.
3. Experiential Probes

The proposed concepts in an EDL, which we call ‘Experiential Probes’ (EP), are highly intelligent, open, networked, sensor-enhanced product-service systems. They are probes with built-in intelligence to gather data on the use of the concept in real life. Through adaptive questioning and sensing [8] people provide feedback without being obtruded (too much) in their natural use of the concept. In this way the designer gets insight and understanding in the (latent) needs, behaviour and experiences of the people using their concepts, allowing them to further develop the concept towards a changing or new behaviour. Moreover, it allows the designer to gain a first person perspective and understanding of the people in the EDL.

The designer searches and explores the opportunities together with the people using the concept through the experiential probes. This is a different approach to probing as with ‘Cultural Probes’ [9] or ‘Technology Probes’ [10], where the designer tries to gain a third person perspective of the current situation, the researcher creates a distance between the participants and him/herself. With experiential probes it is important that they do not obtrude or change the current situation of the participants. They merely try to probe, distil and understand the current situation as inspiration for the designer.

In the EDL however we want the probes to actually disrupt the current situation and position the designer in the middle of the disruption together with the person using the probe to design the outcomes of the disruption to reach sustainable transformation. Any individual use, misuse and unexpected behaviour can therefore lead towards design inspiration for a high diversity in people.

Earlier work has shown that ‘Experiential Probes’ work best when the intention and meaning of the probe is preferably not fully defined by the designer. As we want to find out what values and meaning are important to the people using the probes this can best be left open for them to define. In this way unexpected use will happen a lot easier, since the designer doesn’t fully define the expected use with the experiential probe. An EP is therefore not the same as a product prototype. It doesn’t try to fulfil any functional needs of users; instead it aims at disrupting people's current behaviour and frames of reference. In some of the examples shown later in this paper it is unclear at first what the probe actually does for/to people, therefore they start to explore what it can mean and do.

This shows the importance for the designer to always have a good understanding of what people are doing with the probe and how their behaviour changes or emerges. In this process the designer should understand the new behaviour and iteratively tailor the probe towards the types of behaviour he/she finds fitting with their envisioned transformation. The process therefore starts out in a very explorative way, in which real people in their real lives also take part in the design process.
4. Cases

Three different experiential probes were designed and are described in more detail below:

**Social Stairs** Social Stairs is an intelligent staircase that was installed in the university’s main building, which made ascending/descending sounds as you walk up and down them. The concept aimed at stimulating people to move by making the stairs more appealing, and early EDL experimenting showed that social engagement encouraged more active behaviour. To encourage this social behaviour, which is also how it differentiates itself from the well-known Piano Stairs [12], people who worked together whilst using the Social Stairs were treated with a louder, orchestral chime that echoed up the stairwell. Next to this, the system provided the designers with long-term user data, which was used to test whether the intended effects were actually achieved. The Social Stairs got university wide popularity, which made the recorded data very rich and diverse.

![Social Stairs](image)

**Figure 2. Social Stairs Face-it**

Inspiration for this experiential probe came from real people’s behaviour; being easily distracted from work because of the urge to visit Facebook (too) regularly throughout the day. First ideas and probes aimed at tracking this event, where more insight was gained in the overall concentration people have during the day. Face-it is a screen frame to be placed on the outside of a notebook screen and acts in the periphery of the viewer. The screen frame consists of an array of LEDs which light up sequentially at a certain pace. With a control unit both pace and fade-in/fade-out intensity of the LEDs could be personalized. Face-it was designed to support people in staying focused during work.
Bouncers is a live wallpaper for your Android smartphone. The wallpaper was designed to be non-obtrusive and provide a subtle way of displaying information during everyday use of your smartphone. Bouncers visualises physical activity using the accelerometer data of the android smartphone. An individual’s activity is represented in the speed of one circle in the wallpaper. Other circles represent the physical activity of a selection of your friends. The information about one's physical activity and lifestyle is therefore shared in a small and close group of friends. As illustrated in Fig. 4, Bouncers shows different circles, each with their own unique colour. The large circle (red circle in the image) represents the owner of the phone and the smaller circles represent his/her selected friends. The speed of each circle corresponds to an individual’s activity, measured and processed by the internal accelerometer, processed as a rolling average. Therefore the results are not immediate and can only be perceived over time. Thus the speed correlates with the general amount of physical activity of the individual.
5. Reflections and Discussion

In the different EDL projects there was a high diversity in design approach, tools, involvement of people, running time of the probe, and (data) returns from the EDL. Below we reflect in-depth across the different projects.

