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## Dissemination Level

<b>PU</b>	Public	<b>X</b>
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	
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## Dissemination Type

<b>R</b>	Document, report	
<b>DEM</b>	Demonstrator, pilot, prototype	<b>X</b>
<b>DEC</b>	Websites, patent filling, videos, etc.	
<b>O</b>	Other	
<b>ETHICS</b>	Ethics requirement	

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## **Executive Summary**

In Deliverable 3.2 “Public Communication of In-depth research”, we discussed our plans for blog posts on the project’s website and other multi-media reports. We noted that we were planning ‘Ethical Unboxing Videos’ on our project’s YouTube channel. In this Deliverable, we reflect on our plans for the blog posts, unboxing videos and other multi-media projects we are planning for the project. We also aim to share our ideas for sharing the interim empirical findings of the Virt-EU project with the IoT developer communities of practice disseminated via social media and other channels.

This deliverable describes our schedule for the remaining blog posts that are planned for the website, YouTube videos that are published, in production or at planning stage along with the scripts of the first two videos and a public engagement event we are co-organising with Women of Wearables in London, on May 1, 2019, a major IoT developer community.

## Section 1: Blog Posts

In Deliverable 3.2, we had presented a total of 12 blog posts that were planned for the website. Some of these blogs were delayed as we waited for our new website to launch. Now that our website is live, we will be publishing all of the planned posts until the end of May with a weekly rota.

The recently published two blogs: “Do-ers v. Postpon-ers: How do IoT developers respond to ethical challenges?” written by Funda Ustek-Spilda and “When Things Shape Values: Energy and Maintenance and Repair Systems in the Internet of Things” and “Can Non-technicians Code? The Relevance of Communities for Ethics Oriented Initiatives” by Sebastian Lehuede are presented below. The next blog that will be on the website is: “Peril v. Promise: IoT and the Imagination of Future?”

The full schedule of planned blogs until the end of July 2019 is as follows, including four new special additions:

Title	Author	Date to be Published
“Peril v. Promise: IoT and the Imagination of Future” (based on the authors’ accepted abstract submission to CHI 2019)	Funda Ustek-Spilda, Alison Powell, Irina Shklovski and Sebastian Lehuede	5 April 2019
“Tech for Good: Is it Business-as Usual?”	Funda Ustek-Spilda	12 April 2019
“Tech for Money, Tech for Good and Tech for Tech: Social Imaginaries of Tech”	Funda Ustek-Spilda	19 April 2019
SPRING BREAK		
Special*: Women of Wearables and Virt-EU Event on Ethics and IoT (based on Virt-EU panel with Women on Wearables)	Funda Ustek-Spilda	3 May 2019
Special*: CHI 2019 and Virt-EU: IoT and Ethics (based on Virt-EU presence at the CHI 2019 conference)	Funda Ustek-Spilda and TBC	10 May 2019
“Ethics beyond Data: How does IoT challenge our perspective on data ethics?”	Funda Ustek-Spilda	17 May 2019
Developer Cultures Series: Serbia and DesCon	Funda Ustek-Spilda	24 May 2019
Developer Cultures Series: London	Funda Ustek-Spilda	31 May 2019
Developer Cultures Series: Rotterdam, ThingsCon	Funda Ustek-Spilda	7 June 2019
Developer Cultures Series: Values and Ethics of Developers in Europe (Discussion and Conclusion)	Funda Ustek-Spilda	14 June 2019
Special*: Virt-EU Design Challenge (Reporting on the Virt-EU Design Challenge at OrgCon)	Funda Ustek-Spilda and TBC	19 July 2019
Special*: What is data justice for IoT? (based on Virt-EU Team’s presentation at IAMCR Conference in Madrid in July 2019)	Funda Ustek-Spilda and Alison Powell	26 July 2019

In addition to these blogs, we are also planning to publish the scripts of our YouTube videos as they include important background research about the products. We are planning to publish these scripts one month after each blog. On 5 April 2019, we will be publishing the script for our first Unboxing Video: Sammy Screamer by BleepBleeps.

### **Do-ers v. Postpon-ers: How do IoT developers respond to ethical challenges?**

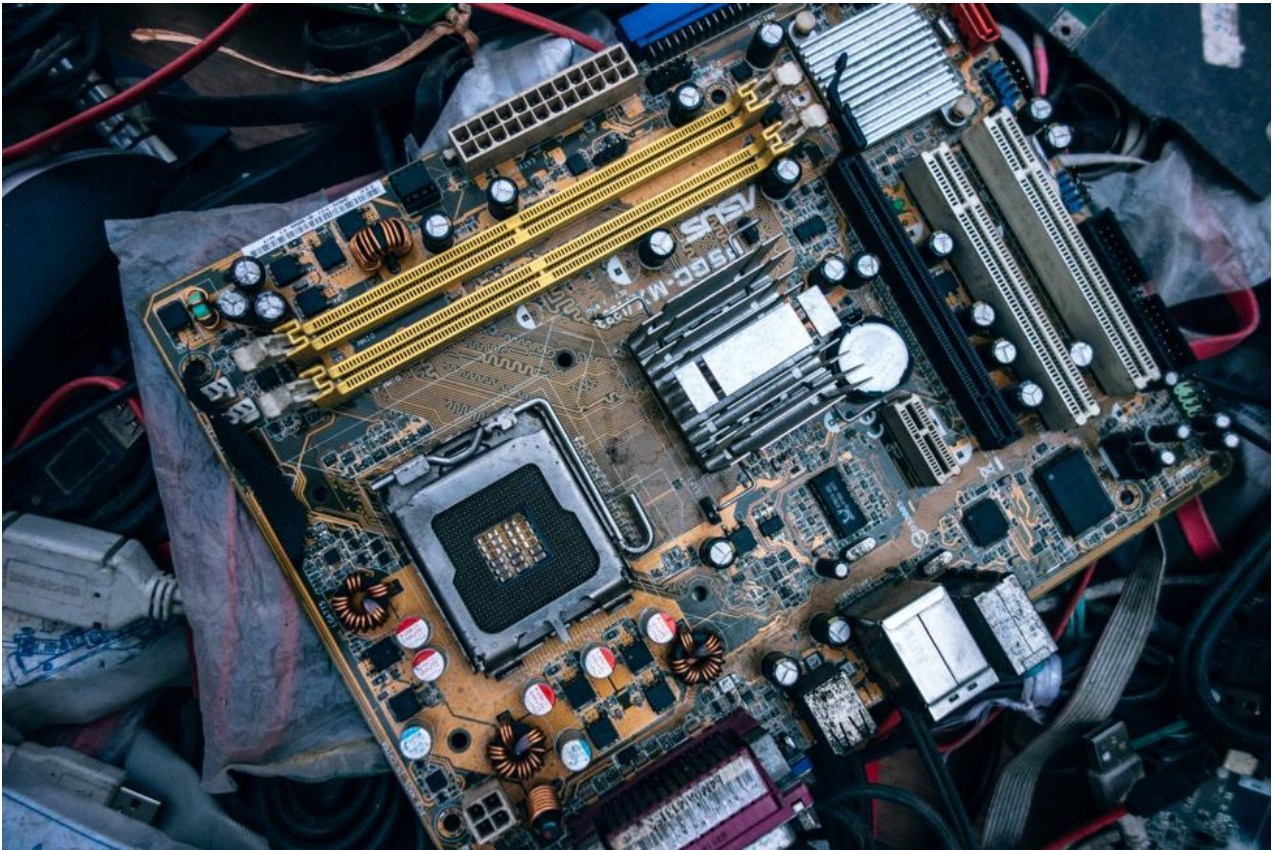
<https://blogit.itu.dk/inda/2019/02/08/do-ers-v-postpon-ers-how-do-iot-developers-respond-to-ethical-challenges/>

*By Funda Ustek-Spilda*

#### **INTRODUCTION**

In an event organised by one of the major internet of things (IoT) networks in London, I asked a developer who recently started her own company on wearable IoT technologies, if she ever faces any ethical challenges in her work. She leaned in and repeated more loudly: “Ethics?” as if she did not hear. I nodded and said, “Yes, ethics.” Then she responded: “Oh that!” and continued “Unfortunately, ethics never makes it into my ever-growing to-do list. Maybe one day, I will have time for it. But not at the moment, not when I am just starting my company. Indeed, time and time again, I came across this response, even when it was formulated in slight variations. For instance, a software developer explained it to me how in their company they mainly rely on “the giants” such as Google in ensuring their data is kept secure, as they use Google Drive or other Google products, which are mainly free. “After all” he said, “Google has all the resources, time and money to make sure everything is in order. I neither have the time, nor the money.” Another developer who works at a company that develops software for supply-chain management mentioned how in their company, they make sure they comply with legal rules and regulations, but other than that, ethics is not one of their “day-to-day concerns.” In contrast, I have met developers who refused major investments because the origin of the funds did not fit with their personal values. Or I have met developers who went separate ways with their co-founders as they did not agree with how far they were willing to veer away from the values they identified with and wanted their products to stand for. Similarly, I had lengthy discussions with developers who continue to provide product support to their customers, even when their ventures went bankrupt years ago, as they felt ethically responsible for the full life-cycle of their products.

