"Stranger Things – Prototyping Inconvenience": A Case Study On Critical Design In Design Education

Figure 1: *Inconvenient forks*, by Sophia Grote and Marjolein Mulder

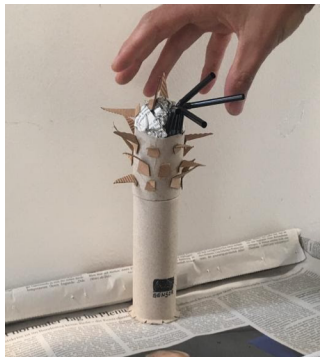

Figure 2: *Inconvenient water tap*, by Daniel Boubet and Hsuan Lee

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Abstract

There is a prevalent obsession in design-oriented disciplines and in the technological industry with comfort, efficiency, smoothness and smartness, which relates to a trend of envisioning super-convenient futures. In this paper, we raise convenience as a topic for inquiry within critical design practice and affirm the importance of questioning the broad implications of "design for convenience" in design research and design education. To this end, we investigate the potential of Inconvenient Design as a discursive and critical approach. By combining prototyping with tactics of critical and speculative design, we build a methodology that aims to push designers beyond their "comfortable human perspective", engaging them to question current practices in design and to think about alternatives. This methodology was the starting point of *"Stranger Things – Prototyping Inconvenience"*, a design course held at the University of Applied Sciences Potsdam. The key insights and reflections from this course are summarized and illustrated through the results of the iterative prototyping sessions as well as the final projects completed by the graduate and undergraduate students.

Author Keywords

Inconvenient design; critical design; prototyping; provocation; design fiction; design methods; research through design; design education.

CSS Concepts

• Human-centered computing~Interaction design~Interaction design process and methods

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Context for Debate: Convenience

For many years, Human-Centered Design (HCD) has been one of the most common approaches in Human-Computer Interaction (HCI). HCD claims a design that is user-friendly, smart and efficient and that offers positive, joyful, seamless and even endless user

Figure 3: *Convenient fork,* by Fabian Gampp and Annika Rauch

Figure 4: *Convenient toothbrush*, by Lennart Franz

experiences. Any friction in everyday life is addressed and smoothed over through interfaces, products or services. We consider the convenient design mindset as one of the *"myths taught at design school"* (in interview with James Auger in [15]). As convenience is strongly tied to the neoliberal innovation-oriented ideal of the tech industry, design students are trained in this comfortable human-centric perspective without any critical inquiry. While convenience in itself is not inherently problematic, it represents a meta-perspective of the world's wicked problems and may hold negative implications at multiple levels: psychological [4], socio-economical and political [9] and ecological [16, 22], among others. To visualize the implications of convenience and to investigate the design opportunities (e.g., design patterns, interaction paradigms) that may reveal from removing convenience as a "constraint" [1], we propose *Inconvenient Design* as a conceptual and methodological framing and as the basis for a didactic concept for design education.

Mapping Inconvenient Design in Discursive and Critical Practice

The inconvenient approach to design strongly builds on current discourses and practices on new forms of critical and speculative inquiries within HCI and interaction design research that address the gray area between "affirmative" and "critical" design [3, 8, 15]. Related work includes the conceptual framings of material speculations [24], research products [17] and the critical artifact methodology [6]; the critical framework of reconstrained design [1] and interaction design research on provocations [2, 18], frictions [13], limitations [19] and discomfort [20].

Case Study: "Stranger Things – Prototyping Inconvenience"

The course *"Stranger Things – Prototyping Inconvenience"* served as a first case study to critically address the convenience ideal in design education. The course was offered in 2019 at the Potsdam University of Applied Sciences as part of the design curricula. A total of 17 graduate and undergraduate students enrolled in the course. The methodology and course were designed and conducted in the context of the joint research project "PROTOTYP", funded by the German Federal Ministry of Education and Research (BMBF), which investigates the roles of prototypes as a medium for crafting, communicating and engaging in discussions on alternative preferable futures. With this, in the course we adopted a double role: lecturers and researchers, and the students acted as co-researchers.

