

Designing for Meaningfulness

An exploration of designing for meaningfulness in welfare technology products and services in collaboration with Welfare Technology's Innovation Network for Health and Welfare Technology.



Designing for Meaningfulness

How do we incorporate critical reflection about the products we are designing, and their intended use and experience?

As we approach the year 2020, a milestone in human development, we are surrounded by increasingly complex and innovative technologies. Available and affordable are an endless array of sensors and actuators: ways to explore the world around us via devices which offer everything from saving lives, to incremental increases in convenience. With this rise in readily accessible technology comes an enthusiasm for prototyping new devices and exploring use case scenarios. Many new smart products enter the market every week, often seeking to be the next big hit in the Internet of Things (IoT).

While an increasing number of companies have begun to incorporate user centred design approaches when creating smart products and services, there is little in the way of critical reflection about what types of products are being brought to market, and why they are needed. Designing for Meaningfulness has been a three year research programme into how practitioners might approach the develop of new smart products, considering how to design for meaningful experiences.

In this framing, meaningful experiences refers to: see on page 3.

These represent the value-based aspects of designing for meaningfulness and are explored via the *Mechanics of Meaningfulness* - 5 value-based qualities to consider when designing for meaningfulness. There are also the *Manifestations of Meaningfulness* - 4 physical characteristics which exemplify how we might approach the physical attributes of the new products we are creating.

Designing for Meaningfulness has emerged from two major projects within FORCE Technology, the Design Smart Things performance contract as awarded to IdemoLab, FORCE

Technology from the Danish Agency of Science, Technology and Innovation under the Ministry of Higher Education and Science, and the Welfare Tech Innovation Network for Health and Welfare Technology. It has materialized as a PhD in collaboration with Aalborg University, Copenhagen at the Doctoral School of IT and Design and will be made publically available in early 2019.

Throughout this period, work has been conducted with companies and this report aims to show the cases, workshops, and resulting guidelines from this period. Since this work has spanned all three areas, the Design Smart Things performance contract, and the Welfare Tech Innovation Network for Health and Welfare Technology, and work done at Aalborg University, Copenhagen, this report aims to focus on the work done with Welfare Tech Innovation Network for Health and Welfare Technology, but will reference other work and learnings conducted throughout the period.

With sincere thanks to Welfare Tech Innovation Network for Health and Welfare Technology, as this project has been made possible due to their support.

Report structure

A description of the Mechanics and Manifestations of Meaningfulness is presented, followed by three brief case study descriptions, a descriptions of workshops conducted, the primary findings from these activities and then guidelines for companies developing smart welfare technology products are presented as a final takeaway. As extensive work has been conducted in each of these areas, this report aims to highlight the main activities and point readers to further research and resources. The Mechanics and the Manifestations of Meaningfulness are derived from work done in industry for the past six years, as well as interviews, seminars, and workshops conducted with companies.

Meaningful Experiences Refers to



People-to-people connections

These are the relationships between people and how people relate to one another.



A person to their sense-of-self

These are how a person focuses on their self-development, exploring who they have been, who they are, and who they want to be.



People-to-time

These explore a person's relation to time and if they are seeking fulfilment in life, how that manifests throughout time.

Mechanics of Meaningfulness



Personal development:

Identity, purpose, who am I, who have I been, who will I be in the future?



Moments of significance:

Discovery, transformation, the ah-ha moment, leading to identity change.



Value over function:

The result of using a device, as it adds value to your life.



Meaning in everyday life:

Meaningfulness is different to every person in every situation.



Critical thinking:

Asking the hard questions, analyzing and reflecting, leading to growth.



Offline artefacts:

Non-connected is the new connected, a possible future Mechanic of Meaningfulness.

Manifestations of Meaningfulness



Non screen



Tangible



Craft



Everyday

Cases

Three case studies are chosen to exemplify how we describe designing for meaningfulness in welfare technology. These are presented briefly here and are available in more detail, online at <https://idemolab.madebydelta.com/>

Case Study 1: Sarita Pearl

Sarita CareTech developed the Pearl, an accessory worn by seniors to help them to communicate with caregivers if needed. The Pearl incorporates a call button, two way communication, automatic fall detection, GPS monitoring, and is supported by an online platform that caregivers can access via Web and App. When interviewed about Designing for Meaningfulness, Sarita CareTech explained how the Pearl creates a sense of safety. By working with jewellery designers, they were able to create a personalised accessory which the seniors would want to wear. In terms of designing for meaningfulness, the Pearl addresses several of the Mechanics of Meaningfulness, namely:



Sarita Pearl

It was a great pleasure and I look forward to hear what the future brings when meaningful design is a part of product development.

