

# Meaningful Futures with Robots—Designing a New Coexistence

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Edited by

Judith Dörrenbächer, Ronda Ringfort-Felner, Robin Neuhaus  
and Marc Hassenzahl

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## Chapter 12

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### Design Fiction—The Future of Robots Needs Imagination

*Ronda Ringfort-Felner, Robin Neuhaus, Judith  
Dörrenbächer and Marc Hassenzahl*

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# Design Fiction—The Future of Robots Needs Imagination

Ronda Ringfort-Felner  
Robin Neuhaus  
Judith Dörrenbächer  
Marc Hassenzahl

*Early on a Wednesday morning in 2045. The mall fills with the first customers and robots. Businesspeople pick up their pre-ordered breakfast from robots. Families settle down in the café, enjoying fresh coffee and croissants, while robots run their errands or play with their kids. A jogger is doing his laps in the rooftop garden, while robots do his weekly grocery shopping. Teenagers hang out in the arcade and giggle at the clothing suggestions sent to them by a robot. The mall offers stores to buy everything imaginable, as well as a variety of opportunities for leisure and recreation. Robots are ubiquitous—high-tech assistants, whose sole purpose is to make the shopping experience as pleasant as possible. Do you notice how the robots get to know the visitors, their clothing size, their likes and dislikes better with each visit? How they flawlessly adapt their behavior to their acquired knowledge? Recently, many of the premium shopping malls have started to cooperate and exchange the data collected by their robots.*

This chapter is about how design can be used to speculate, elaborate, and evaluate potential futures with robots. It is about how we can use design to open up new perspectives, to create spaces for debate, to inspire people's imaginations, to thoroughly explore different futures—the desirable and the undesirable. In this context, the scenario described above is not just a fictional story written to entertain, but the result of a design practice called →[Design Fiction](#). Design Fictions are created by designers and researchers to raise questions about

**Design Fiction** is “part of a group of design practices [called] Speculative Design. Rather than solving problems, these approaches use design to ask questions. They do this by creating prototypes, but instead of making prototypes that will later be put into production, these prototypes are used to encourage people to think critically about issues that the design embodies” (Coulton et al., 2019, p. 9).

how everyday life with certain technologies will and should be, highlighting potential problems and opportunities—long before the technology is mature enough to become a part of our lives.

Certainly, many filmmakers and novelists have already thought about the future with robots. Almost everyone is familiar with various types of robots from novels or movies; mostly they rebel against humans or against being mistreated by humanity, as in *Blade Runner* (Scott, 1982), *I, Robot* (Proyas, 2004) or the popular television series *Westworld* (Nolan & Joy, 2016). Of course, these stories and images shape our perception of what a future with robots might look and feel like. Unfortunately, most of these cinematic depictions are far removed from what is desirable, or what we can expect soon. Hopefully, we will never have to deal with a robot pointing a gun at us in our living room. On the contrary, roboticists are currently working on a technological species which will live with us in our homes like family members (→ p. 78), go shopping with or for us (→ p. 154), work side-by-side with caregivers in nursing homes (→ p. 216), or support therapists in autism therapy (→ p. 58). So far, these robots are most often found in research laboratories, at tech fairs or in highly supervised study settings. But what will happen when they are deployed into the real world? Will we accept them into our families? Will they increase sales, make our lives easier, and positively impact our wellbeing? Or will they lead to lower sales, more conflict, and even social isolation? And are there any ways to mitigate such negative impacts?

**Possible Futures** include preferable futures, but also probable or plausible futures. A possible future makes a link between today’s world and the suggested future world. “A believable series of events that led to the new situation is necessary, even if entirely fictional. This allows viewers to relate the scenario to their own world and to use it as an aid for critical reflection” (Dunne & Raby, 2013, p. 4).

While roboticists think primarily about a robot’s design, its exact configuration and technical implementation, far-reaching social consequences tend to be slightly out of focus. Other researchers, such as ethicists, psychologists or sociologists, discuss the moral and social questions surrounding that technology, but they often do so in a rather general way, far removed from concrete designs and a design’s impact on everyday life.

