Degrowth Journal Volume 3 (2025) Special Issue: Arts 00340
https://doi.org/10.36399/Degrowth.003.02.07

degrowth
JOURNAL

ESSAY

The post-growth potentials of design. How techno-empathy can support a speculative, critical and mindful approach. Insights from the Mindful Design Studio

Dominika Sobolewska [a]

[a] Eugeniusz Geppert Academy of Art & Design in Wrocław, Poland
Email address: dso@asp.wroc.pl, interlab411@gmail.com

Information
Received 23 September 2024
Accepted 31 March 2025
Online 15 October 2025

Keywords
techno-empathy
mindful design
humanized technologies
reflective product concept
ethically provocative design

Abstract
In response to the consequences of unchecked economic growth, this article calls for a redefinition of success within a post-growth framework. It draws on Neri Oxman and John Maeda's advocacy for interdisciplinary collaboration to explore how techno-empathy and design can address societal challenges.

Design, traditionally seen as solving specific problems, is reimagined in the Mindful Design Studio at Wroclaw Academy of Art & Design, emphasizing environmental, social, and ethical considerations. Techno-empathy, which uses technology to foster understanding, guides these projects. Examples include an RFID-equipped closet for conscious clothing management, a *20 seconds* bathroom installation for mindful water use, and *Plant Station*, which deepens plant-owner connections through interactive sound.

These projects address issues like overproduction and thoughtless consumption, encouraging reflection and sustainable attitudes. They also counteract the negative effects of economic growth, such as faster life pace and declining empathy. Citing Professor Richard Wiseman's research, the paper shows how mindful design and techno-empathy promote sustainable lifestyles and healthy social habits, aligning with the "slow life" concept.

The article features the *Light it Up* project, an Alternative Participative Product Concept, evolving from the *Deplastification* initiative by Dominika Sobolewska. This ethically provocative design tackles plastic pollution through a DIY interactive lamp that requires users to collect beach plastic and assemble the lamp from recycled materials. By integrating gamification and mindfulness, *Light it Up* not only engages users in environmental stewardship but also exemplifies post-growth innovation by merging design with ethical considerations to inspire meaningful social and environmental change.

1. Introduction

Throughout the 20th century societal success was largely defined by economic growth. Increased productivity, efficiency, and material accumulation were considered signs of progress and prosperity. However, this growth-driven model has destabilized the environment by increasing production and consumption far beyond the planet's biophysical limits. In parallel, it has accelerated the pace of life itself. These effects are strongly felt in urban environments where the rhythm of daily activities has intensified dramatically. Globally, walking speeds in cities have increased by an average of 10% over the past decade (Wiseman, 2007). This relentless acceleration, often celebrated as a sign of progress and efficiency, has weakened social bonds with detrimental impact on human psycho-physical wellbeing, resulting in heightened stress, exhaustion, and a sense of disconnection. As people rush through their daily routines, the space for genuine human interaction and empathetic connections diminishes. The focus on productivity and time management fosters a culture where empathy is sidelined, leading to a decline in the quality of our social bonds and an overall sense of disconnection. As Ellul (1964) argued in the 1960s, modern technological societies are often driven by an obsession with increasing efficiency and technical solutions, a pursuit that has become detached from reflection and the consideration of alternatives.

This article examines the place of design in advancing a society which focuses on human and planetary wellbeing rather than economic growth. Here I align myself with perspectives in ecological economics which emphasize the need to shift economic thinking toward recognizing ecosystems, energy flows, and material limits (Costanza and Daly, 1987; Daly 2005), and studies that argue that growth and technology do not necessarily solve socio-economic issues and injustices (Kallis, 2018). I also consider how these examples align with the emerging field of post-growth innovation, a field which explores how technological artefacts can promote values, goals, and relations beyond capitalist logics of efficiency, productivity, and profit (Pansera & Fressoli, 2021). I will return to these alignments in my discussion.