Methodological Approach

Iterative prototyping sessions and the Proto-card

Inconvenient design was applied in the course using an approach that linked theory and practice through prototyping. (Lo-fi) prototyping was utilized throughout the sessions as a practical methodology in short, on-site workshops. We did not use prototyping for the traditional purpose of building preconceived ideas, but rather as an ad-hoc ideation technique in which ideas are created, developed or concretized through direct confrontation with the materials. After prototyping, students documented each prototype with a *"proto-card"*, a log we designed to facilitate self-reflection on the prototyping process. The proto-card was used as a cultural probe [11]. Through this research instrument, students were able to document the designing of each prototype and its use. In total, 78 prototypes were logged by 17 students. This method allowed us to track

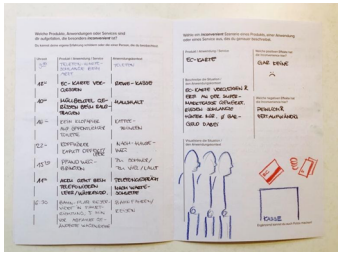

Figure 5: *The In*convenience Diary*

Figure 6: *Money Workout*, by Fabian Gampp, inspired by the In*convenience Diary

Figure 7: *Inconvenient escalator,* by Sophia Grote, inspired by the In*convenience Diary

decisions through the design process and the prototype evolution. The following sections present excerpts from the proto-cards to support our arguments.

*The design of in*convenient everyday things*
The first phase of the course encouraged students to analyze how convenience and inconvenience are experienced in everyday life. On day one, we conducted a kick-off prototyping workshop, in which students crafted both super-convenient and inconvenient reinterpretations of everyday objects. While some students explored convenience and inconvenience by altering aspects of materiality or functionality in objects (Figures 1 and 2), others pushed the boundaries of well-known forms and functions and crafted more radical speculative artifacts (Figures 3 and 4).

A self-ethnography study was also conducted during this first phase of the course. With *the "In*Convenience Diary"* (Figure 5) as a cultural probe, students collected self-observations over two weeks on convenient and inconvenient experiences, not only related to existing designs or technologies, but also to broader situations and interactions in everyday life. Moreover, students were asked to choose one convenient observation from their diaries and prototype inconvenient counter-proposals (Figures 6 and 7).

Design fiction and storymaking
Storymaking helped to bring the designed prototypes closer to everyday life, making them relatable and understandable [5]. Placing prototypes in a story context and turning them into diegetic prototypes [12] pushed students to think beyond constraints, concretize their concepts and sharpen their inquiry. Indeed, students were *"surprised how probable some prototype scenarios have become the more the processes, interactions and journeys contained details"* [proto-card].

Getting out of the utopia-dystopia binary
We designed the *"Speculation Ping-Pong"* method to achieve a balance between the utopia-dystopia binary commonly found in speculative fictions [14, p.85]. The method consists of performing short iterations between utopian and dystopian scenarios, combining convenient and inconvenient perspectives: first, a utopia with a convenient mindset is created. A convenient dystopia that counters key aspects of the previous utopia is then created, and the cycle continues. This process leveraged a shift from a convenient utopia (the trend in mainstream design) towards an inconvenient utopia (to identify positive inconveniences), which enabled students to find a creative balance and create "better worlds".

Counterfunctional speculations
In a speculative workshop inspired by the "counterfunctionality" concept [19], we questioned students about the essential purpose and functionality of their on-going projects. Counterfuncionality in [19] is aimed at designing limitations that counter the essential functions of everyday products (e.g., a photo camera). In our workshop, limitations were also applied to further critical aspects of the students' final projects (e.g., everyday rituals, compulsive shopping, waste disposal). Designing "speculative limitations" pushed the boundaries of feasibility and materiality, resulting in counterfunctional speculations with unusual forms and functions (Figures 8 and 9) and sometimes, akin to speculative designs, with elements of creepiness and dark humor (Figure 10).