Hence, it emerged that developers of IoT products mainly have two [seemingly] contrasting standpoints towards ethics. In this article, I will refer to the first group as Postponers, as they tend to defer any ethical decision unless they absolutely need to respond to them (e.g. legal liability); and the second group as the Doers, as they strive to build their companies around the values they identify with. This, however, is a simple categorisation. The important question is why do some developers postpone ethical decision-making, while others take it to be their responsibility to face them? My main argument is that how developers understand *responsibility* — vis-a-vis the products they build and businesses they set up — shape their ethical positioning.



*Photo by Fancycrave on Unsplash*

#### WHEN IS [EVER] A GOOD TIME FOR ETHICS?

Building a start-up is not an easy undertaking. It comes with many unknowns and many uncertainties. The CEOs and co-founders of the start-ups I have met all shared the same anxieties: What if things go wrong? And everybody knows, things do go wrong –after all, it is [almost] public knowledge that majority of start-ups fail within two years of their ventures. From failures to close investment rounds to spending the precious limited funds they raised on “poor” recruits, the end always lurks in the horizon when money is so tight. It is not unheard of that some cofounders do not even pay themselves salaries, and invest all the money their companies make back into the company itself. It is also common practice to employ developers and designers on a sub-contractual basis, to keep costs to a bare minimum. So, priorities almost always lie with keeping the company going. This entails a constant cost-benefit analysis on the part of [co]founders and those in managing roles, but also developers, designers and other employees who personally feel the impact of uncertainty working for a start-up brings.

Cost-benefit analysis is inherently a consequentialist decision-making paradigm, that is, the consequences of any decision determine the basis of its rightness or wrongness. Here, not only the financial costs, but also human costs such as time and effort are key. Benefit, on the other hand, almost always is measured in terms of financial outcome. After all, when a start-up fails, the cost of that failure is not shared equally across all stakeholders. The CEOs, co-founders and those in managing roles feel a personal pressure to keep the company going. As a CEO of an IoT startup put it, one feels responsible for not only the company’s survival, but also mortgages, rents, childcare

expenses, school fees of those who work for the company. Hence, even when the financial pressures might be industry-wide, how they are felt within the context of small companies is personal. All start-ups, however, face (at least some) financial pressure. Against this background, many co-founders [and developers] reason that the priority is first to grow and scale the company and then once everything is more or less stable and one has the funds, to hire legal persons to make sure that the company is in line with legal requirements and ethical considerations.

Why do some developers choose to postpone making ethical considerations, when others take it as one of the building blocks of their products (and companies)? I think the answer to this question can be sought in how developers understand and approach the concept of *responsibility* when building their products/companies, and how they interpret ethical risks in their cost-benefit analysis.

Alexei Grinbaum and Christopher Groves in their chapter titled “What is ‘responsible’ about responsible innovation?” identify two ‘tenses’ of responsibility: a “backward-facing” condition and one that is concerned with a “secular future.”[1]The backward-facing condition looks at how one’s actions conform or differ from the duties assigned to her. The secular future, in contrast, is not concerned with the pre-ordained duties, but with how an individual as a moral subject takes responsibility for deciding what she should and should not do and how she prepares to be accountable later (p.121). One of the main challenges of emerging technologies such as the IoT is that, while there are some risks that have been already identified (e.g. privacy and security), there are still others that remain unknown. It is also uncertain how future technologies would interact with the ones that are being built today. This means that developers building new technologies are not always in a position to be able to identify what they should and should not do and how they would be accountable later for something they could not know today. That there are no “pre-ordained” duties assigned to any role in the context of a start-up entails that this unknown future (and its unknowability in general) creates a vacuum for developers to choose not to engage with ethical decision-making. While some explain this non-engagement as waiting for bigger companies to pave the way so that they can follow their lead; others stress that current ethical thinking cannot keep up with the speed of technology, so ethics will [have to] follow technology rather than the other way around. Else, they argue that a time will come for them to consider ethical implications of their products, but first, their products should “make it” in the market.

But is there [ever] a good time for ethics? If ethical thinking constantly gets pushed in people’s agendas and ever-growing to-do lists, and personal responsibility remains vague in the scenario of an unknown future, then how will we produce ethical technologies today? The doers, developers who engage with ethical thinking in all stages of a product as well as in all aspects of the companies they are part of, tell us that we need to think about responsibility differently. Rather than an understanding of responsibility as a matter of personal liability, they are concerned with the future they are building through their products and companies. Instead of creating technologies just because they find them interesting or ‘a challenge’, they would like to improve the current societies they are part of and help future societies at the same time. So, how can we move from a personal



understanding of responsibility that feeds into the consequentialist cost-benefit analyses to a *collective* one that cares for the future of the planet and its inhabitants?[2]

Hannah Arendt in *Responsibility and Judgement* writes that collective responsibility is not merely being there or being engaged in a particular action or non-action when a non-ethical [moral] decision/event takes place.[3] She gives the example of a thousand able swimmers not coming to the help of a man drowning at sea. She explains that in this example there is no collective responsibility because the thousand able swimmers are not a collective, to begin with (149). As such, she stresses that it is membership in a group, that makes responsibility collective and *political*. So, the political considerations of a group's conduct[4] become pertinent in understanding how and why ethical decision-making is done today with implications for the future.

Take the example of sourcing sensors for IoT devices. Companies that work with sensors make this decision daily. Are they going to buy sensors produced in Europe or China or other countries where the privacy and security regulations are not very strict? Are they going to source sensors with rechargeable batteries which potentially cost more or sensors that are cheaper but need replacing after a certain period of time? Answers to these questions have important implications for the users who will be using the devices built with those sensors, and for the environment. Users will get more [or less] secure devices and more [or less] e-waste will be produced and less [or more] minerals will be extracted from the oceans.



Photo by rawpixel on Unsplash

Such positioning of responsibility with implications for the future also helps us move away from individualistic accounts of why some developers engage with ethics from an early stage, while others choose to postpone. It is not merely the personal values of the developers or that one group is more 'virtuous' than the other [though they may well be], it is rather how they position themselves and the technologies they are building vis-a-vis the technical cultures they are part of and the technical futures they would like to see being built. This implies that when making a seemingly technical decision as whether to add a camera and a microphone to a device which might not necessarily need it, they consider not only their own subjective positions, but they also extend a *matter of care*[5] to the networks they are part of, their potential users as well as the future generations that might be affected by them. They make an ethical judgment by assessing the options: the camera and microphone might give them a competitive edge if their competitors do not provide them, but would it make the device less secure and more prone to privacy risks? Adding a camera and a microphone might help them increase their revenue if they can increase the price, but would it make the device less recyclable or shorten its lifespan, given that camera technologies move very fast? As such, they go beyond the consequentialist logic as these questions become serious moments of deliberation.