With this in mind, in April 2021, I (first author), together with Jochen Feitsch from the *University of Applied Sciences of Düsseldorf*, organized a *robot Design Fiction workshop*, where we learned how valuable early speculation about future mundane life with robots can be for robot developers, as well as for laypeople who might live alongside such robots in the future. Together with developers of four robots (*VIVA*, *I-RobEka*, *ERIK*, *KoBo34*), we created four → possible futures based on their ideas of how their robots might be designed and used in the year 2045. We created various Design Fiction artifacts—texts about future scenarios, like the one at the beginning of this chapter, and fictitious product flyers (→ Figs. 1 and 2)—which assume that the imagined technology is already widely used.

We created these artifacts in advance, together with designers, copywriters, and the robot developers, to make the potential futures more graspable.

We then invited the robot developers, as well as researchers and role-players, to our *robot Design Fiction workshop* to speculate on and discuss these possible futures and how we might live in them. During the workshop, participants used the artifacts to immerse themselves in the four different futures and their respective robots, and then discussed their thoughts. By reading through the flyers and future scenarios, a concrete image of each future was gradually formed, becoming more and more detailed through the participants' thoughts and imaginations. Subsequently, the participants were asked to imagine different people whose lives might be affected by the robot in the future. They imagined a wide variety of individuals, ranging from a child, mother, janitor, health insurance representative, tech guru, politician, candy maker, pet, and even the robot itself. The participants were asked to put themselves in the shoes of each fictional character to explore likely emotions, attitudes and opinions, and to imagine fictional everyday experiences of these characters.

In a "future-dialogue," participants discussed with each other from their character's perspective. For example, one researcher became a 7-year-old child who sadly recounted how her brother had stopped playing with her because of the family's social robot. Another participant became a therapist who reported on the consequences of social isolation, but also on the potential for better therapy through access to more data. Someone else spoke from the perspective of a tech guru, enthusiastically seeking to bring the emotion recognition module developed for autistic children to the entire population to help humanity progress to a new level. Through this imagination and role-play, diverse topics, conversations, conflicts, and questions were raised: How must robots be designed to promote social interactions rather than restricting them? Does the incorporation of seemingly positive characteristics, such as conflict avoidance, into a robot's design lead to long-term benefits, or do we need robots which will provide criticism and start debates? The process of discussing futures from different points of view revealed areas of tension, far-reaching ethical and social implications, and ultimately concrete solutions (such as training for social interaction with robots)—themes that are rarely thought about in regular development processes, since roboticists focus on the robot itself and not on the possibilities, social dynamics and potential conflicts initiated by their robots.

You might object that the entire discourse, with all the conflicts and issues that emerged, was only fictional. However, the emerging fictions remained strongly grounded in everyday real life. The participants did not simply make things up, but rather *simulated* futures based on their knowledge about their own everyday practices,

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Fig. 1 Fictional product flyer showing future vision for the social robot VIVA. © University of Siegen, Ubiquitous Design & University of Applied Sciences Düsseldorf



Fig. 2 Fictional product flyer showing future vision for the shopping robot i-RobEka. © University of Siegen, Ubiquitous Design & University of Applied Sciences Düsseldorf

needs, and knowledge of how technology affects particular situations. This led to fictional, yet plausible themes. Of course, none of this represents a prediction about what precisely we can expect in the future. Rather, it is a pre-enactment, a simulation of the possible feelings, reactions and opinions of relevant stakeholders—but nonetheless, one from which we can learn. By evaluating our pre-enactment, we learned about the positive and negative impacts a robot might have on our lives, and identified aspects that might prevent robots from being accepted. If we are aware of these things, we can use this knowledge to actively shape and consciously direct the future through design.

Of course, this is not easy. After all, the whole process of thinking up possible futures and speculating about them requires fantasy, imagination and the will to detach oneself from preconceived concepts. Critical speculation and Design Fiction plays an important part here, providing a frame to do so.

## DESIGN AS A WAY OF SPECULATING

When thinking about design, many people assume it to be mostly about future commercial successes and solving concrete problems relating to form, interaction, or even packaging. We are used to pictures and movies of commercial products that do not yet exist, such as drones for delivering packages, or 3D printers for printing food. Usually, designers focus on the product itself to be commercialized, rather than the potential consequences of its use, or alternative concepts. Nevertheless, design can also be used to critically speculate about a product's impact, and about ideas not primarily intended for market exploitation, but rather concerned with broader questions of how we want to live in the future.