Rasmine A. Rasmussen, Sarita CareTech

Personal development: Maintaining an identity of someone who is independent, and who can live without direct supervision.

Value over function: The function, as explained by Sarita CareTech, is “where are you, did you fall or not, did you call for help or not? You can also detect if the Pearl is on the body or not.” They highlight that this is not the value, the value is rather: for the seniors: feeling close to the caregivers who respond and protect them in emergencies, for the professional caregivers: knowing that the resident of a care facility is okay, and for the family members: feeling a sense of security, knowing someone will take care of their loved ones if something happens.

Meaning in everyday life: For some seniors, the meaningfulness will be knowing that they will have help when they need it. For others, the meaningfulness might be inherent in that they can continue doing what they love, attending family and friends’ events, for others it might be knowing they are providing a sense of security to their adult children, who worry about them.

Manifestations of Meaningfulness: The Pearl has no screen, and only one button. It is very simple to wear, and incorporates traditional craft (jewellery design), tangibility (the smooth surface and round shape of the Pearl), and is reminiscent of an everyday object from times past, the brooch.

Case Study 2: .TIBA

.TIBA is a wearable and app designed for people who want to change their eating habits. As people learn new habits, they need to learn to recognize their current bad habits. .TIBA helps them to identify the cues which lead to bad habits and consider how they can create new habits from old. The wearable developed by .TIBA helps people to record when they are experiencing a feeling, for example, hunger, and to identify whether this feeling is actually hunger to if they are just tired or anxious.

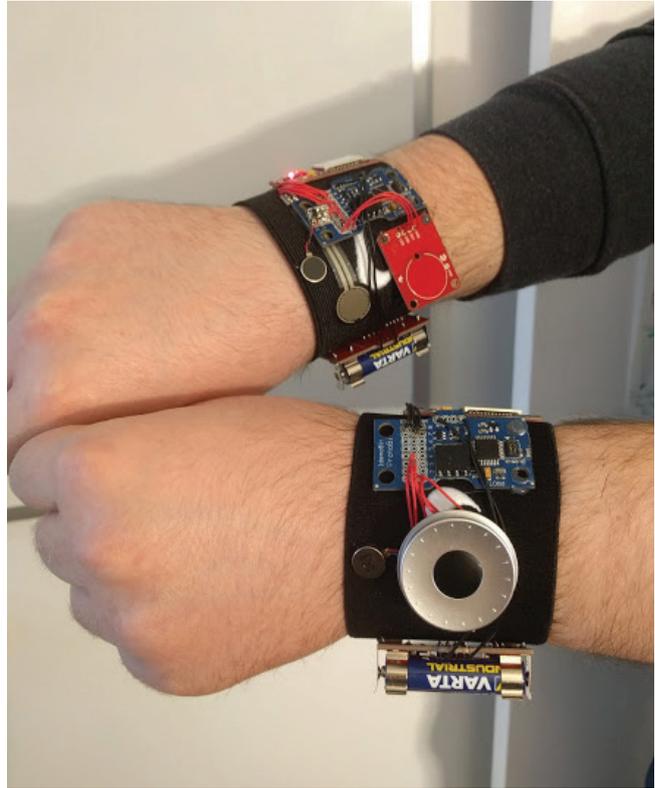
Mechanics of Meaningfulness

Personal Development: As a person is developing new habits, they explore what their values are and how this contributes to their sense of sense.

Critical Reflection: Asking the tough questions about one's habits and why we have them is a primary aspect of this product, and this is one of the most difficult Mechanics of Meaningfulness, not only reflecting, but answering and acting on those reflections.

Moments of Significance: Recognizing when one is experiencing a feeling which leads to a bad habit is an ah-ha moment, and the beginning of changing habits.

Manifestations of Meaningfulness: .TIBA itself does not use a screen, it is a tangible wearable, wherein the wearer manipulates the wearables through pressing or turning, to record the experienced feeling and the intensity of that feeling. It has been designed as a wrist worn wearable as watches are everyday objects, something we are familiar with and accept as a worn object to interact with.