## CONCLUSION

Technologies are not neutral. They can be ethical or unethical, responsible or not, depending on the context in which they are put into use. The same technology can be used to provide care to those in need and create surveillance societies. Autonomous technologies give us further reason to move from individualistic cost-benefit analyses to collective responsibility, as personal responsibility is hard to apply when there are [seemingly] no persons involved in making the decisions. We need to acknowledge that ethics is an on-going process and there will unlikely be a moment where we will be able to just stop and wait for ethics to catch up, or a moment where ethics will transpire on its own. If technologies are being built, then responsibility is shared. Obviously, not all developers go through ethical training, or are able to foresee the societal implications of the seemingly technical decisions they make on a day-to-day basis. This is not a limitation, but a great opportunity to form better collaborations between developers, legal experts, ethicists and social scientists.

At Virt-EU, we have developed a framework based on Virtue Ethics, Capability Approach and Care Ethics to move beyond consequentialist ethical approaches. We believe through identifying virtues that developers and companies care for and acting within their capabilities but also together with other stakeholders in their industries, responsible technologies can be built. We will continue this blog series to demonstrate how this framework can be put into use.

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[1]Grinbaum, Alexei, and Christopher Groves. "What Is 'Responsible' about Responsible Innovation? Understanding the Ethical Issues." In *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Richard Owen, John Bessant and Maggy Heintz eds., 119–142. Chichester, West Sussex: Wiley, 2013.

[2]I am particularly cautious here to not only talk about future generations, as technologies such as the IoT have tremendous environmental costs, with growing e-waste and plastic waste, as well as demand for minerals and raw materials.

[3]Arendt, Hannah. *Responsibility and Judgment*. New York: Schocken Books, 2003.

[4]Grinbaum and Groves, 2013, 133.

[5]Puig de la Bellacasa, Maria Puig. "Matters of Care in Technoscience: Assembling Neglected Things." *Social Studies of Science*41, no. 1 (2011): 85–106.

### **When Things Shape Values (2/3): Energy and Maintenance and Repair Systems in the Internet of Things**

<https://blogit.itu.dk/inda/2019/02/08/when-things-shape-values-2-3-hardware-components-and-energy-power-in-the-internet-of-things/>

by Sebastian *Lehuedé*

The post is the second of a three-part series looking at the ethical stakes of different technical elements that make up the Internet of Things (IoT). While in the first post I *discussed data and network architectures*, here I look at *hardware components and electric power*. In addition, I associated these components with discussions about flexibility and the ethical framing of technical solutions. In the upcoming blog post I will focus on maintenance, repair and interfaces.

#### Changing the focus: From Values to Things

A few months ago, I explored a 'materialist' approach to ethics and technology. As I explained, one of the most common approaches to ethics can be summarised in two steps. In the first one, the researcher carries out some ethnographic work in order to identify the values shared by relevant social groups. Usually, these groups are the ones that are closer to the processes of conception and building — programmers and designers — although sometimes business managers, activists and journalists are also taken into account. The second step consists of looking at the way the values and ideas held by these groups actively shape or get encoded in specific engineering and design solutions.

In this article, I am interested not in the 'values' shared by technical communities but instead in the way the technical properties of technology can also open up or constraint how groups conceive, materialise and reflect about values. This is a different emphasis compared to previous work on ethics and technology that, I suspect, can shine a light in some aspects that have not been developed in detail.

In relation to the social sciences, I would like to situate this attempt within what has been called 'material turn' or 'turn to things'. This framework has contributed to de-centring the discursive or symbolic dimension of technology in order to highlight the technical properties that

open up or constraint possibilities. In the case of the Internet of Things, I translated this definition as the *things* that make up connected devices, such as the hardware components, data and electric power that make possible the construction of connected devices. In case you are interested, in the first blog post of this series I developed more on this approach and discussed some of its advantages and disadvantages.

These blog posts draw on the ethnographic work carried out by researchers at the LSE, ITU, and CIID. Since the beginning of the project we have attended conferences and meetups, interviewed different actors and ran co-design workshops with people involved in the IoT in Europe. Here I share the results of a re-reading of these data with a ‘materialist’ concern in mind. After carrying out this method, I came up with a list of six components — data, network architectures, hardware components, energy power, maintenance, and interfaces — , to which I add a discussion on the ethical concerns that they make salient. Here I draw on some examples to illustrate the ways in which technical components are ethically framed.

#### HARDWARE COMPONENTS: CHALLENGING DETERMINISTIC ACCOUNTS OF THE IOT

One of the things that fascinate IoT developers[1] is to work with *physical* things, such as computer chips and visual screens. Unlike programming, the IoT also implies *designing* and *making* devices that are made up of multiple components. This physical dimension is valued by designers and developers because they provide an opportunity to practice — and sometimes also show off — virtues such as engineering mastery, innovative thinking, and creative design. For this reason, the possibility to create devices from scratch is one of the factors that attract people to the IoT.

However, what we have seen in our fieldwork is that, in the end, few IoT designers and developers manage to actually end up working with hardware. As is the case for data, dealing with hardware components can become the source of several difficulties. In general, dealing with hardware significantly increases the amount of capital required to set up a company, slows down commercial growth and introduces the problem of distribution. More than once I heard advisers and entrepreneurs recommending to ‘avoid hardware’ as much as possible. Apparently, there is a moment when IoT developers *give up* and focus on software and business development. ‘Let’s be honest’, I heard an entrepreneur saying in a meetup, ‘we all end up buying our components in Alibaba’. This can be even more difficult in places like Serbia in which, according to some participants, the lack of resources and bureaucracy, can introduce additional constraints.

There is an interesting initiative seeking to tackle the difficulties of building IoT devices. Buzz Technologies’ project seeks to change the way the IoT is usually developed. Through a Uber-style model of production, it seeks to decentralise the process by offering “overnight peer-to-peer, distributed manufacturing in the home and small business”. Machines such as 3D-printers can be booked by guests, who can then employ them during the machine’s spare time. Although there are some details in the proposal that would need to be cleared, it is interesting to see how machines such as 3D printers and p2p platforms can afford new ways of ‘making’ IoT products. The consequences of this new mode of production would be interesting to study further.

Also, and in spite of these difficulties I mentioned above, the material affordances that make up IoT devices might also allow for the advancement of certain ethical values. Take sustainability as an example. One of the setbacks underpinning the proliferation of connected devices is the increasing amount of electronic waste being produced, a phenomenon that has been widely criticised. Indeed, research conducted by colleagues of Virt-EU from IT University of Copenhagen shows that the environment is a big concern for some IoT developers in Europe.

In practice, however, the affordances of the IoT might also contribute to the protection of the environment. Cupclub is a good example of it. This ‘poster child’ of technology-enabled circular economy seeks to replace single-use cups by distributing and washing re-usable ones. It employs RFID technology to track the cups, and users can receive incentives for contributing through an app. I find particularly interesting that according to the founder, Safia Qureshi, privileging single-use products “is a selfish and arrogant stance”.

Dealing with the physical dimension of the IoT is usually seen as a barrier for business growth. On the contrary, Cupclub shows that a ‘material’ approach can help us study the way values and technical configurations can be associated in multiple and flexible ways. Different combinations of technical arrangements and ethical values, even within a category such as ‘the IoT’, do not necessarily follow a clear-cut set of values or ideals. Once again we are reminded of the need to challenge the deterministic assumption that purports technological development as following an ‘automatic and unilinear’ path.

#### POWER: SHAPING VALUES IN HIGHLY DISCURSIVE REALMS

I realised the importance of power when I heard the presentation of a developer from a smart bikes start-up. When introducing the company, he made an interesting distinction. ‘What we do, are smart bikes’, he said. ‘But in technical terms, we are experts in dynamos for bikes’. Indeed, power is so relevant that it can provide you with a membership in the club of the IoT.

The example illustrates the relevance that power can have for IoT products and services. Given the small size and high mobility required by connected devices, low power consumption is an important imperative within the developer community. This challenge has given rise to interesting initiatives, especially when it comes to network architectures such as LoRa or NB-IoT that, unlike the Wi-Fi one, provide connection with low power consumption.