5.1 Designing the experiential probe(s)

One of the more difficult things of setting up an EDL appeared to be defining a point of departure. Some designers found inspiration in observing real people’s behaviour/habits; other designers defined their design approach based on their own vision, personal experiences and design beliefs. The designers of the Social Stairs looked into the opportunities to make people more active during their workday. Their inspiration came from people’s, often unconscious, decision to take the elevator instead of the stairs for only one or two floors in a building. With the first experiential probe they designed, people first had to cycle a few minutes on a home trainer that was placed in the elevator, before they gained access to the control buttons of the elevator. In the reflection sessions it was decided this was not the ‘right’ approach. Instead of offering people an open disruption where they can choose how and if they (re)act upon it, their actions were now predefined and decided on by the designers, comparable for instance to speed bumps. After this reflection, the decision was made to try and probe people on the stairs instead of the elevator, trying out ways to disrupt the moment of (consciously) choosing to take the elevator or stairs. They defined new design actions eventually leading to the Social Stairs. They learned that people don’t want to be ‘punished’ for their decision to take the elevator. Furthermore, people also didn’t like the fact that it is was decided for them that they didn’t get access to the control buttons of the elevator before they spent some time on the home trainer. Lockton et al. [2010] describe this as design becoming a tool of the ‘nanny state’ which ‘knows what’s best for you’. In order to really change people’s behaviour the designers found it important that people themselves reflect on what’s best for them. After an in-between experiment of covering a flight of stairs with bubble-wrap plastic they dove into ways of making the stairs engaging and fun. Through this experiment they learned that people were immediately attracted to take the stairs, and wanted to try and play with the new stairs.

The designers of Face-it gained inspiration from their peers. They noticed that their peers were often easily distracted from their work because they visited Facebook quite a lot throughout the day. Based on these observations they immediately started designing their first experiential probe. Through this first probe they gained more in depth insight on the behaviour of the people using the probe. This led to the design of the Face-it probe.

Bouncers was designed by a vision. People desire to have social relationships. One of the ways to form social relationships and create a social status can be achieved by joining a sports club. However, in our current society the social role of sports clubs is disappearing, resulting in a lower participation level in sports [12]. For society this creates a challenge, as the lower participation in sports can lead to several health issues, like for instance obesity, diabetes, etc. Next to the trend of declining sports
participation social media is also starting to take over part of the social interaction, taking over the role of sustaining relationships. Based on these observations a virtual sports club for an active lifestyle was created, to stimulate people to become more socially connected by means of physical activity. Because people have the urge to fit in, their behaviour is influenced by others around them [13]. The influence others have on a person differs by means of their relation to the person [14]. This opened the opportunity to create a virtual sports club through which people can motivate each other to be more active: Bouncers

5.2 Value Proposition

One of the difficulties all designers came across when designing their first probe was to balance the open character of an EP with a value proposition. For many of the people who used their experiential probes it was often unclear what was asked from them as most experiential probes had a too open character and didn’t address or convey an explicit meaning or intention. Many designers were afraid of losing the probing character of their designs when a very clear proposition and meaning was defined. This is all about finding the right balance. While the probes have to be open enough for people to find their own way of interacting with it and defining their meaning and value for it, a too open character will not engage people into interacting at all, as they don’t see a point why they should engage. Some designers got this right early on, others needed to re-iterate their probe.