Figure 8: *Counterfunctional Dumbphones.* by Julian Broocks

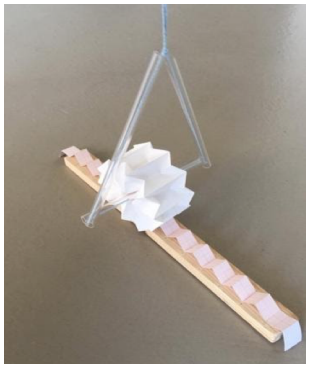

Figure 9: *Counterfunctional Light Dimmer for the Smart/Dumb Home*, by Marjolein Mulder

Figure 10: *Counterfunctional Shopping,* by Hsuan Lee

Final Projects

The 13 final student projects mapped in Figure 11 included speculative scenarios with "inconvenient convenience", near-future scenarios with functional confrontations and functional provocations with "friendly" frictions. Other projects addressed disciplinary meta-topics and used inconvenience to alienate design methods or question the use of design tools. All of the projects, as well as their processes, contained a wide range of physical (e.g., objects, storyboards, role plays) and digital artifacts (e.g., app screens, click-dummies, videos).

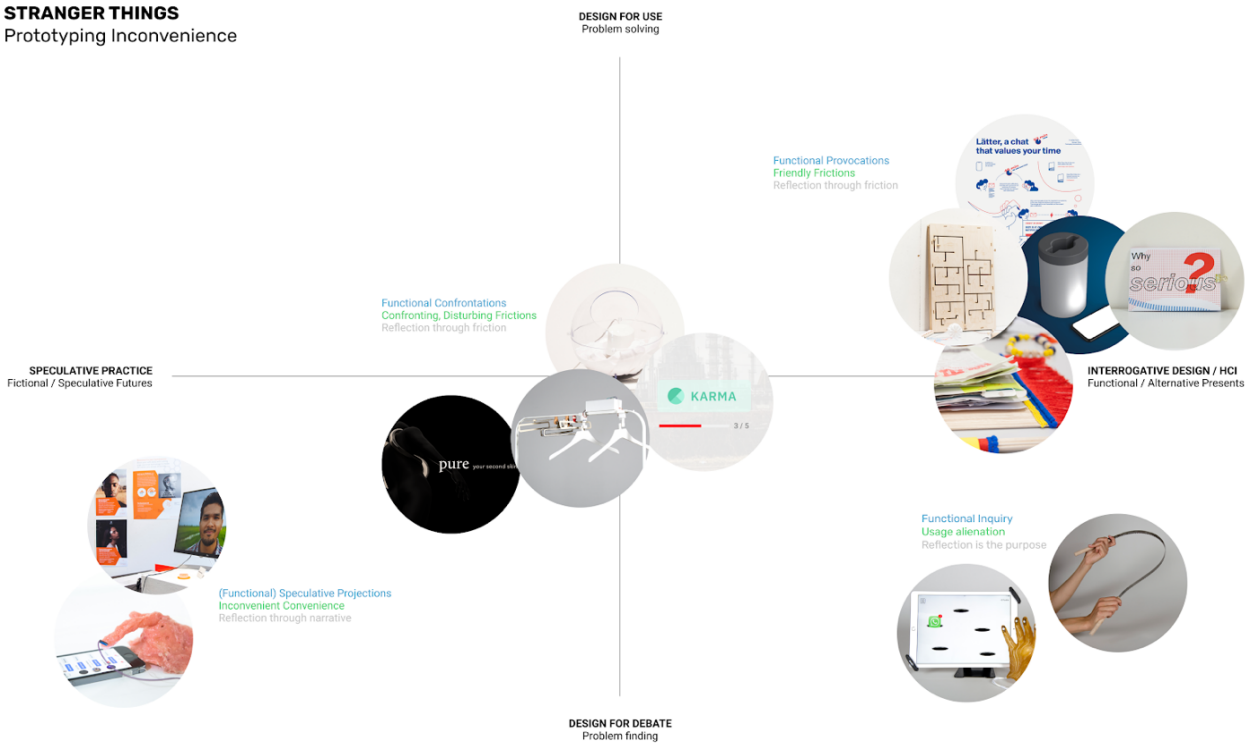

Figure 11: Mapping of the 13 final student projects. “x” axis: Speculative practice vs. interrogative design and HCI; “y” axis: design for use vs. design for debate

The methodological concept of the course leveraged a "shift" from fictional futures to functional alternative presents, from design for debate to discursive design for use. The concept supported the design of *strange* artifacts that, with an embedded criticism, provoke through their use, but also propose design solutions. Two selected student projects, *Lock&Light* and *Karma System*, demonstrate how the different sessions left "inconvenient traces" (highlighted in the respective matrices with yellow bubbles) that ended up in the final artifacts and scenarios (highlighted with a green bubble). The respective design processes are visualized in Figures 12 and 13.