What I find particularly interesting in relation to power is that, for some reason, initiatives working in this field tend to draw on strong ethical narratives in order to introduce their mission and goals. The first example is Chargifi, a company that provides wireless chargers in public spaces. For them, ‘power has become a basic human need’, and one of their slogans is ‘power to the people’. According to this view, connectivity is so fundamental that it needs to be put at the bottom of Maslow’s hierarchy of needs. The second example is BuffaloGrid, a company that manufactures solar-powered phone chargers. Since they work in developing countries such as India, they state

their missions as one of “bringing mobile power and internet to the next billion”. As Chargifi, they also draw on a narrative of connectivity, sustaining that ‘off-grid shouldn’t mean offline’.

Unlike these examples, projects innovating in other elements of the IoT tend to highlight some of their features from a more pragmatic and functionalist logic. For example, network solutions would mention their lower costs, years of experience spectrum efficiency in their website, not necessarily specific ethical values. A good question is why does power lend itself apparently easily to the employment of ethical narratives?

How could a materiality-first approach contribute to such a discursively charged field? I would argue that what could be interesting in this case is to see how can the specific technologies offered by these companies shape the very values through which they introduce them to broader audiences. Take *connectivity*, for example. What happens when connectivity is equated with the possibility to access the internet? What is left inside and outside through this analogy? How do the technical affordances of IoT devices shape the way designers and developers understand by connectivity? Values are not static but instead mutable over time, and one of the ways in which they change is by getting associated with different *things*. The modern belief in the primacy of the mind and abstract reasoning has kept us from acknowledging the important role of objects in areas such as public participation, sciences and, why not, ethics.

The acknowledgment that we think with objects have fundamental analytical consequences because objects, as I have discussed, are not neutral but open up or constraint possibilities. What developers understand by connectivity necessarily changes in the process of conception, design, and construction of *connective* objects. This is partly because the design process is *contingent*, far from straightforward. What seems to be the case most of the times is that plans tend to change in order to reflect the always-changing environmental conditions. Putting values into practice involves interaction with pieces that do not fit together, protocols that are not interoperable and infrastructures that break down. In the end, the device considered to be *connective* is the result of the interaction between the plans of designers and the physical properties of the components with which it has been built.

## CONCLUSION

In sum, looking at materiality illuminates the fact that the ethics of technology is not only defined by the intention and agency of human designers but also by technology itself. In a way, modernity has convinced us that we are in full control of our tools, but seeing technology as a process shows us that the scenario is messier and more complex than we originally thought. I completely agree with people proposing ethical design frameworks as a means to acknowledge the situated and contingent nature of technology building. This also explains Virt-EU’s goals of developing a tool that could help people to elaborate on ethics in the very process of designing and developing IoT products.

After a reading of Virt-EU's field notes and interviews, hardware components and power came out as two important technical challenges faced by IoT designers and developers. In this blog post, I analysed the IoT in order to discuss two particular topics associated with a 'material' interpretation of ethics. On the one hand, I employed hardware components to address the way the 'physicality' of technology can challenge deterministic notions of the IoT, such as the idea that it has a negative impact on the environment. On the other hand, I drew on issues surrounding power to highlight the way technology can shape the way we conceive ethical values.

Echoing the theoretical lenses that inspired this post, I have argued that values such as environmental consciousness and connectivity are more than mere abstract ideas held by specific groups. Instead, I have discussed ways in which the very technical characteristics of the IoT mandate us to avoid deterministic and straightforward understandings of the ethics of technology.

*I am very grateful to Funda Ustek-Spilda for her thoughtful suggestions and edition.*

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[1]At Virt-EU we use 'developers' in a broad sense, encompassing programmers, designers, innovators, makers, business managers and all those involved in the conception and production of connected devices. Given the focus of our research, we mainly focused on small and mid-size companies

### **Can Non-Technicians Code? (3/3) The Relevance of Communities for Ethics-Oriented Initiatives**

<https://blogit.itu.dk/inda/2018/12/06/can-nontechnicians-code-the-relevance-of-communities-for-ethics-oriented-initiatives/>

*by Sebastian Lehuedé*

Internet of Things (IoT) is a highly contested ethical arena. While some see connected devices as a source of empowerment, recent reports associate them with domestic abuse and home surveillance. So far, some of the proposals to address these ethical concerns highlight the fundamental role that designers and *developers* can play in achieving a more reflexive ecosystem. Two examples of this approach are calls to foster more and better codes of conduct and to strengthen ethics in the curricula of STEM programmes.

In this blog post I shine a light on an alternative path, suggesting that policies, research projects, ethical tools and other initiatives focusing on ethics would benefit from paying more attention to the collective spaces where designers and programmers participate. Looking at my engagement with a hacker community and an IoT meetup based in London, I argue that communities help actors to broaden their ethical concerns by facilitating their interaction with people from different backgrounds. Although this statement sounds obvious, in this post I will provide a grounded example of how the dynamic operates in practice. I hope to inspire more people to get involved and support these types of communities.

Certainly, what I am saying here is not new. Moral philosophers from different currents agree with the idea that ethics is a collective endeavor [1]. As Hannah Arendt argues, morality “finds itself always and primarily, even if I am quite alone in making up my mind, in an anticipated communication with others” (2006, p. 217). A similar claim has been made by indigenous groups and religious spiritualities. For example, Buddhism employs the idea of the nonself to refute the assumption that we are individual units in essence (Kongtrul, 2006). In this post, I reflect on some ways in which these formulations can be put to work in the IoT.

#### WHY COMMUNITIES? TACKLING ISOLATION IN PROGRAMMING

The ideas I am discussing here started to take shape in a visit we had to a hacker community as part of our ethnographic work for Virt-EU[2]. In this visit, we met John, a developer who ran weekly programming workshops. He told us that he decided to start them as a result of his own isolated experience as a developer. Interestingly, he did not think he was incorporating any ‘ethical’ component in these workshops. He said, he just wanted to provide beginner programmers a nice and warm environment where they could help each other and learn collectively.

In the beginning, I felt John was missing an opportunity. His workshops could be employed to introduce some ethical discussions or to spread free software or other types of value-led technologies. However, after a while, I realised that his workshops could also be understood as an ethical argument *in themselves*. I started to interpret John’s initiative as an argument according to which, in addition to discussions of the values guiding the IoT, we need to pay attention to *the conditions* under which technical actors do their work. Indeed, the lack of human proximity that he perceived can have relevant ethical reverberations. As some philosophers argue (Benhabib, 1992; Habermas, 2015), moral reasoning usually takes place through communication, and since what is considered ‘good’ is collectively defined, the only moral assessment we can undertake is on whether the process was guided by mutual understanding and solidarity. John’s discomfort made me think that programming in isolation might not provide the best *social infrastructure* to conduct this type of ethical deliberation.

It is important to mention that John’s initiative is not an exemption when it comes to technical communities. In recent history, designers and programmers have shown awareness of the necessity of building more community-oriented spaces not only online but also offline. Hackers are a great example. Even though they are usually associated with an inclination towards individuality and autonomy, in practice they tend to negotiate these values with more communitarian mechanisms of organisation. For Gabriella Coleman, hacker conferences are instances when the “social bonds between participants are made manifest, and thus felt acutely” (2010, p. 50). In contrast to hackers, however, people involved in IoT development share a more varied range of sensitivities, such as makers and entrepreneurial ethics. Also, the increasingly popular co-working spaces can provide them with the opportunity to meet people facing similar challenges. The obvious question, then, is what type of social infrastructure might be appropriate for groups focusing on the design and development of IoT projects.