The Face-it designers didn’t define any specific meaning for the screen frame; its only function was a ‘walking’ LED light over the frame. However, their design did embody a certain value proposition. Their inspiration for Face-it came from real people’s behaviour being easily distracted from work because they have the urge to visit Facebook (too) regularly throughout the day. By giving people the screen frame it was immediately clear they could place the screen frame on the outside of their notebook screen. Several probes were made to fit the most popular notebooks in our department. Face-it already acts in the periphery of the user during their work. Furthermore, giving them full control over the behaviour of Face-it offered opportunities for people to give meaning to the probe themselves. Instead of the earlier mentioned ‘nanny state’ [15] which ‘knows what’s best for you’, the behaviour of Face-it (which is defined by the user) is open to any type of meaning. Initially Face-it was developed with the intention of a time management tool but soon it became a ‘pace-indicator’ supporting people in doing different paced tasks such as writing emails, searching on the web etc. For each task, people would alter the pace of the LED to a pace they found fitting to their job at hand. Others however would synchronize the pace with their music.

Social Stairs also wasn’t initially designed for the immediate situation in the particular staircase. Moreover, it was not communicated as a social staircase value proposition with pre-defined meaning. Through interaction people (individually, in groups etc.) discovered that Social Stairs had different types of behaviour. The people interacting with Social Stairs eventually defined its meaning (together) and thus its possible value propositions. Here the designers of Social Stairs also learned that even the smallest alterations they made to their probe had large effects on the people in the EDL using
the probe. Moreover, as the Social Stairs aimed at long-term behavioural change, they could already see a difference in use of the staircase. The staircase was used more often and it was perceived as a more social and fun place.

5.3 The Designer in the EDL

In all EDL projects the role of the designer was questioned, and the designer was perceived as the contact person/ambassador of the experiential probe. For example, while designing Faceit the designers were seen as part of a co-creation session. Based on feedback from the people who used Face-it the probe was tailored and given back to them. While the designers were more aimed at designing for long-term behavioural change and transformation, people saw them as experts who knew a lot about their use of Face-it. Based on this information the behaviour of Face-it was tailored to the user’s needs and wishes.

With Bouncers, the designers came across an ethical dilemma. Bouncers could monitor the activity level of each individual 24/7. As they were monitoring their peers for the designer this started to feel really creepy. Basically they could literally see in the dataset what each individual (their friends) was doing, and when. Here they became aware of the ethical side of experiential probing and their responsibility as a designer to be aware of the thin line between ethical and unethical.

The Social Stairs designers started to develop a certain attitude towards the people using the experiential probe. As they were designing ‘in the wild’, a real staircase in the university’s main building, a small amount of people complained about this work. The designers found this interesting to note as they didn’t expect this to happen in such an innovation driven environment that should be open for change. As the stairs were fully open for everybody to use, this only applied when they were physically working on the probe. Next to numerous questions that arose in the university from people who didn’t see them on what the probe was about. In the end even the attention of the internal university’s newspaper was raised, for whom it took a while to find out who was responsible for this probe.

5.4 Returns

One of the more difficult aspects of experiential probing within an EDL is to get proper returns that can tell the designer what is happening with the people using the probe. Because of the interactive nature of the probes sensor data could be logged to gain insight into the probe’s usage. Trying to distil behaviour and changes in behaviour out of the data of a single sensor however turned out to be difficult. However, when different sets of sensor data were combined, or when combined with other ways of getting returns like interviews, video analysis, etc. it became a lot more insightful and easy to see behaviour patterns in the returns. What also worked is actually discussing returns with the people in an EDL. As they are already part of the design process, they can understand and interpret the returns from their perspective. This however depends on the setup of the EDL, depending on whether the people participating were known or not.
The Social Stairs designers developed a public EDL, everybody could enter and use the experiential probe. Therefore it is hard to say anything about behavioural change on an individual level based on the returns. Instead, the probe sampled the behaviour patterns and changes of the community in the university building. The Social Stairs measured the use of each step on the stairs. Next to this a concealed video camera was placed, allowing the designers to see in hindsight what people would do with their probe. Together with the data from the steps this gave quite some insight on the change of behaviour, which prompted an iteration on the probe to emphasize social behaviour. This change too could be monitored and followed by the designers.