.TIBA: An example of the technologies - a rotary button input



PreCure's elbow solution - <http://www.precure.dk/precure-elbow/>

Case Study 3: PreCure

PreCure has developed a wearable which measures muscle activity and utilizes machine learning, so a user can be notified of harmful activities which might cause them to re-injure their arm after a repetitive strain injury. As part of IdemoLab's work with Designing for Meaningfulness in Health Care, we have engaged with PreCure to help them explore the technology and value-based aspects of their smart product. This project has focused on sharing knowledge about design thinking including exploring how to conduct in-context user studies from a technology standpoint.

Mechanics of Meaningfulness: PreCure is an excellent example of how a welfare technology product can be very meaningful for the user, in this case, preventing re-injury, and reducing strain, and at the same time, does not necessarily fit into the framework of Designing for Meaningfulness as defined with the PhD done in this area. The PreCure device contributes to Moments of Significance wherein the user recognizes that their current activity might be harmful and they can reduce further strain. Much like .TIBA, this aspect helps a person to recognize those moments throughout their day. However, it does not necessarily help them develop personally, in terms of their identity or sense of life fulfilment. Nonetheless, it represents a segment of devices which physically help a person which is important and represents a significant sector within welfare technology - not every device must cater towards Designing for Meaningfulness.

Manifestations of Meaningfulness: Looking to the physical characteristics, PreCure is an everyday object, an arm band with embedded technology, an associate application, and artificial intelligence, which gives feedback to the user enabling behavioural change.

Workshops

As a primary activity in the Innovation Network for Health and Welfare Technology, nine workshops were conducted with companies recruited from the Health and Rehab Messe at Bella Centre.

These companies participating in the workshops represent a variety of specialities within welfare technology, ranging from those with technology in their products to those without, and from startups to well established companies. The ambition of these workshops was to evaluate the explorations done thus far in terms of how companies relate to and understand concepts of designing for meaningfulness. Companies completed six worksheets which asked them about how they think about the nuances of meaningfulness.

When asked if their products were meaningful, nearly all companies said “Yes” however, when asked about the nuances of meaningfulness, the replies differed greatly and it is within these nuances that the learnings about designing for meaningfulness occur.

The workshops were designed by Vanessa Julia Carpenter, Technology Experience Designer in IdemoLab, FORCE Technology and PhD Candidate at Aalborg University, Copenhagen and by Dr. Elisa Mekler, the Research Director at the Human-Computer Research Group, Center for Cognitive Psychology and Methodology in Basel.

Workshops were two hours in duration, and six worksheets were completed:

1. The Mechanics of Meaningfulness
2. The Manifestations of Meaningfulness of meaningfulness
3. Components of the Experience of Meaning (from Dr. Mekler’s work)
4. “BetterThings” questions from (<http://betterthin.gs/>)
5. The HEMA questions about eudaimonic experience (Huta & Ryan, 2010)
6. The Meaning as a Subjective Experience questions (Huta, 2017)

As some companies preferred to remain anonymous, the following is a list of the participating companies without reference to their names:

1. A feeding robot and assistive arm.
2. A system of interactive ‘spots’ which are round, durable plastic discs used for physical interaction.
3. A series of assistive chairs to help caregivers in elderly homes to assist the citizens and prevent injury to themselves.
4. An online network to allow people who are seeking companionship to find others and create relationships. Many of the users are experiencing profound loneliness, stigmatization, or disease and are seeking relationship and understanding from others who have experienced this and can help them.
5. A series of sensory stimulant and calming textiles which allow people with anxiety, autism, or similar to lead a more social life, or even to exit their homes.
6. An intelligent medicine box which offers a button to record when medication has been taken and provides alerts to caretakers or family when medicine is forgotten.
7. A system of mechanical products to help people ascend stairs, whether they have difficulty walking or are in a wheelchair.
8. An activity monitoring device for patients with dementia in care homes to monitor their day rhythms and help them to overcome sleeping problems.
9. A wearable alarm for the elderly which calls a caregiver in case of emergency.

Workshop findings

As a result of conducting these workshops, we learned which worksheets made the most sense for companies, and which questions helped them to best discuss their product in terms of meaningfulness. These workshops have been summarized in an academic paper for CHI - Computer Human Interaction.