## LONDON IOT MEETUPS AND THE VALUE OF 'AMATEUR' COMMUNITIES

As part of our ethnographic work at Virt-EU, we have visited conferences, co-working spaces and companies, among other social IoT spaces. So far one of our deepest engagements have been with the Internet of Things London (*IoT London* hereafter), a meetup run by Alexandra Deschamps-Sonsino that started seven years ago and which I have been attending for more than a year. This group is the most popular one in Europe in the Meetup platform, with more than 13,000 members. Looking at IoT London brings to the surface the ethics of putting together people from different backgrounds to discuss a specific topic. As a developer once told me, one of the main characteristics of this group is it targets 'amateurs'. Being called 'amateur' might be offensive for some, but for me it is precisely this 'amateurism' that illustrates one of the main strengths of the initiative. Compared to similar communities in the same city, participants of IoT London come from quite a diverse range of backgrounds[3], such as programming, design, law, commercial development and academia. As I discuss below, this setup can enrich the process of ethical deliberation.

A few weeks ago I had the chance to present some of the findings of our project in one of these meetups. As a PhD researcher used to write essays addressing a very specific audience, one of the main challenges I had was to introduce our insights in a way that the audience could make sense of it. Why would an engineer interested in mechanical joints or pollution sensors care about the values shared by different IoT communities? Certainly, it is easier to think of why *should* he/she care, but this normative position does not ensure that the person is going to really engage with your arguments. The point I want to make here is that the diversity of backgrounds requires presenters to make adjustments of their speech.

These 'adjustments' do not only encompass avoiding technical jargon but also an active transformation of the form and the content.

In the introduction, I referred to Arendt's concept of *anticipation*, an idea that comes to the surface again. In a way, the presentations delivered in IoT London are the product of a negotiation between the speakers' thoughts and their *anticipation* of the interpretation that the rest of participants will do on it. In the words of Swierstra and Rip (2007), we are challenged to mentally transit from a cold morality of 'unproblematic acceptance' to a hot ethics of 'explicitness and controversy'. In the sessions of IoT London there is also a moment of Q&As after each talk, but if Arendt is right then the dialogues that is established at this stage have been already partially 'cooked' by the anticipations made by the actors.

The anticipations required to address communities with diverse backgrounds can help participants to cultivate what Aristotle calls *practical wisdom*. For him, the search for the right decision does not only has to do with finding 'scientific' truths but also with taking into consideration the broader context in which these decisions are taken. Among other elements, practical wisdom implies taking into consideration not only one's but also other people's perspectives. Speaking in IoT London makes it necessary to draw on this virtue in order to make sense to the whole of the community. This is not only true for those working in academia, and I guess that the people who presented

previously that evening on wireless network platforms and developing an animal care startup had to go through a very similar process.

#### TECHNICIANS AND NONTECHNICIANS ALTOGETHER

Since their backgrounds are so varied, speakers in IoT London have touched upon a broad range of topics. Certainly, the majority of presentations are ‘technical’ (sensor networks, programming languages and so on), but there are also ‘softer’ ones addressing themes such as the implications of Brexit for the IoT or the different regimes of intellectual property. I think it is precisely this encounter between ‘technical’ and ‘nontechnical’ actors — its amateurism — what makes IoT London a fruitful platform for advancing collective ethical deliberation.

Some might argue that I am being naive since, in the end, what makes a decision *technical* is precisely the fact that it is informed by neutral and objective criteria. According to this understanding, discussions on ethics are relevant, but in practice, programmers conduct their work based on a rational assessment of the available options. However, ethnographic research and science and technology studies depict a different dynamic. For example, Alison Powell(2018) argues that the distinction between *moral* and technical argument is not always clear-cut. Her study of the discussions surrounding the Openmoko project illustrates that programmers and designers draw on *operational pragmatics* that entangles ethical and technical justifications to define what qualifies as a ‘good’ or ‘bad’ technological development. In sum, communities such as the IoT London can provide nontechnicians the opportunity to inform the ideas that technicians will later employ during the design and development of products and services.

Events like IoT London meetups provide a social infrastructure that facilitates this interchange between technical and nontechnical arguments. Looking at some of the first hacker conferences during the eighties, Fred Turner argued that focusing in technological conferences “allows us to acknowledge the roles nontechnicians have played in shaping our perceptions of life with digital technologies” (2006, pp.265–266). In Turner’s vocabulary, I argue that IoT London provides a platform for the *articulation* of different visions surrounding the IoT. In other words, a process like this one can significantly enrich ethical deliberation by broadening programmers and designers’ repertoire of moral considerations.

#### CONCLUSION

In this blog post, I explored one of the ways in which communities such as the IoT London can provide social infrastructure to facilitate collective ethical deliberation, an advantage that might be especially helpful for programmers and designers working in isolation. Of course, there is still much work to do in technical communities to involve a broader range of participants, especially when it comes to less privileged groups in terms of gender, race, and class. Also, here I have mainly discussed positive aspects of communities, but a more in-depth analysis might also want to take into consideration the power dynamics of exclusion and oppression that also form part of them. However, even in its current form spaces like IoT London provide a valuable platform for the exchange of perspectives between technical and non-technical actors.

Initiatives such as policies or ethical tools seeking to advance a more reflexive IoT ecosystem could have much more impact by acknowledging this social dimension of ethics. So far collective organisations have proved to be one of the main sources of ethical articulation and transformation. As a group in Colombia affirms, “the word and the action outside the spirit of the community are death” (as cited in Escobar, p.176). Initiatives overlooking this fundamental dimension of ethics will have a hard time seeking to produce impact.

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[1]Due to space constraints, in this article I do not distinguish between *social*, collective and communitarian approaches to ethics.

[2]I have changed the details in order to preserve the anonymity of the actors.

[3]I employ the word ‘diverse’ here in reference to the professional background of participants. Unfortunately, this diversity does not range to other backgrounds, such as gender, ethnicity, and race.

## Section 2: Ethical Unboxing Videos

Tech unboxing videos are increasingly becoming a genre on their own. There are tens of thousands, if not hundreds of thousands, videos available on YouTube and other multi-media platforms where latest tech products are unveiled, presented and reviewed. None of these videos, however, feature ethical evaluation of the products they unbox.

We came up with the idea of unboxing videos when we were reviewing IoT devices' privacy and security policies with Open Rights Group. Soon after we started our research we came upon the realisation that companies rarely, if at all, shared privacy policies of their devices online. One could come across privacy policies but these mostly referred to their website's privacy and cookie policies and not their devices. We thought if we could order the devices, maybe they would come with manuals and also privacy policies specific to the devices. We considered this as a good opportunity to review the devices from an ethical perspective and also reach out to wider public, as well as the developers of the devices.

### Ethical Unboxing Video 1: Sammy Screamer by BleepBleeps

Our first video "Ethical Unboxing: Sammy Screamer by BleepBleeps" has received nearly 300 views on YouTube (more than any other video we have published before) and we have received great feedback.



The video can be found here:

<https://www.youtube.com/watch?v=JDy8-sBxB1c&feature=youtu.be>

The caption we have written for YouTube lists names of all the individuals who have worked for the video as well as our funding:

*Virt-EU (Values and Ethics in Innovation for Responsible Technology in Europe) is a EU Horizon 2020 Project (No. 732027).*

*Video Presented by Funda Ustek-Spilda (London School of Economics)*

*Filming and Editing by Zoë Glatt (London School of Economics)*

*Research by Funda Ustek-Spilda (London School of Economics) and Ed Johnson-Williams (Open Rights Group)*

*\*This video does not contain paid promotion.*

We have also published a short introduction about the video on our website for wider visibility with the following caption:

<https://blogit.itu.dk/inda/2018/11/05/ethical-unboxing/>

*This is the first video in our Ethical Unboxing series here at Virt-EU, where we will be unboxing internet of things (IoT) devices and review them from an ethical perspective. In this video, we are unboxing Sammy Screamer, a motion alarm by BleepBleeps.*

*One of the main reasons we decided to make these unboxing videos at Virt-EU is that it is incredibly difficult to get hold of privacy and security policies of IoT devices before actually buying them. Company websites usually only feature privacy policies for the websites and not the devices.*

*In this video, our review focuses on the following values: 1) Security and Privacy, 2) Interoperability, 3) Usability and 4) Sustainability.*

*Stay tuned for our next video!*

### **Script for Unboxing Video 1: Sammy Screamer by Bleep Bleeps**

Funda Ustek-Spilda (LSE) and Ed Johnson-Williams (Open Rights Group) worked together on the background research for the video and Funda Ustek-Spilda wrote the script that guided the video. We include the script of this video below. Not all information that were included in the script were mentioned in the video as we tried to keep the video to less than 10 minutes. This information, however, will be published in the blog version of the script.