Student project #1: *Lock&Light*

This project by Annika Rauch started with the problem of electrosmog and different dystopian scenarios that resemble the "Faraday Chair" [7] (see sketches on the lower left corner in Figure 12). Through the design process, the project was concretized into the final research product: *Lock&Light*, a lamp that supports digital detox. The lamp only turns on when users lock their smartphones inside of it. The user-lamp interaction integrates designed inconvenience, triggering a personal dilemma [18] (forcing the user to give up the phone). Figure 12 visualizes the shift from fictional problem statement to functional (and still critical) problem-solving.

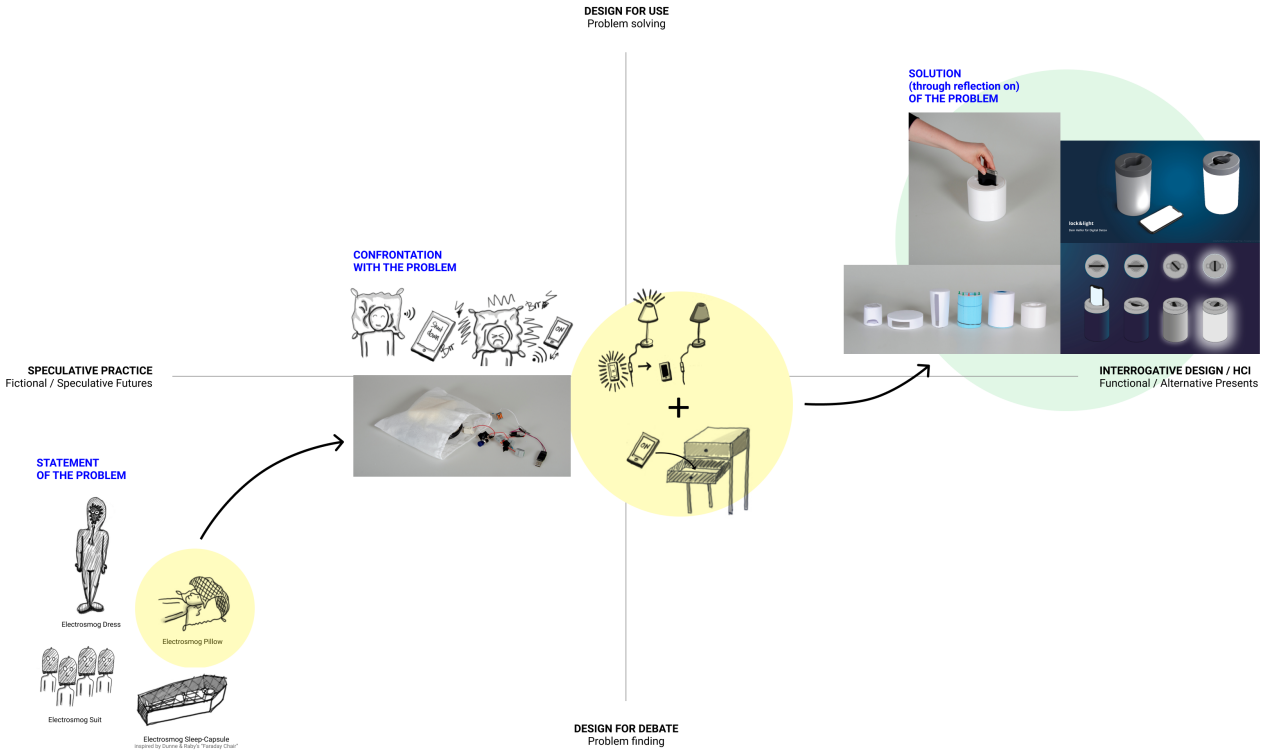

Figure 12: *Lock&Light*, by Annika Rauch

Student project #2:
Karma System

This project started with the problem of (online) consumption and its ties to unfair labor conditions and the environmental crisis. The results from the prototyping and storymaking sessions included elements of dystopian critical speculations (lower left corner in Figure 13), friendly frictions (upper right corner in Figure 13) and numerous experiments on how to disrupt the payment process (middle left side in Figure 13). The final concept is a near-future scenario in which a "parasitic interface", the *Karma System*, is attached to every shopping platform and monitors users' "consumption footprint". Different types of friction are built into the system to make the implications of consumption visible and to punish the "excess of the karmic limits" (e.g., by blurring the users' device screens with smog when their consumption leaves a high CO2 footprint) and with this, encourage consumers to avoid unsustainable or unfair purchases.