In a society obsessed with fast-paced innovation and practical, problem-solving products, designers and industry understandably feel the need to create market-oriented products. However, this can ultimately cause us to move in circles, as alternative ideas may not seem *practical* enough, or potentially commercially successful enough, for designers to spend time exploring them. We need to carve out a space to explore these ideas to challenge existing expectations about the future, and Speculative Design and Design Fiction are ideal for this.

In fact, → [Speculative Design](#) is a more critically minded design practice that is based on fiction to explore, discuss, and reflect on ideas beyond the market-focused or obviously practical. Speculative Design thrives on imagination and focuses on asking questions rather than providing answers (Dunne and Raby, 2013).

**Speculative Design** is a general term of a design practice that comprises a range of similar design practices such as Critical Design or DesignFiction. "Speculative Design practices have no direct interest in producing a finished article for production, sale or implementation. [They] aim to challenge assumptions, be critical, and stimulate conversations. Design Fiction sits within the taxonomy of Speculative Design" (Lindley et al., 2015, p. 59).

Dunne and Raby (2007) provide an excellent example of Speculative Design in the domain of robots. In their *Technological Dreams Series: No. 1, Robots*, they present thoughts about alternative emotional interactions with household robots. They show four different robots which address human fears created by years of negative portrayals of robots in science fiction. For example, concerns and fears about privacy and data protection are addressed by Robot 3 (→ Fig. 3), which uses retinal scanning technology to decide who can access its data. While in movies iris scanning is always based on a quick glance, here, a long look is required; the robot has to be sure it's you. Robot 4 (→ Fig. 4) is a very needy robot which, although very intelligent, is trapped in an underdeveloped body and is therefore highly dependent on its user. This neediness built into a highly intelligent product allows the user to maintain a sense of control, thus addressing a human fear of losing control to robots. This project offers a new perspective on domestic robots, their form and interactions, and critically asks how we might interact with robotic household members in the future. Dunne and Raby write: "These objects are meant to spark a discussion about how we'd like our robots to relate to us: subservient, intimate, dependent, equal?" (2007) At first glance, the robots appear strange, but in a deliberate way. They create friction, an encouragement to consider the motives of the designers rather than asking what the robot can do in terms of its functionality.

Thus, Speculative Design (including Design Fiction) is not about creating innovations, market successes or improving current products, but about critically discussing how things ought to be in the future. Physical prototypes are developed, not for the purpose of putting them into production, but to provoke discussions, and to make these discussions more real by providing concrete forms, images and situations. Speculative Design poses questions but does not claim to provide answers; rather, the answers might be delivered by those who participate in the process. This, along with the absence of an intention to develop actual marketable products may, in fact, be the most criticized aspect of Speculative Design practices—idle ideas, many questions and a vague method which seems to lack any aim to actually solve anything. In the words of James Auger: "My response to this is that the methodology is not based on short-term solutions but has the purpose of providing a longer-term, more critical approach to technological research and development" (2014, p. 21). By exposing design decisions to the complex rules of daily life before a product actually exists, and by asking the right questions when confronting a broad audience with it, we create the opportunity to inform and redirect technological developments.



**Fig. 3** Anthony Dunne & Fiona Raby, Technological Dreams Series: No. 1, Robots, 2007. Here: Robot 3: Sentinel. © Per Tingleff



**Fig. 4** Anthony Dunne & Fiona Raby, Technological Dreams Series: No. 1, Robots, 2007. Here: Robot 4: Needy One. © Per Tingleff



**Fig. 5** Excerpts from the fictional documentary about a social robot Seyno (2018). Here: A developer explains the (fictional) technical background of Seyno. © Ronda Ringfort-Felner, Valentin Puls



**Fig. 6** Excerpts from the fictional documentary about a social robot Seyno (2018). Here: A traveler shares his (fictional) experiences with Seyno. © Ronda Ringfort-Felner, Valentin Puls



## SPECULATING ABOUT SOCIAL ROBOTS

Think of potential social robots. It is striking that while companies try to sell them, they often lack a clear notion of their specific *meaningfulness*. Some, such as Sony's *Aibo*, just mimic pets. But beyond the fact that real pets cannot be switched off, the additional contribution of an *Aibo* to everyday life remains vague. It seems as if the interest in the technology itself drives purchase (if at all).