#### **Unboxing Video 1: Sammy Screamer by Bleep Bleeps**

Sammy Screamer was launched in February 2014 and started being shipped in April 2016. So, we can say it has been around in the market for nearly 3 years. It had a really successful Kickstarter round, raising over \$90k with more than 1000 backers.

Sammy is a movement sensor that connects to the Bleep Bleeps smartphone app. Bleep Bleeps advertises that you can stick Sammy on the stuff you want to keep an eye on – like a door, a bag or a kid's buggy or the cookie jar. When they are moved, Sammy starts screaming and you get a notification on your smartphone. The level of sensitivity to movement can be adjusted, so can its volume.

We have reviewed Sammy on 5 aspects: Privacy, Security, Interoperability, Usability and Sustainability.

### **Privacy and Security**

One of the main reasons we decided to make these unboxing videos at Virt-EU is that it is incredibly difficult to get hold of privacy and security policies of IoT devices before actually buying them. Company websites usually only feature privacy policies for the websites and not the devices.

One thing we noticed when we received Sammy is that, the box did not include any information on the privacy or security of the device. As you can see, we just received a plain little box with the device in it. This means that as a user, if you would like to try and test this device, you are giving your consent to its privacy and security settings, without actually knowing what they are.

We found through online search that Bleep to Bleeps collect some technical information like IP address, location to help them to “better understand who is using the Services and how they are using it.” They also mention that they “may combine this information with the information you give us and the information we collect about you.” and that “they may use this information and the combined information for the purposes set out above (depending on the types of information we receive”. We found this paragraph incredibly confusing and a mouth-ful to read. What information is that and how is it being collected and combined? What happens to that information? We don’t know, we just don’t know...

We then thought maybe these privacy and security policies will be prompted to us once we download the Bleep Bleeps app and pair the device. We did find that there is a small print of the privacy policy on the main page of the app before sign up, but this is not sufficient for GDPR. It needs to ask for specific consent and the user needs to review the actual policy before pairing the device and the app. More specifically, implied consent is not allowed under the rules of GDPR anymore. In general though, because Sammy Screamer uses only bluetooth connection and not Wi-Fi, it can be argued that it might be a bit more secure and less vulnerable to attacks. Bleep Bleep notes that it is difficult to pair a device that has been already paired with an app to ensure that Sammy does not get hacked by outsiders who can turn it on and off. This is good design thinking, but as we will discuss later when it comes to usability, bluetooth also significantly reduces the usability of the item. But more on that later.

### **Interoperability**

In terms of interoperability, we can say that since bluetooth is now available nearly on all smart phones, Sammy can be easily set up and paired with all phones. Since we only purchased one Sammy, we do not know, however, what would happen if we had four Sammies paired to one mobile phone. As far as I can see from the app, I can pair two devices from Bleep Bleeps at once: Sammy Screamer and Suzy Snooze, but there is no information on how many of each I can pair with one phone.

Similarly, I can pair Sammy with only one phone at a time. This means that only one person can have control over the device. Again, we think this significantly reduces its usability.

### **Usability**

As part of our review process, we also went through the Amazon reviews Sammy Screamer received and reviews on the Bleep Bleeps blog. In general, reviewers mentioned that Bluetooth connectivity was poor, resulting in poor usability. While some mentioned that the bluetooth connection is not stable and it often connects and disconnects resulting in frequent alerts to the user even though no item has been moved, others noted that the bluetooth range of 5-7 meters were very short to be of use at all. In general though, users stressed that they liked the idea and the design. It is indeed very neat and cute- but that the range is quite limited and with no wi-fi functionality its performance remains poor.

### **Sustainability**

The first thing to mention when it comes to sustainability is that Sammy does not come with rechargeable batteries. On their website, Bleep Bleeps says that it depends on the amount of use you get out of Sammy and how often she screams. The simple cell battery will last approximately 6 months if left sleeping, 3 months with moderate use and 1 month with heavy use, which is 24 hours a day. Approximately 1000 alerts on full volume would drain the battery. For increased usability, it would be better to be able to charge Sammy rather than using batteries. This would be much better for the environment as well.

Sammy has a full plastic casing. These cases are made in China and assembled in the UK. It would be better to use recycled plastic for the cases, and in general have more information about the kind of plastic used in the production. It would also be desirable if Bleep Bleeps had a recycling scheme for its products and their batteries, as it stands, Sammy cannot be recycled.

### **Ethical Unboxing Video 2: Fitness Trackers for Kids (FitBit Ace Kids Activity Tracker, Garmin Vivofit Jr., HanGang GPS Tracker for Children, Bhdlovely Kids Smart Watch)**

Background Research: Funda Ustek-Spilda (LSE) and Ed Johnson-Williams (Open Rights Group)

Script by: Funda Ustek-Spilda (LSE)

Video presented by: Funda Ustek-Spilda (LSE) and Alison Powell (LSE)

Filming by: Funda Ustek-Spilda (LSE) and Alison Powell (LSE)

Editing by: Inda Memic (ITU)

We have filmed our second Ethical Unboxing Video: Fitness Trackers for Kids on 26 March 2019, featuring four fitness trackers at different price points.

- Fitbit Ace Kids Activity Tracker, £79.99

<https://www.amazon.co.uk/Fitbit-FB411SRBU-EUCALA-Ace-eletric-blue/dp/B07B4BVL7X/>

- Garmin Vivofit Jr. Daily Activity Tracker for Kids, £79.99 <https://www.amazon.co.uk/Garmin-010-01634-20-Vivofit-Motivator-Activity/dp/B01LW8SVRB/>
- Hangang GPS Tracker for Children, Waterproof Smartwatch Anti-Roaming SOS Calling Child Finder Real Time Tracking, Compatible with Smartphones, £25.88 <https://www.amazon.co.uk/Hangang-Waterproof-Smartwatch-Anti-Roaming-Smartphones/dp/B07CMY8VNC>
- bhdlovely Kids Smart Watch Mobile Cell Phone, Child GPS/LBS Tracker SIM Touch Screen SOS Call Camera Voice Chatting For Boys Girls Birthday Compatible with iOS/Android (Pink-S9), £28.99 <https://www.amazon.co.uk/bhdlovely-Tracker-Chatting-Birthday-Compatible/dp/B07KY9LMVL>



The video is now in the production phase, and will be published on our website once it is ready. Unlike the first video where the presenter (Funda Ustek-Spilda) was unboxing the device and reviewing it from an ethical perspective, we shot the second video in an interview and discussion style. In this video, Funda Ustek-Spilda and Alison Powell both unbox the devices and review them



and ask questions about the ethical questions the products raise. The background research and the script were used as a guidance to the video. Because of its chatty style, the video will be longer than the first one, approximately 15 minutes.

A shorter version of the script is presented below.

### **Script for Unboxing Video 2: Fitness Trackers for Kids**

We are exposed on a daily basis to news of creepy stories about smart objects gathering people's data. But such an unethical practice is often left unaddressed for the sake of technology-led economic-growth.

No one yet knows how to solve the challenges of ensuring ethical data practices in the way new technologies are designed.

In this video series, we are unboxing internet of things devices and reviewing them from an ethical perspective.

With the introduction of the GDPR last year,, important discussions are being held about the security and privacy of emerging technologies, such as the internet of things.

But we also need to broaden our perspective to include ethics and evaluate the impact of these devices in our lives.

In this video, we will be reviewing four fitness trackers for kids. Technologies that target kids should have strong safeguarding policies in place, as the common rules for consent do not apply.

We also see that internet of things devices that target kids are often presented as increasing children's safety, so that parents can track and keep hold of their children at all times.

This means, however, that constant surveillance is presented as a value in itself, and the potential risks and violation of children's right to privacy are not mentioned. And from the parents' point of view, the potential downsides of having the constant ability to monitor your children are not explored either.