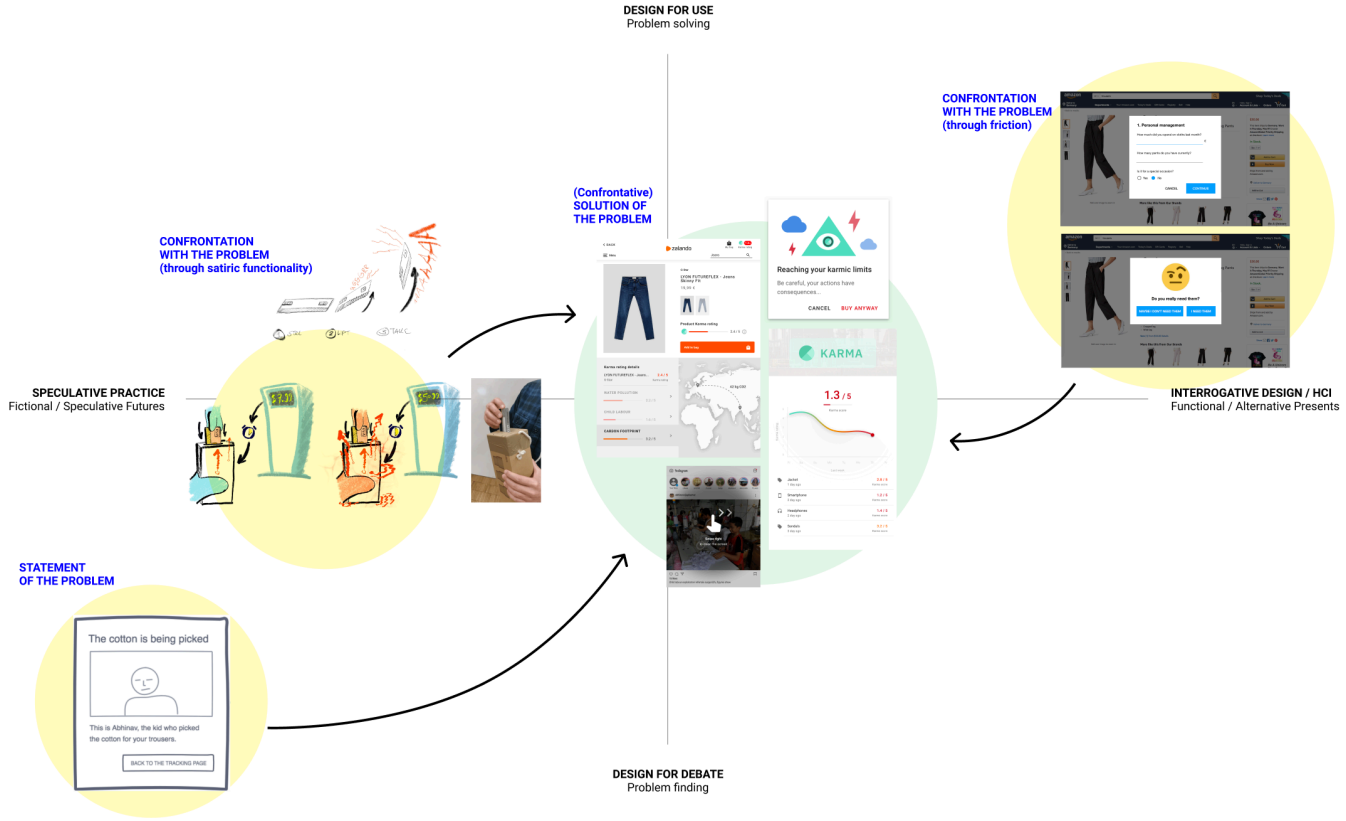

Figure 13: *Karma System.* Final project by Clara Lozano, Lennart Franz and Robin Müller

Reflections and Key Insights

Convenience and inconvenience are in constant interplay

The analysis demonstrates that the products and services that are supposed to make our lives easier and more comfortable also produce uncomfortable results.