In the seminar *Critical Inquiries into Human-Robot-Interaction*, graduate students of Human-Computer Interaction at the *University of Siegen* were asked to speculate about potential roles and functions of future social consumer robots. For example, together with Valentin Puls, I (first author) created a concept for a social robot called *Seyno* (Ringfort-Felner and Puls, 2018). It is supposedly used on high-speed trains by the national railway company of Germany and is tasked with reminding passengers to comply with social and societal norms. *Seyno* confronts passengers with their inappropriate behavior, such as listening to music that is too loud, eating particularly smelly food, or putting their feet up on seats, when other travelers might feel incapable or afraid of addressing such issues. The idea to create a robot for this particular use may seem strange at first, but unlike humans, robots are emotionally invulnerable, have no sense of shame, and are not affected by any emotions when communicating. For a human, such tasks would require rather *supernatural social powers*, but this is not the case for a robot. Valentin Puls and I explored this idea through a fictional documentary (<https://vimeo.com/291653885>), which features different stakeholders, such as a CEO, railroad manager, and various travelers (→ Figs. 5 and 6).

They talk about their imagined experiences with and feelings towards the robot. The robot is not shown in the film (an example of → *Invisible Design*). Instead, we focus on the conceptual idea and how it might impact travel. The work creates a concrete vision of the potential impact of a *meaningful*—in terms of the social, not necessarily in terms of the commercial—robot, without the need to deal with its form and interaction design. At the same time, through the fictional experiences and opinions of the travelers, the work critically examines the extent to which a robot can, or should, actually take over socially unpleasant tasks for humans.

Although exploration of alternative ideas and their implications through Speculative Design and Design Fiction seems valuable, the practice is rarely used in robotics development. While it is often difficult to see how existing social robots make a clear contribution to society, which is why they are not particularly successful, unique, and new ways of using robots often seem strange and superfluous. In the seminar *Critical Inquiry into Human-Robot Interaction*, a number of other interesting concepts emerged, such as a couch potato robot

**Invisible Design** is the mediation of user experience without explicitly depicting the object that generates that experience (Briggs et al., 2009).

sponsored by *Netflix* to make movie watching more social, a robot to support immigrants with acquiring tacit German cultural knowledge, or a robot to help couples who argue a lot. Of course, many of these ideas are questionable. However, they represent valid application scenarios for social robots, making use of the unique possibilities robots offer.

## DESIGN FICTION IN RESEARCH AND PRACTICE

While Speculative Design comprises, or is related to, a number of similar practices, Design Fiction is one that emphasizes a “character of neutrality (as opposed to criticality)” (Lindley et al., 2015, p. 59). Design Fiction possesses a narrative element (Kozubaev et al., 2020) and creates emerging or fictional technologies which are brought into the real world through artifacts, such as videos, posters or quick start guides (Coulton et al., 2017). It puts people at the center (Lindley et al., 2015) and depicts futures where a particular technology is already widely used to help develop an understanding of its potentially far-reaching ethical and societal implications (Coulton et al., 2019; Lindley et al., 2017).

A well-known example of Design Fiction comes from the *Near Future Laboratory*, a team of designers and researchers. They created a fictional *IKEA* catalog that features various imaginary Internet of Things (IoT) products (→ Fig. 7), such as a smart sofa that adjusts its color and pattern depending on the mood of the person sitting on it (→ Fig. 8), dynamic cooking instructions on a countertop (→ Fig. 9), or a shampoo that autonomously re-grows through eco-friendly biogenerating base starter compounds (Near Future Laboratory, 2015). Like all Design Fictions, the catalog is meant to “encourage conversations about the kinds of near futures we’d prefer, even if that requires us to represent near futures we fear” (Near Future Laboratory, 2015). The catalog was deliberately chosen as a compelling way to represent normal, ordinary life in many parts of the world. It combines the practical production of a printed catalog with a variety of microscale scientific, technological, and social fictions expressed through product descriptions, asides, disclaimers or footnotes. Reading through this familiar type of catalog blurs the borders between reality and imagination.