In the case of the ‘Face It’ probe the people who participated were known as the designers handed out the probe to them. In this way the designers could combine the measurements of how the user would set the speed of the LED’s on the screen frame, with individual interviews. Doing so, by means of the sensor data the designers first found that the range of the sensor was too narrow; the user wanted a higher speed of the LEDs than what was possible. Through interviewing they found that people didn’t use the ‘Face It’ for relative time keeping, but for pace. Because of this process several following iterations were made. In Figure 5 an example can be seen of the combination of returns.

Bouncers received a lot of user data as different sensors of people’s mobile phones were. The participants in this case were also known so these returns could be complemented with individual interviews. In this case the designers received a huge amount of data points, which made the comprehension of the behavioural patterns a lot more complex. This shows a trade-off will have to be made between the amount of data you can retrieve and how much you actually need.
6. Conclusions

As said in the introduction of this paper already, the turn to the wild is not easy. In our research we are constantly working on developing the EDL method through design experiments like the ones described in this paper. Different aspects are continuously being explored and redefined. The method as such is still in its early stage of development, we are just beginning to understand the impact of taking design into the wild (i.e. society). This paper shows a part of this process, where we and the designers got hands-on experience with this way of designing. Through the creation and results of the ‘Experiential Probes’ we have learned what their impact can be and what insight they can create in the design process. In this section we will sum up some of the conclusions we found.

6.1 People, not users

In this paper we have referred a lot to the term people, instead of using the word users. This is a deliberate choice. In the EDL method the move is made into the wild, into real people’s lives. We are looking for ways to change these lives in order to have impact on society. How can we change and create new behaviour that will transform society. The term ‘users’ therefore doesn’t apply anymore, as this defines a group of individuals by the fact that they use a certain artefact. This works well in terms of looking at functionality or usability, but behaviour is subject to personality, habits, human values, relationships, daily life, social structures, etc. In order to experiment and explore with different ways of changing and emerging behaviour we like to fully involve all aspects of human beings. This is also why we keep the ‘Experiential Probes’ open for interpretation of meaning. We strongly believe in letting people create meaning in the process of designing in order to empower them towards a different and improved society.

6.2 Designing probes, not products

One of the challenges for the designers was to actually design a probe, instead of a product. As they are being trained in becoming professional designers this is of course their normal expectation in a design process. A probe however is different from a product, or a design concept. A probe can at first merely be to disrupt current situations in order to find inspiration for a design direction. By continuously creating small loops of development on the probe and setting it out in real life again probes will however become better tailored towards the envisioned transformation. We believe that this in the end will turn probes into valuable design concepts which can lead to products and/or systems with related services. Unfortunately the probes described in this paper only ran for a few weeks due to educational scheduling. This meant that only the first few steps could be made. More developments and experiments will be needed in the future to gain more insight into this process. The three ‘Experiential Probes’ described in this paper would probably need different timelines in the wild.
Based on the outcome and returns of the wild the designer will have to decide when to reiterate and how long to keep an Experiential Probe running. In these cases three weeks was definitely the minimum to gain insight and create ‘Experiential Probes’ based on ‘open scripts and intentionality’.

6.3 Turn to the wild

In order to truly change society in a sustainable and structural way through design we need to rethink the processes of design in order to reach a paradigm shift towards the transformation economy. In our view the turn to the wild is inevitable here, since these complex societal challenges cannot be solved by small incremental solutions aimed at functional needs and requirements. Disruptive innovative solutions are required to realise behaviour change on a societal level. By turning the process into the wild we put people central of this process, they are important stakeholders in the creation of radical new meaning. Due to this disruptive character, designers cannot predict or define this meaning on their own anymore. We have to explore meaning and behavioural change in the wild, with real people in their real lives, with families, friends, neighbours, jobs, pets, hobbies, diets, wishes, needs, concerns, obligations, habits, quirks etc. We strongly believe Experiential Design Landscapes can facilitate this process and will keep on developing the method in the near future.

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