In this article I argue that design can lead to a transformation away from technological

determinism towards a conscious approach that recognizes the interconnectedness between technology, humanity, and the environment. I claim that to change the harmful growth-oriented model of "progress," it is essential to intervene in its structures through "mindful design" and the incorporation of empathy into the development of new technologies (Niedderer, 2010). This approach enables the creation of a society where technology not only supports but also safeguards both our social bonds and natural resources, paving the way for a transformation in our patterns of consumption and the possibility of more equitable futures.

I will discuss these issues through different design case studies, looking particularly at speculative and mindful design with participatory elements, explaining the characteristics of each and how they overlap. The examples I present showcase how design, supported by simple technological mechanisms, can not only address responsible development issues, but can also reflect emotions, social moods, and our connection with nature. These projects seek to manifest, critique, educate, and prototype future possibilities, demonstrating how empathetic design can contribute to the goals of post-growth.

2. Design and Techno-Empathy

"Creativity is the power to connect the seemingly unconnected." — William Plomer

Due to present-day social and environmental challenges, artistic and design practices are undergoing a dynamic transformation. Design is evolving from a tool primarily focused on aesthetics and functionality to one that incorporates social and activist dimensions. Designers, artists, and humanists are increasingly involved in developing concerned, pro-environmental, and pro-social solutions for the problems of today, as evidenced by the evolution of terms such as socially engaged design, eco-design, design activism, critical design, mindful design, and speculative design.

This idea builds out from broader discussions about the role of creative and design practices in addressing global issues. This discussion has emerged as a result of a growing awareness within society concerning the problems with "scientific" methods of knowledge production. For example, Ulrich Beck's concept of the risk society argued that scientific knowledge alone

is insufficient to address issues like climate change without integrating social rationality (Beck, 1992; Cf. Funtowicz and Ravetz 1990). This perspective highlights the need for a culture which challenges and complements scientific expertism. Others have argued that literature and art are critical to such a culture. Eco-critic Rob Nixon (2011) has emphasized that the arts often capture the "slow violence" of ecological disasters more effectively than scientific reports and underscores the importance of cultural narratives for conveying the impacts of environmental degradation. We also see this in the work of Amitav Ghosh (2016) who frames the climate crisis as a crisis of culture and imagination. Ghosh suggests that new ways of thinking and envisioning the future are crucial for tackling the root causes of environmental challenges, linking this to the need for innovative and imaginative approaches to problem solving.

Here design can offer many solutions. How can we choose the right tools or artistic languages to achieve tangible results? What role can design play in this process? The role of art and design in addressing global inequalities has gained increasing recognition in the 21st century, as reflected in reports from UNESCO (2019), the World Economic Forum (2020), and initiatives such as Creative Europe (2021) as well as the New European Bauhaus (2021). Major European research organizations including the European Council for Nuclear Research (2022), the Joint Research Centre of the European Commission (2021), the European Cultural Foundation (2022), and ClimART (2023) invite artists and designers to collaborate in tackling global challenges. These collaborations highlight the potential of design to tackle issues of social and environmental justice by integrating aesthetic, technological, and ethical considerations. They are based upon the premise, as Neri Oxman (2016) has argued, that adopting a holistic approach to knowledge creation which integrates science, engineering, design, and art is essential for overcoming disciplinary boundaries, addressing contemporary challenges, and fostering revolutionary change.

In this context, we can observe that digital advancements aimed at confronting global civilizational issues include empathetic elements. I have named this phenomenon techno-empathy, which can be defined as the ability to comprehend, express, or feel compassion towards individuals or groups (even non-human communities) through technology (Sobolewska, 2021a). Proponents of techno-empathy aim to infuse technology

with empathy for the planet and its inhabitants in order to ensure that digital advancements align with social and environmental values. Techno-empathy involves the use of technological tools and platforms to enhance the understanding and sharing of feelings, experiences, and perspectives across physical distances and cultural divides.