We will be unboxing four fitness trackers for kids that are available in the market today. They are at different price points and they have different ranges of functionalities.

We're not going to tell you to buy or not buy any of these devices. But we do want to encourage parents to think about what devices they buy for their children and what the implications of buying those devices are.

Users usually rate products in terms of comfort, ease of use, design and features. We found that ease of use both in terms of kids' understanding and using it without difficulty and parents' setting up the app for the kids to use it were important for consumers. They also mention that the kids fitness trackers help them to move around and be more active. There are a range of functionalities these watches provide.

- Step count
- Sleep tracking
- Heart rate tracking
- Tracking of chores and other pre-set activities
- GPS/LPS tracking
- Camera and microphone
- SOS functionality where the child can call pre-set numbers in case of emergency
- SIM-card functionality (2G)

It is however, increasingly difficult to understand the ethical design principles of these products. They usually do not give information about where the data will be stored, how long it will be stored and who will be able to access it. For watches that provide location-based tracking services, it is usually mentioned that the tracking is not always accurate, yet these are stated only in small print and the initial marketing pages of the products appear as if 100% accuracy with tracking can be achieved.

### **Fitbit Ace – Kids Activity Tracker**

Fitbit Ace is the market leading brand.

It tracks

- Steps and active minutes
- Sleep duration & schedule
- And rewards kids with goal celebrations and & badges on the app.

With a fitbit account, parents can set up a family account and add their kids to it. It comes with an expendable wristband, and replacement bands or bands with different designs can be purchased separately.

The box itself comes with a leaflet that explains Safety Instructions and Limited Warranty of the device. There is also a safety, wear and care leaflet that briefly explains that the wristband needs to be cleaned regularly and warns the parents that prolonged contact with the device might cause skin irritation.

- The device comes with a charging cable, and once the battery runs out, it is also replaceable. In terms of sustainability, these are both positive points for Fitbit Ace.

The leaflet states that device complies with several regulations, including the Federal Communications Commission (FCC) Statement, Industry Canada (IC) Information and Simplified European Union Declaration of Conformity. It would be better if the leaflet explained what these regulations entail in the specificity of this particular device. There is a link given to fitbit's website to read more on the Regulatory and Safety details of the device. They have for instance a dedicated privacy policy page.

<https://www.fitbit.com/uk/legal/privacy-policy>

They explain the types of information they collect, how they store, use and share this information and their policies for children.

Account information contains name, email address, password, date of birth, gender, height, weight, and in some cases yor mobile telephone number. They say, this is the only information necessary to create an account. One may also choose to provide other types of information, such as a profile photo, biography, country information and community username.

When your device syncs with our applications or software, data recorded on your device is transferred from your device to our servers these are:

- Steps and active minutes
- Sleep duration & schedule
- And rewards kids with goal celebrations and & badges on the app.

FitBit has separate privacy policy for children:

#### OUR POLICIES FOR CHILDREN

We appreciate the importance of taking additional measures to protect children's privacy.

Fitbit allows parents to set up accounts for their children to use with select Fitbit devices ("Children's Account"). Children's Accounts are subject to a separate Privacy Policy for Children's Accounts which explains what information we collect to set up these accounts, what information we collect from a child's use of our Services, and how we use and share that information. Parents or guardians must consent to the use of their child's data in accordance with the Privacy Policy for Children's Accounts in order to create such an account.

Persons under the age of 13, or any higher minimum age in the jurisdiction where that person resides, are not permitted to create accounts unless their parent has consented in accordance with applicable law. If we learn that we have collected the personal information of a child under the relevant minimum age without parental consent, we will take steps to delete the information as soon as possible. Parents who believe that their child has submitted personal information to us and would like to have it deleted may contact us at [privacy@fitbit.com](mailto:privacy@fitbit.com).

#### **Garmin Vivofit Jr. Daily Activity Tracker for Kids, £79.99**

- Children's chore and activity tracker to encourage a lifetime of healthy habits. Connectivity-Bluetooth
- Robust, comfortable, stain resistant, secure, swim and bath safe plus 1 year battery life.No recharging needed. Display resolution 64 x 64 pixels
- Regular accommodates wrists up to 145 mm ; Case material: polymer ; Strap material : silicone. The display size is 10 X 10 mm. X-large size fits wrists 146-170 mm
- Parent-controlled app motivates the child with rewards and mobile adventures
- Fitness tracker for children aged 4 to 9 years: records steps, sleep and Summary of child's 60-minute daily get active goal

The only part about the security and safety of the device really is:

"Garmin navigation products are intended to be used only as a travel aid and must not be used for any purpose requiring precise measurement of direction, distance, location or topography. Garmin makes no warranty as to the accuracy and completeness of data."

There is nothing about the security or the privacy of the data, where data is stored, etc.

Garmin's web page for compliance also just lists the regulations they are party of, but does not explain anything with respect to how the data is stored, used and shared. There is no information regarding potential unauthorised accesses to the device, since it works on bluetooth and syncs over a Wi-Fi network.

**Hangang GPS Tracker for Children, Waterproof Smartwatch Anti-Roaming SOS Calling Child Finder Real Time Tracking, Compatible with Smartphones, £25.88**

When you open the box, three leaflets pop out. One of them is a leaflet for contacting Hangang. It is striking that whatsapp numbers of Hangang employees are given in this leaflet, along with their company email addresses. Some reviews online mentioned that they used these whatsapp numbers for setting up the device as they found setting up the SIM tricky.

The second leaflet is a quick installation guide of the watch, and describes how to set up the product and use it.

The third leaflet is to set up the GSM card functionality of the watch. It comes fully loaded with descriptions to setup the GPRS network.

In general, the leaflets had poor English, which made it difficult to understand them at times.

In the box, there is also a charging cable and a screwdriver to open the back.

The watch itself has the following functions:

- Step tracker
- Sleep tracker
- Tracking in real time
- SOS for help - children can press the SOS button to seek help
- Electronic fence: parents can adjust the safety zone, parents get an alert on the app
- Parents can set the time of the class on the application to prevent children playing with the smart watch.
- Voice conversation: Parents can talk to their children through micro chat functionality
- SMS conversation: through the app, parents can send messages to their children.
- No camera.

For the voice conversation and SOS functionalities, a 2G SIM Card for 850/900/1800/1900MHz Sim Card should be purchased separately. The device does not support 3G, 4G.

- It is quite heavy in comparison to others

In comparison to the previous two watches - there is absolutely no information about privacy and security of the device, or the app, or the data that is collected via the app and the watch.

**bhdlovely Kids Smart Watch Mobile Cell Phone, Child GPS/LBS Tracker SIM Touch Screen SOS Call Camera Voice Chatting For Boys Girls Birthday Compatible with iOS/Android (Pink-S9), £28.99**

The fourth and last smartwatch we are reviewing today is bhdlovely kids. In comparison to the previous three watches, it comes with the widest range of functions, including a camera.

- Uses Lithium Polymer batteries
- People say the app is rubbish but the watch works with Find my Kids app
- \*GPS+LBS 2 modes accurate location.
- \*Remote monitoring. Set one phone number for voice care and send the command, and you will instantly receive the call from the watch.
- \*Call & text message contact
- \*Pedometer/sleep rolls count
- \*Camera
- \*Quick learning game
- \*Make friend
- \*No disturbing period
- \*Heart reward
- \*Remote shutdown
- \*Remote photograph
- The whole pack smells of cheap plastic
- Nothing about security and privacy in the leaflet
- Has voice recorder functionality - but not sure where the data is kept
- The creepiest of all the watches we have reviewed today as it lets the parent to 'spy on' their kids either by listening in or turning on the camera to watch what they are up to.
- They can also remotely shut down the device.
- Also allows 'making friends' function on the app, which can be risky, given that it is not clear how these friendships would be formed. Can the kids for instance make friends with complete strangers, or do the friends need to be approved by parents on the app? Will the parents be able to control the conversations children have with their friends on the watch? For these kinds of issues, perhaps a detailed security analysis of the device would be good, before giving them to children.