Companies responded most thoughtfully to four of the metrics in particular: meaningfulness in the everyday, value over function, purpose (personal goals) and significance (beyond momentary interaction). We found that the interview style questions worked well to initiate discussion about the intended experience and meaningfulness of a particular product and can recommend that companies utilize a discussion forum with prompts to evaluate their products.

Further, by asking companies to rate a particular aspect on a scale from 1 - 10, sometimes companies were able to say right away, 'it's a 3', and sometimes, a discussion elaborating on the decision helped to clarify the rating. This may also be a good method of discussing products within a company. We provide several examples of questions which initiated interesting discussions or challenges in the workshops.

Meaning in everyday life

- How can it adapt to fit what we need in a given moment?
- If we should focus on right now, instead of the past or the future, how does it help us with our current selves?

Value over function

- How does it offer more than convenience?
- What are the emotional values that the function allows for?

Purpose

- Does the product help users identify personally important goals?
- Does the product help users set manageable smaller goals to reach those personally important goals?
- Does the product support users in reaching and achieving those goals?

Significance

- Does the product matter to users beyond the momentary interaction? How so?

From BetterThings

- How is it art?
- How does it make me a better person?
- How does it create a sense of wonder?

To what degree would users approach your product with each of the following intentions¹?

- Seeking to do what you believe in?
- Seeking to pursue excellence or a personal ideal?
- Seeking to contribute to others or the surrounding world?

Testimonials

Companies engaging in the Designing for Meaningfulness activities have expressed their interest in this area both through their time invested in the activities and by telling us the following:

"It was really interesting, we certainly got some tools we can use moving forward". - Julie Giltoft Jensen, Liftup

"It was a great pleasure and I look forward to hear what the future brings when meaningful design is a part of product development" Rasmine A. Rasmussen, Sarita CareTech

"Thank you for some great hours, reflective thinking and good feedback on our product" - Tina Skaarup Blenstrup, Zibo Athene

These comments speak to the relevance for industry in the area of designing for meaningfulness.

Links to academic work

The PhD "Designing for Meaningfulness in Smart Products" will be defended in January, 2019 and (hopefully!) published shortly thereafter. During this PhD period, several publications relating back to designing for meaningfulness have been published and include:

Carpenter, V., and Overholt, D. (2018) "Designing for interpersonal connections in future technologies: An annotated portfolio of jewellery devices". *Proceedings of the 2018 NordDesign conference*. Design Society. <https://www.designsociety.org/publication/40883/>

Carpenter, V. J., and Overholt, D. "Designing For Meaningfulness: A Case Study Of A Pregnancy Wearable For Men." *Proceedings of the 2017 ACM Conference Companion Publication on Designing Interactive Systems*. ACM, 2017. <https://doi.org/10.1145/3064857.3079126>

Carpenter, V. J., Mobius, N., Willis, A., and Overholt, D. *Electronic Kintsugi: An investigation of everyday crafted objects in tangible interaction design*. *Proceedings of the 2018 IEEE Future Technologies Conference*. Springer, 2018. https://link.springer.com/chapter/10.1007/978-3-030-02686-8_9

Carpenter, V. J., Kampmann, B., Stella, A., Maunsbach, M., Minovski, M., Ville-France, N., & Overholt, D. (2018, September). *MusicFabrik: a playable, portable speaker*. In *Proceedings of the 10th Nordic Conference on Human-Computer Interaction* (pp. 701-705). ACM. <https://doi.org/10.1145/3240167.3240242>

Møller, N., Overholt, D., Carpenter, V., Stella, A., Kampmann, B., Minovski, M. and Maunsbach, M. (2018). *SketchyTuna: Exploring A Design For Screenless Creativity*. Zenodo. <http://doi.org/10.5281/zenodo.1422633>

Carpenter, V., and Overholt, D. "Provoking breath: an exploration of how to remind people to breathe". *Persuasive Technology: Development and implementation of personalized technologies to change attitudes and behaviours*. 12th International Conference, *PERSUASIVE 2017*, Amsterdam, The Netherlands, April 4-6, 2017 Adjunct Proceedings. 2017. (pp. 22-23). <http://persuasivetechology.eu/wp-content/uploads/Adjunct-proceedings-2nd-ed.pdf>

¹ From Huta, V. and Ryan, R. M. 2010. Pursuing Pleasure or Virtue: The Differential and Overlapping Well-Being Benefits of Hedonic and Eudaimonic Motives. *Journal of Happiness Studies* 11, 6. 735-762. <https://doi.org/10.1007/s10902-009-9171-4>

Design Guidelines

Companies may ask themselves the following questions when designing their smart product.