It can be seen in existing environmentally oriented strategies which use technological tools for social participation. A prime example is the *Citizen Sensing* project,[1] coordinated by Stichting Waag Society (2018) and recognized at the ARS Electronica festival in 2018. This initiative seeks to empower citizens to actively contribute to positive change by using open-source technology and sensors to monitor and address environmental challenges. This is done using the "Making Sense Toolkit" which includes a sensor kit, software for data collection and analysis, and detailed guidelines to help communities monitor and interpret data on issues such as air quality, noise, and radiation. The Citizen Sensing project integrates art and design through the collaborative involvement of designers and artists in developing these open-source technologies and participatory tools. Creative professionals contribute by crafting sensor designs, interactive platforms, and community-focused applications that prioritize accessibility, aesthetics, and user engagement. Their involvement ensures that the technologies not only function effectively but also resonate emotionally and socially with users, fostering "civic empathy" by connecting communities to environmental issues in an intuitive and empowering way. Here, by promoting practices of care, design cultivates empathy among citizens, both for each other and their environment.

While projects like Citizen Sensing focus on empowering communities with tools to gather and interpret environmental data, other initiatives use immersive technologies to engage with systemic issues. For example, the collaborative project *Gone to Water* by Love Death Design (2024) enables citizens to participate in activist protests thereby advancing their political agendas. This VR immersive documentary explores the impact of urban oil production on community health in Los Angeles, specifically on Tongva Land. By integrating real-time 3D, visual effects, spatialized audio interviews, and multimedia works by local

[1] Funded by the European Commission within the H2020 Call ICT2015 Research and Innovation, specifically under the CAPS "Collective Awareness Platforms for Sustainability and Social Innovation" program.

artists, the project creates a virtual space of protest. Within this virtual space the environmental injustices experienced by Black and Latinx communities living near the city's oil wells are highlighted. In this example, design immerses participants in the lived realities of affected communities, using cutting-edge technology as a tool for witnessing firsthand the struggles of those affected by oil extraction. This enables citizens to gain an embodied understanding of the necessity for a transition away from fossil fuels in order to address systemic environmental racism and its impacts upon the bodies of marginalized communities.

This techno-empathetic approach evokes a deep emotional response, fostering a sense of shared urgency and moral responsibility. This emotional connection transforms passive observers into engaged witnesses, bridging the gap between virtual experience and real-world activism. A similar mechanism for engaging the audience as active witnesses—who, through observation, develop an emotional connection to the subject—can be seen in Sebastian Sobótka's *iPreacher,* (Figure 1). This installation shifts the focus from environmental injustice to the intangible yet equally pressing issue of time consumption. This peculiar piece of work, which refers to contemporary devices such as the iPad and iPhone, explores the theme of time expenditure using robots. One robot laboriously and slowly types the phrase "don't waste your time" while the other erases the message as soon as the first one finishes writing it. This loop mirrors the struggle of Sisyphus in Greek mythology, whose relentless effort to push a boulder up a hill serves as a metaphor for the futility of the ceaseless pursuit of productivity. By fostering empathy for the technology itself, Sobótka's work urges viewers to reflect on the commodification of time and the impact of this accelerated pace on their wellbeing and relationships, reminding us of the trap we fall into when life becomes a race against the clock. As spectators witness this futile exchange, they may begin to empathize with the struggling robot, experiencing a sense of shared frustration. This techno-empathetic response allows them to project their own anxieties about time onto the robotic figures, reinforcing the emotional weight of the piece.

Having introduced the concept of techno-empathy through these examples, the following section explores how this perspective is advanced by other speculative and mindful design practices. These explorations exemplify how design can challenge dominant narratives and

open up space for alternative imaginaries of technological innovation. Rather than reinforcing the traditional link between progress and economic growth, the following projects show how innovation can be oriented toward fostering collective wellbeing, environmental responsibility, and more inclusive forms of technological engagement. This shift not only critiques the extractive logic of conventional, growth-oriented innovation models but also envisions new ways of integrating technology into society—ways that prioritize care, reflection, and long-term sustainability over relentless efficiency.

Figure 1: *iPreacher*.