Hearing the term Design Fiction for the first time, you may have thought immediately of → science fiction. In fact, the term was coined by the science fiction author Bruce Sterling, who once mused that he doesn’t write *science* fiction, but *Design* Fiction (Lindley and Sharma, 2014). In his book, *Shaping Things*, Sterling explains: “Design Fiction

**Science Fiction** is an “imaginative fiction based on postulated scientific discoveries or spectacular environmental changes, frequently set in the future or on other planets and involving space or time travel” (Oxford English Dictionary).



Fig. 7 Ikea catalog from the near future featuring various imaginary Internet of Things (IoT) products. © Near Future Laboratory



Fig. 8 Ikea catalog from the near future featuring various imaginary Internet of Things (IoT) products. Here: The NOSTALGI sofa from the future. © Near Future Laboratory



**SMÅKLIG kitchen module**  
29:-/hour

Combine with:  
**DELNING Self-subscribing food storage & pantry**  
99:-/month/family member

**New KRÄFTSKIVA kitchen module** \* 29:-/h/guest



**FOLKLIG kitchen activity/preparation counter**  
1295:-

**New service FOLKLIG kitchen activity/preparation counter 1295:-**

**FOLKLIG kitchen service contract 36:-/month**

(c) InterIkea Systems B.V. 2015

Fig. 9 Ikea catalog from the near future featuring various imaginary Internet of Things (IoT) products. Here: Various kitchen modules and services from the future. © Near Future Laboratory

reads a great deal like science fiction; in fact it would never occur to a normal reader to separate the two” (Sterling, 2005, p. 30). However, a distinguishing factor is the “more practical, more hands-on” character of it (Sterling, 2005, p. 30). Julian Bleecker later transferred the term from literature to → [Design Research](#), boosting its popularity (Bleecker, 2009). Bleecker argues that the connection between design and fiction emerged from a drive to find ways for design to “re-imagine how the world may be in the future” (Bleecker, 2009, p. 15). After working with Julian Bleecker and members of the *Near Future Laboratory*, Sterling proposed what is now the most widely used definition of Design Fiction: “the deliberate use of Diegetic Prototypes to suspend disbelief about change” (Bosch, 2012).

Let’s take a closer look, since this definition may need further clarification. Diegesis, in this case, refers to “the world of the story” (Lindley and Sharma, 2014). A → [Diegetic Prototype](#) is a prototype that exists within, and makes sense in, the world of a particular story (Kirby, 2010). The second part of the definition, *to suspend disbelief about change*, describes the intent of Design Fiction to create a discursive space by suggesting a concrete and → [believable future](#), and thereby ultimately challenging existing expectations and assumptions.

In fact, Diegetic Prototypes are the hallmark distinguishing Design Fiction from other Speculative Design approaches. Diegetic Prototypes pretend to be real as a way of overcoming disbelief in potential change—just like the example of the fictional *IKEA* catalog, or the fictional product flyers in our *robot Design Fiction workshop*. These prototypes can use a range of different media and formats beyond catalogs or flyers; fictional films, advertisements, apps, websites, exhibition objects, job postings, or research papers (Coulton et al., 2017). While the catalog and the flyer are just two artifacts from the future, Coulton and colleagues (2019) use a miscelany of Diegetic Prototypes of different media and forms to create a world. They call their approach → [Design Fiction as World Building](#)—rather than merely creating a single story or artifact, they aim to build an entire coherent world, revealed through the interactions between people and things within that world (Coulton et al., 2017). As a great example, Coulton et al. mention *The Lord of the Rings* (Coulton et al., 2019). J.R.R. Tolkien builds a whole world, populated by characters such as elves, who have their own language, songs and maps. He combines different elements that show how this world is different from (and similar to) ours. The world is coherent and comprehensible to the reader, who can thus access it intuitively. This is exactly what Design Fiction is about, only instead of making Middle-earth accessible and creating a world of fantasy and fictional creatures,

**Design Research** is a research practice that uses design as “a way of inquiring, a way of producing knowing and knowledge” (Downton, 2003).

A **Diegetic Prototype** is a prototype that exists within a fictional world (Coulton et al., 2017). Diegetic Prototypes do not need to exist in reality and must only be consistent with their own diegesis (Lindley et al., 2014).