Non-Screen

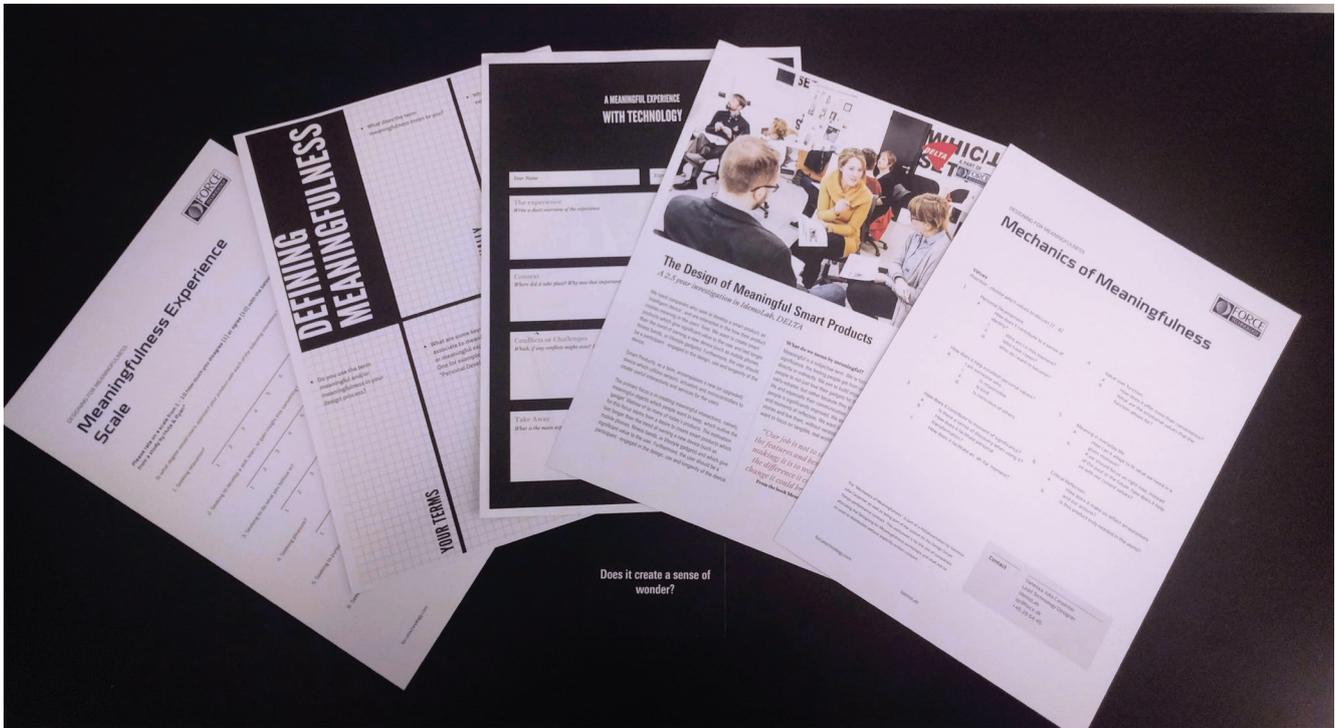
1. What information needs to be communicated?
2. Is a screen the best way to communicate this information?
3. How does it affect someone to look at a screen to get this information?
4. Could this information be communicated through: Sound / Light / Movement / Temperature change / Physical state change / Scent
5. For each of the above, what would be a possible scenario?
6. What would be the best and worst aspects of that scenario?
7. Could the new smart product have more impact using a non-screen approach?

Tangible

1. What if there was no mobile phone, how might one interact with this?
2. Should the information be communicated in an obvious, or a subtle way?
3. Could a user interact by: Pushing / Pulling / Turning / Squeezing / Moving / Tapping / Stroking
4. For each of the above, what would be a possible scenario?
5. What would be the best and worst aspects of that scenario?
6. Could the new smart product have more impact using a tangible approach?