This effect also manifests in the reverse direction: when designing inconvenience, students were astonished at how convenient the effects could be from other perspectives: *"the intentionally inconvenient design proposal for the individual user turns out to have a convenient effect on the environment"* [proto-card].

Another student noted, *"we first looked at inconvenience in an ironic way and then realized how inconvenience could have a positive impact on our lives"* [proto-card]. The applied methods helped the students to become aware of this interrelationship.

Discursive prototypes foster discussions on complex topics

The iterations between theory and practice, between making and reflection, provided a dynamic and accessible way to address a complex topic. Students used prototyping to build a common understanding about the course topic through making ideas tangible and touchable. Akin to speculative practice, in which critical artifacts aim to foster discussion, prototyping (through the design process) serves as a discussion opener. Sometimes discussions started by *"people laughing about the irony of the prototype"* [proto-card]. One student observed, *"The prototype raises questions about how it should be used. Hereby it creates an atmosphere of experiment and interchange"* [proto-card].

Prototyping is an irritating practice that supports speculation

Students' confrontations with materials facilitated speculation: *"The prototype opens new conceptual spaces to think outside the box"* [proto-card]. Indeed, experimentation was fostered by the irritating quality of the prototype: *"The prototype creates irritation and plays with expectations. It invites people to play and experiment and ask questions"* [proto-card]. Prototyping cannot be planned in detail; rather, it relies on improvisation that provokes serendipity [10]. Designers must face the friction with the material. Turning abstract, language-based ideas into artifacts is limited, because the material world demonstrates resistance [21]. Nevertheless, this limitation can have positive effects. One student noted, *"Through limitation of the materials I had to leave my comfort zone. I developed ideas that would not have come up with just by imagination. I was inspired by the materials"* [proto-card].

Reflections on combining research and teaching

The potential of combining research and teaching manifests when both the lecturers and students profit. Through the *"Stranger Things – Prototyping Inconvenience"* course, the lecturers and students learned from each other about the prototyping process, how to critically design and the potential of inconvenient design. Cultural probes (the proto-card and the In*convenience Diary) served exactly this purpose: a two-sided inspiration that fosters reflection on a practice [11]. Conducting research on design students, especially conducting research together with them, benefits from the beginner's mindset [23]. Students reflect more and are more conscious about their own actions than experienced designers as they have not internalized routines that are difficult to verbalize.

Conclusions

In this work, we propose convenience as a topic for inquiry within critical design practice and affirm the importance of questioning the broad implications of "design for convenience" in design education. Our course represents a first approximation of an inconvenient approach to design as a counterproposal, described through the conceptual framing, didactic concept and methods. By adopting a research-through-design approach, we conducted –together with the

students– research on inconvenience design through prototyping inconvenient designs. The diversity illustrated by the resulting projects (both the final projects, as well the research prototypes crafted during the process) demonstrates the potential of this approach, both as a critical and speculative practice, and as an interrogative reframing methodology within HCI.

Acknowledgements

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References

[1] James Auger, Julian Hanna, and Enrique Encinas. 2017. Reconstrained Design: Confronting Oblique Design Constraints. Design+ Power. Nordes, Oslo.

[2] Shaowen Bardzell, Jeffrey Bardzell, Jodi Forlizzi, John Zimmerman, and John Antanitis. 2012. Critical design and critical theory: the challenge of designing for provocation. In Proceedings of the Designing Interactive Systems Conference (DIS '12), 288-297. http://doi.acm.org/10.1145/2317956.2318001

[3] Jeffrey Bardzell and Shaowen Bardzell. 2013. What is "critical" about critical design? In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13). Association for Computing Machinery, New York, NY, USA, 3297–3306. DOI:https://doi.org/10.1145/2470654.2466451

[4] Harley Bergroth. 2019. 'You can't really control life': dis/assembling self-knowledge with self-tracking technologies. Distinktion: Journal of Social Theory 20.2, 190-206. https://www.tandfonline.com/doi/abs/10.1080/1600910X.2018.1551809

[5] Julian Bleecker. 2009. Design Fiction: A short essay on design, science, fact and fiction. Near Future Laboratory 29

[6] Simon John Bowen. 2009. A critical artefact methodology: using provocative conceptual designs to foster human-centred innovation. Doktorarbeit. Sheffield Hallam University.