One thing we can say is that if you think these functionalities are for the safety of the kids, it is important to keep in mind that if you can use it to spy on your children, others can also use it to spy on you and your children.

In general, the more functionalities these wrist watches have, the creepier they get we find.

### Conclusion

- Hyper quantification of everyday life
- Surveillance of kids

Risks parents should consider before buying internet of things devices that target kids.

1. Ease of Unauthorised Access
2. Remote Audio Surveillance
3. Location tracking not always accurate. Other tracking functionalities might not always be accurate too, including step, heart rate count or sleep quality.
4. SOS Compromised
5. Insecure data storage, data retention and share with third parties. There is also lack of information about what happens to data when consumers stop using the device. It is not even clear, once the app accounts are deleted, their data would be deleted from the servers or clouds of the companies.

These devices might look good and children might be interested in having them. Certainly, they are colourful, cute and nice designs. But what they entail in terms of the security and well-being of your child and your home need to be given a further thought.

Our final conclusion is that less is more when it comes to internet of things devices. The less data hungry the devices are, the less risky they are. Yes, this might mean less functionality, but it is important to assess the added risks that come with those functionalities.

Thanks for watching. If you have any questions or comments for us, please leave them below.

There is no information on what happens to the data, even though the watch collects highly sensitive information, such as location tracking, voice messaging, SOS calls and messaging through the watch.

There is also no information regarding the accuracy of the functionalities of the watch, such as sleep tracking, steps count or amount of exercise.

There is also no information about the security of both the watch and the app - for instance, is it possible to spoof location-tracking? Is it possible that the calls might be hacked? What are the precautionary steps to prevent data leaking, hacking or other methods to prevent data being compromised?

## **Future Unboxing Videos**

We are planning a total of 5 unboxing videos, to be published monthly. We are now in the process of planning the third unboxing video which will be about Smart Home Assistants. We will again review different devices at different price points and review them from an ethical perspective.

Unboxing Video II (Kids Activity Trackers)	To be published in April 2019
Unboxing Video III (Smart Assistants)	To be published in May 2019
Unboxing Video IV (TBC)	To be published in June 2019

Unboxing Video V (TBC)	To be published in July 2019
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In addition to Unboxing videos, we are also planning to publish videos from our demos, conference presentations and other public engagements on our YouTube channel.

### **Section 3: Upcoming Public Engagement Events with Developer Communities: Women of Wearables (London) and Virt-EU Panel on Ethics**

Funda Ustek-Spilda (LSE), Alison Powell (LSE) and Javier Ruiz (Open Rights Group) are joining Women of Wearables for a panel on Wearables and Ethics on May 1, 2019 in London. Women of Wearables has a huge global network and has a nearly 5k following on Twitter. The event will be live-tweeted and the Virt-EU team will also follow up on these tweets for wider engagement with the developer communities in London and beyond.

Women of Wearables will also publish a full interview with Funda Ustek-Spilda shortly before the event on their website, which will include pointers to the Virt-EU website and our YouTube channel. Funda Ustek-Spilda has written the event description for this panel, and the panellists shared their biographies with the CEO of Women of Wearables, Marija Butkovic. The invitation link is now published on the group's Eventbrite page: <https://www.eventbrite.com/e/wearables-ethics-tickets-58109203191>

If possible, we are planning to film this event and make a short video for our YouTube channel.



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## Wearables & Ethics

1 May 2019 | 18.00-21.00

MHP Communications, 6 Agar Street, London WC2N 4HN



Funda Ustek-Spilda  
@fundaustek



Alison Powell  
@a\_b\_powell



Kat Hadjimatheou  
@surveillanceethics



Javier Ruiz  
@OpenRightsGroup



Terrie Smith  
@digiseqUK

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ORGANISED BY **WOMEN OF WEARABLES**

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Internet of Things (IoT) is an ever-growing field with more and more products and services being connected to the internet every day. As such, according to a report by Internet Society published in 2015, 100 million IoT devices will be connected to the internet with a global economic impact of \$11 trillion by 2025.

IoT technologies in general, but wearable technologies in particular, have come under substantial scrutiny in the last couple of years due to high-level security and privacy breaches. As a result, they are often presented in media as insecure and highly risky technologies for personal privacy. Moreover, wearable technologies have the potential to blur the boundaries between machine and human, as demonstrated by possibilities of 'upgrading' human skills and capabilities through RFID tags, data mining, enhanced sight and vision through cameras and hearing devices attached to human bodies and other new computing technologies.

With all this in mind, for our May event, we decided to focus on ethics to have a conversation about what kind of ethical visions wearables carry for the future, and how their developers engage and represent those ethical visions in their products. By focusing on the ethical visions of developers, rather than the risks and challenges of the products, we hope to start a new discussion in the field of IoT about how wearables can be done ethically and responsibly. We are bringing together founders, researchers and technologists who will share their stories and views on ethics and wearables, IoT, machine learning, AI, blockchain and everything in between.

Speakers include:

Funda Ustek-Spilda is a postdoctoral researcher at London School of Economics, Department of Media and Communications. She is currently working on a project titled Virt-EU: Values

and Ethics in Innovation for Responsible Technology in Europe which aims to understand how European IoT innovators and developers make ethically consequential decisions in their work. She obtained her D.Phil from the University of Oxford in Sociology (2015) and M.Sc in Comparative Social Policy (2010). She is interested in tech for good, responsible tech and ethics.

Alison Powell is Assistant Professor in Media and Communications at the London School of Economics and Programme Director of the MSc in Data & Society. Her research examines how people's values influence the way technology is built. Alison spends time with two projects: VIRT-EU, a Horizon 2020 project examining ethics in practice among Internet of Things developer communities where she is co-principal investigator, and Understanding Automated Decisions, which explores how to design services to explain how algorithms work, where she is principal investigator. Her book on citizenship in smart cities will be published in early 2020 by Yale University Press.

Dr Kat Hadjimatheou is a moral philosopher and criminologist at the University of Essex. She is currently looking at the ethical implications of policing and security applications of digital tech for the Human Rights Big Data and Technology project, a 5-year interdisciplinary research project funded by the UK's Economic and Social Research Council. Previously, she ran a confidential ethics advisory service for security technology developers, funded by the EU. She sits on a number of police ethics committees in the UK, including for the the National Crime Agency, and ethics and legal advisory boards for EU-funded security technology research projects.

Javier Ruiz leads on policy at the UK based advocacy organisation Open Rights Group. His work covers a broad range of digital rights in areas such as transparency, privacy, state surveillance and intellectual property. Javier is part of the VIRT-EU project, where he is helping create an ethical impact assessment toolkit for IoT designers and developers. He has previously worked as a union organiser, journalist and campaigner building citizen media platforms and supporting the digital activities of campaigning organisations in Europe and Latin America.

Terrie Smith is a creative technologist committed to innovation, delighting customers, and advancing wearable technology. Focused on revolutionising the Wearable and IoT market, she has utilised her expertise in mobile, contactless payments and NFC to create the world's first secure provisioning Platform as a Service (PaaS), DIGISEQ, in 2014, where she serves as Chief Executive Officer. DIGISEQ simplifies the delivery of payment accounts whilst maintaining a high level of security enabling almost anything to support contactless payments, grant access, reward loyalty, and more — unleashing the power of the IoT, all without disruption to existing manufacturing and distribution process.

Many thanks to our sponsors MHP Communications for providing us with the venue, food and refreshments for the evening!

#### Agenda

6.00 - 6.30 - Registration and networking

6.30 - 6.35 - Women of Wearables - 5 minute presentation

6:35 - 6:40 - MHP Communications - 5 min presentation

6.40 - 8.00 - Panel discussion + Q&A

8.00 - 9.00 - Food, refreshments and networking

*\*Be advised that we will be taking photographs at the event, which we will be using in the future to promote Women of Wearables' activities. By registering for the event you are giving Women of Wearables permission to take your picture and post them on our website and social media channels as well as use them in other promotional materials.*