A **Believable Future** is a future which is described in “believable terms, i.e., in terms that are suitably mundane as to allow the audience to become ‘situated’ in the diegetic reality of the Design Fiction” (Lindley et al., 2014, p. 244).

**Design Fiction as World Building** is a flexible approach to Design Fiction which prototypically represents a future world through different media that show how the imagined world differs from ours. The approach was researched and developed at Imagination Lancaster (Coulton et al., 2019).

Design Fiction deals with an alternative, near-future vision of our own world, in which certain technologies, such as robots, have become prevalent. By creating a believable storyline—even one that is entirely fictional—we establish a connection between today's world and a believable future (Dunne and Raby, 2013). This design practice allows us, even urges us, to let our imaginations run wild, yet also to constrain ourselves according to the rules of the imagined world. Thus, we are allowed to imagine living in a world where for example robots are respected as autonomous beings, yet we need to stay within the bounds of the created world. The believable storyline creates the value of a Design Fiction—an engaging way to think technologies through.

We applied the Coulton and colleagues flexible approach Design Fiction as World Building (2017), on the course *Imaginary Robots* with human-computer interaction students at the *University of Siegen*. The course focused mainly on household robots. One group of students imagined a robot which turns trash into art (→ Fig. 10); another group explored a personal learning robot for children. Each group created a series of artifacts to build the fictional future world, such as fictional posters (for example, → Fig. 10), advertisements, quick start guides, research articles (for example, → Fig. 11), *Twitter* conversations (for example, → Fig. 12), memes (for example, → Fig. 13), news articles, interviews with fictional users, or film clips. Similar to the *IKEA* catalog or the product flyers, all content remained purely fictional, but was integrated in a coherent and logical way, making it easy to become immersed in the fictional world. Each of these artifacts represents an *entry point* into the world, providing access on different levels (Coulton et al., 2019). While artifacts such as an advertisement provide a general impression of the technology without introducing specific details (*zoomed-out* artifacts), other artifacts, such as a quick start guide, reveal more specific aspects, such as concrete functionalities (*zoomed-in* artifacts). While each artifact can stand by itself, it is important that they work together, providing the feeling of being a part of the same world (→ Figs. 10, 11, 12 and 13). By creating such artifacts, the creator is driven to elaborate the world as deeply as possible, and thus to gain a reflective knowledge of both the technology and the world. In this sense, preparing the Design Fiction in itself is already a reflective practice for the designer, since it requires the intimate examination of the technology, its forms and its consequences.

While the creation of each single artifact is valuable in itself, they also serve as further stimuli to initiate critical discourse and, through this, to learn more about the future world created. This, however, requires further research, including interviews or focus groups with people using the Design Fiction to explore reservations and opportunities. This is important in order to ensure that the artifacts created in the Design Fiction process are used rather than gathering dust in

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**Fig. 10** Fictional artifact created by students Florian Grieger and Andrej Pantelejev about their imagined robot BIY, which turns waste into art, as part of the course: Imaginary Robots (2019). Here: A fictional advertising poster. © Florian Grieger, Andrej Pantelejev

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How Waste-Recycling-Robots change our behavior

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Authors: Andrej Pantelejev Universität Siegen, Germany  
Florian Grieger Universität Siegen, Germany

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Because of emerging new technology, recycling of trash has made extensive progress in recent years and became a crucial issue in environmental politics and matters of sustainability. Most household trash recyclers aim at recycling as much trash as possible into new material still leaving an unrecyclable rest. However: the BotItYourself™ Trash Waste Recycling Robot is the first trash recycler that does not leave an unrecyclable rest as it produces pieces of art out of formerly non-recyclable waste. While the environmental impact of the BotItYourself™ robot has already been evaluated positively in former studies, this paper investigates how the use of the BIY™ affects the behavior of throwing away and the reactions that are created towards the objects BIY™ creates. Therefore, an ethnographic study was conducted in ten households into which a BIY™ was introduced. A major result was that users lose sight of the goal of recycling as they tend to deliberately throw away more trash than is not completely recyclable simply at getting new pieces from BIY™. This compromises the concept of recycling. Additional results showed that users start to change their home decor more frequently than before going hand in hand with not having a bad conscience anymore to throw away or give away decoration objects they do not like anymore. This seems to positively affect the self-esteem of users. These outcomes help us to understand how transforming waste changes our thinking and behavior about it.