Designing for Meaningfulness in Welfare Technology

1. If we should focus on right now, instead of the past or the future, how does it help us with our current selves?
2. How does it offer more than convenience?
3. What are the emotional values that the function allows for?
4. Does the product matter to users beyond the momentary interaction?
5. Does the product help users identify personally important goals?
6. Why am I making this?
7. Who does it really, actually benefit?
8. Does it work better without tech? Or offline?
9. How does it enable people-to-people links to foster, maintain, or strengthen human connections?
10. How does it enable people-to-sense of self links to tell or enable stories and thus, help to build identity?
11. How does it enable people-to-time links to allow for reflection and the making of meaning?



Worksheets from the workshops

Additional Resources

Academic Reading

Ron Wakkary, Doenja Oagjes, Sabrina Hauser, Henry Lin, Cheng Cao, Leo Ma, and Tijs Duel. 2017. *Morse Things: A Design Inquiry into the Gap Between Things and Us*. In *Proceedings of the 2017 Conference on Designing Interactive Systems (DIS '17)*. ACM, New York, NY, USA, 503-514. DOI: <https://doi-org.zorac.aub.aau.dk/10.1145/3064663.3064734>

Ine Mols, Elise van den Hoven, and Berry Eggen. 2016. *Technologies for Everyday Life Reflection: Illustrating a Design Space*. In *Proceedings of the TEI '16: Tenth International Conference on Tangible, Embedded, and Embodied Interaction (TEI '16)*. ACM, New York, NY, USA, 53-61. DOI: <https://doi-org.zorac.aub.aau.dk/10.1145/2839462.2839466>

Anna Ståhl, Martin Jansson, Johanna Mercurio, Anna Karlsson, Kristina Höök, and Eva-Carin Banka Johnson. 2016. *The Soma Mat and Breathing Light*. In *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems (CHI EA '16)*. ACM, New York, NY, USA, 305-308. DOI: <https://doi-org.zorac.aub.aau.dk/10.1145/2851581.2889464>

Vasiliki Tsaknaki, Ylva Fernaeus, Emma Rapp, and Jordi Salsona Belenguer. 2017. *Articulating Challenges of Hybrid Crafting for the Case of Interactive Silversmith Practice*. In *Proceedings of the 2017 Conference on Designing Interactive Systems (DIS '17)*. ACM, New York, NY, USA, 1187-1200. DOI: <https://doi-org.zorac.aub.aau.dk/10.1145/3064663.3064718>

Nazli Cila, Iskander Smit, Elisa Giaccardi, and Ben Kröse. 2017. *Products as Agents: Metaphors for Designing the Products of the IoT Age*. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. ACM, New York, NY, USA, 448-459. DOI: <https://doi-org.zorac.aub.aau.dk/10.1145/3025453.3025797>

Claudia Núñez Pacheco and Lian Loke. 2017. *Tacit Narratives: Surfacing Aesthetic Meaning by Using Wearable Props and Focusing*. In *Proceedings of the Eleventh International Conference on Tangible, Embedded, and Embodied Interaction (TEI '17)*. ACM, New York, NY, USA, 233-242. DOI: <https://doi-org.zorac.aub.aau.dk/10.1145/3024969.3024979>

Elisa D. Mekler and Kasper Hornbæk. 2016. *Momentary Pleasure or Lasting Meaning?: Distinguishing Eudaimonic and Hedonic User Experiences*. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16)*. ACM, New York, NY, USA, 4509-4520. DOI: <https://doi-org.zorac.aub.aau.dk/10.1145/2858036.2858225>

Industry and Research Reading

TOPP - RIOT (Responsible IoT)
<http://www.topp.se/post/riot>

Sebastian Deterding
<http://codingconduct.cc/Designing-the-Good-Life>

Chris Guillebeau
<https://chrisguillebeau.com/how-to-live-a-good-life-book/>

Irina Shklovski
<https://virtueproject.eu/>

The Internet of Things Needs a Code of Ethics

https://flipboard.com/@flipboard/flip.it%2FM_sFcl-the-internet-of-things-needs-a-code-of-/-f-3cc6f695c3%2Ftheatlantic.com

Oki Sato

<https://www.dezeen.com/2017/08/07/oki-sato-designer-interview-technology-should-look-like-something-in-grandmothers-room/>

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