[7] Anthony Dunne. 1999. Hertzian tales: Electronic products, aesthetic experience, and critical design. MIT Press, Cambridge, MA.

[8] Anthony Dunne and Fiona Raby. 2013. Speculative Everything: Design, Fiction, and Social Dreaming. MIT Press.

[9] Martha Albertson Fineman, Titti Mattsson, and Ulrika Andersson, eds. 2016. Privatization, Vulnerability, and Social Responsibility: A Comparative Perspective. Taylor & Francis.

[10] Annika Frye. 2017. Design und Improvisation: Produkte, Prozesse und Methoden. transcript Verlag, Bielefeld.

[11] Bill Gaver, Tony Dunne, and Elena Pacenti. 1999. Design: Cultural Probes. interactions 6, 1 (January 1999), 21–29. DOI:https://doi.org/10.1145/291224.291235

[12] David Kirby. 2010. The future is now: Diegetic prototypes and the role of popular films in generating real-world technological development. Social Studies of Science, 40(1), 41-70.

[13] Matthias Laschke, Sarah Diefenbach, and Marc Hassenzahl. 2015. "Annoying, but in a Nice Way": An Inquiry into the Experience of Frictional Feedback. International Journal of Design. 9, 129-140.

[14] Ursula K. Le Guin. 2017. No Time to Spare: Thinking about what Matters. Houghton Mifflin Harcourt.

[15] Ivica Mitrović and Oleg Šuran. 2016. *Speculative - Post-Design Practice or New Utopia.* Ministry of Culture of the Republic of Croatia & Croatian Designers Association.

[16] Lisa P. Nathan and Nassim Parvin. 2019. A story of paradise: interactive, digitally enhanced, and radioactive. interactions 27, 1 (December 2019), 74–76. DOI:https://doi.org/10.1145/3371283

[17] William Odom, Ron Wakkary, Youn-kyung Lim, Audrey Desjardins, Bart Hengeveld, and Richard Banks. 2016. From Research Prototype to Research Product. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16). Association for Computing Machinery, New York, NY, USA, 2549–2561. DOI:https://doi.org/10.1145/2858036.2858447

[18] Deger Ozkaramanli and Peter M.A. Desmet. 2016. Provocative design for unprovocative designers: Strategies for triggering personal dilemmas. In Proceedings of Design Research Society 50th Anniversary Conference (DRS 2016), 1-16. http://www.drs2016.org/s/165-Ozkaramanli.pdf

[19] James Pierce and Eric Paulos. 2014. Counterfunctional things: exploring possibilities in designing digital limitations. In Proceedings of the 2014 conference on Designing interactive systems (DIS '14). Association for Computing Machinery, New York, NY, USA, 375–384. DOI:https://doi.org/10.1145/2598510.2598522

[20] Dimitrios Raptis, Rikke Hagensby Jensen, Jesper Kjeldskov, and Mikael B. Skov. 2017. Aesthetic, Functional and Conceptual Provocation in Research Through Design. In Proceedings of the 2017 Conference on Designing Interactive Systems (DIS '17). Association for Computing Machinery, New York, NY, USA, 29–41. DOI:https://doi.org/10.1145/3064663.3064739

[21] Ingo Schulz-Schaeffer, and Martin Meister. 2017. Laboratory settings as built anticipations – prototype scenarios as negotiation arenas between the present and imagined futures. Journal of Responsible Innovation.

[22] Eric Schweikardt. 2009. SUSTAINABLY OURS User centered is off center. interactions 16, 3 (May 2009), 12–15. DOI:https://doi.org/10.1145/1516016.1516019

[23] Suzuki Shunryu. 1970. Zen Mind, Beginner's Mind: Informal Talks On Zen Meditation And Practice. Weatherhill.

[24] Ron Wakkary, William Odom, Sabrina Hauser, Garnet Hertz, and Henry Lin. 2015. Material speculation: actual artifacts for critical inquiry. In Proceedings of The Fifth Decennial Aarhus Conference on Critical Alternatives (CA '15). Aarhus University Press, Aarhus N, 97–108. DOI:https://doi.org/10.7146/aahcc.v1i1.2129