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**Fig. 11** Fictional artifact created by students Florian Grieger and Andrej Pantelejev about their imagined robot BIY, which turns waste into art, as part of the course: Imaginary Robots (2019). Here: A fictional research paper abstract in the ACM digital library. © Florian Grieger, Andrej Pantelejev



Fig. 13 Fictional artifact created by students Florian Grieger and Andrej Pantelejev about their imagined robot BIY, which turns waste into art, as part of the course: Imaginary Robots (2019). Here: A fictional meme collection. © Florian Grieger, Andrej Pantelejev

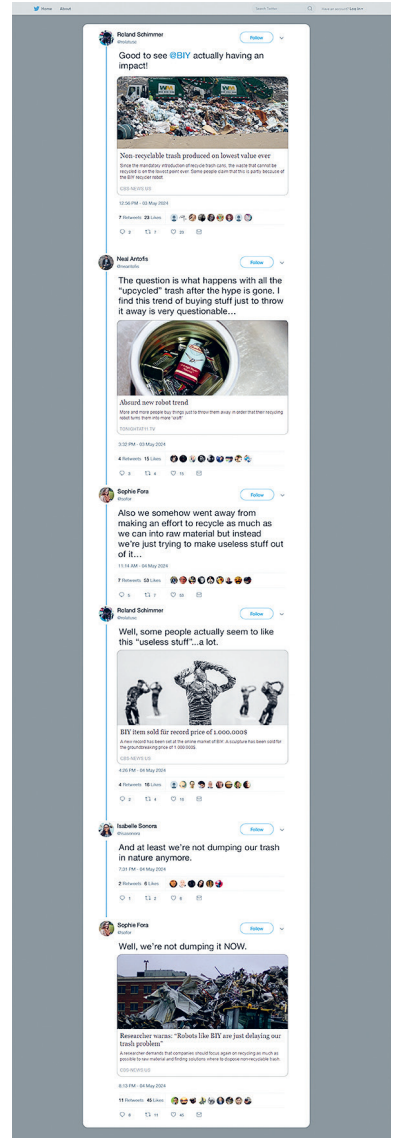


Fig. 12 Fictional artifact created by students Florian Grieger and Andrej Pantelejev about their imagined robot BIY, which turns waste into art, as part of the course: Imaginary Robots (2019). Here: A fictional Twitter conversation. © Florian Grieger, Andrej Pantelejev

exhibitions (Dörrenbächer et al., 2020). It is one thing to understand Design Fiction as the endpoint of a Critical Design practice, and another to think of it as the beginning of a critical dialogue with a wider public.

## THE FUTURE OF ROBOTS NEEDS IMAGINATION

Speculative Design and Design Fiction have the potential to change how we think about what robots are and what roles they could and should play in society. At the moment, robots are mostly solution-oriented and practical—vacuum cleaners, lawn mowers or self-driving cars. However, if we want to change and actively shape the future before it arrives, we need to explore alternatives by considering more than just market success, problem solving and practicality. Design Fiction provides a reflective approach that allows us to do this. Although the future is unpredictable, we should anticipate it by means of design to clarify what should be regarded as desirable or undesirable futures, and which aspects of today's ideas could lead to one or the other. In this way, we can actively shape the future rather than merely respond to arbitrary technological advancements. Neither designers, robot developers nor large corporations alone should determine the future on our behalf. We need an interplay of different stakeholders that come together and discuss what kind of world we want to live in. In this sense, the future needs imagination—the more the better—and Design Fiction is one way to give form to this inventiveness.

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## Uwe Post

is a Software and Game Developer, IT Consultant and Lecturer, as well as the Author of IT reference books and mostly satirical science fiction novels. *Walpar Tonnraffir und der Zeigefinger Gottes* was awarded the *German Science Fiction Prize* in 2011, as well as the *Kurd Laßwitz Prize*. Post lives with his family on the southern edge of the Ruhr area in Germany. [www.uwepost.de](http://www.uwepost.de)