Note. Installation by Sebastian Sobótka from Mindful Design Studio. Presented during the first edition of the *Empathic Design* exhibition at Czysta Gallery during the Eklektik Session BOXED Festival, 2020. Photograph copyright 2020 by Tomasz Augustyn. Reprinted with permission.

3. Techno-Empathy in Design: Speculative and Mindful Design

Speculative fabulation allows for a new imagining of the relationship between technology and the natural world. Rooted in literary theory and critical technology studies, this concept was introduced into the humanities to explore how various fact-based, scientific, and fictional discourses can intersect and form novel, previously unimagined patterns. As discussed by Shelley Streeby (2018) speculative fabulation (SF) is not merely an extension

of science fiction but a critical tool that challenges the status quo, fosters new ways of thinking, and envisions social transformations through storytelling. Thus, SF can propose scenarios that push the boundaries of what is possible by questioning dominant paradigms and constructing alternative narratives. When SF is applied within creative practices and mindful design[2] it can be a powerful tool for ideating scenarios such as post-growth.

Whereas speculative fabulation operates primarily in the realm of narrative and conceptual inquiry, using storytelling to challenge dominant paradigms and envision alternative futures, speculative design (SD) materializes these ideas through tangible artifacts, prototypes, and installations. Consequently, speculative design can make alternative futures more tangible and engaging. For example, Boston-based researcher Kate Reed uses SD to challenge conventional views of technology and design. Her project, *Beyond Biomimicry* (Reed, 2024), advocates for a shift away from anthropocentric design by reimagining everyday items such as clothing. Instead of merely drawing inspiration from nature, Reed's approach treats nature as an active force shaping these artefacts as if technology and the natural world were in constant dialogue. This perspective, which resonates with the concept of the Legal Rights of Nature (RoN), envisions technology as a space where nature actively participates in the design process in order to foster a deeper biophilic connection between humans and the environment. For example, the 3D-printed structural bra prototype from the *Sea Sprouts* series (Figure 2) is inspired by the way barnacles attach and expand. Reed envisions these organisms growing directly on the human body and explores their potential integration with human-made materials.

[2] Mindful design, in the context of this discussion, is a design approach that combines reflexivity, empathy and context awareness, aiming to create artefacts that support social and environmental wellbeing. At the center of this practice is mindfulness—understood as the ability to be present and aware—and the belief that technology should be used to build relationships: with oneself, with others, and with the environment. In line with Kristina Niedderer's (2010) approach, it refers to the design of products that promote and enhance the user's mindfulness by disrupting their interactions during everyday social activities. The goal is to encourage users to reflect on their behavior and surroundings, which may lead to changes in attitudes and habits.

Figure 2: *Sea Sprouts.*

Note. Sea Sprouts series, part of the *Beyond Biomimicry* collection by Kate Reed. Presented through a live presentation and accompanying video materials by the author at TECHNARTE, Bilbao, 2024. Photograph copyright 2024 by Kate Reed. Reprinted with permission.

By emphasizing nature's agency in design, Reed's work invites us to consider futures in which technological advancements align with ecological priorities. Building on this perspective, the projects and prototypes developed within The Studio for Mindful Design of Interactive Spaces and Objects (hereafter Mindful Design Studio), which I established at the Eugeniusz Geppert Academy of Art & Design in Wroclaw, Poland, in 2018, explore how technology can foster a deeper connection between human and non-human communities. Since then, it has evolved into a collaborative platform where designers, students, researchers, and professionals from diverse disciplines engage in grassroots experimental activities aimed at building a better future (Figure 3).

Mindful design is driven not only by the need to solve functional problems but also by the desire to cultivate mindfulness regarding the social, emotional, and ecological impacts of design. The Mindful Design Studio develops artistic and design tools which guide users into a state of conscious attention to their present experience and reflection. Consequently,

projects encourage mindfulness by transforming interactions into an opportunity for introspection and heightened sensory engagement. This approach aligns with Jon Kabat-Zinn's (1994) concept of mindfulness as a deliberate focus on the here and now.

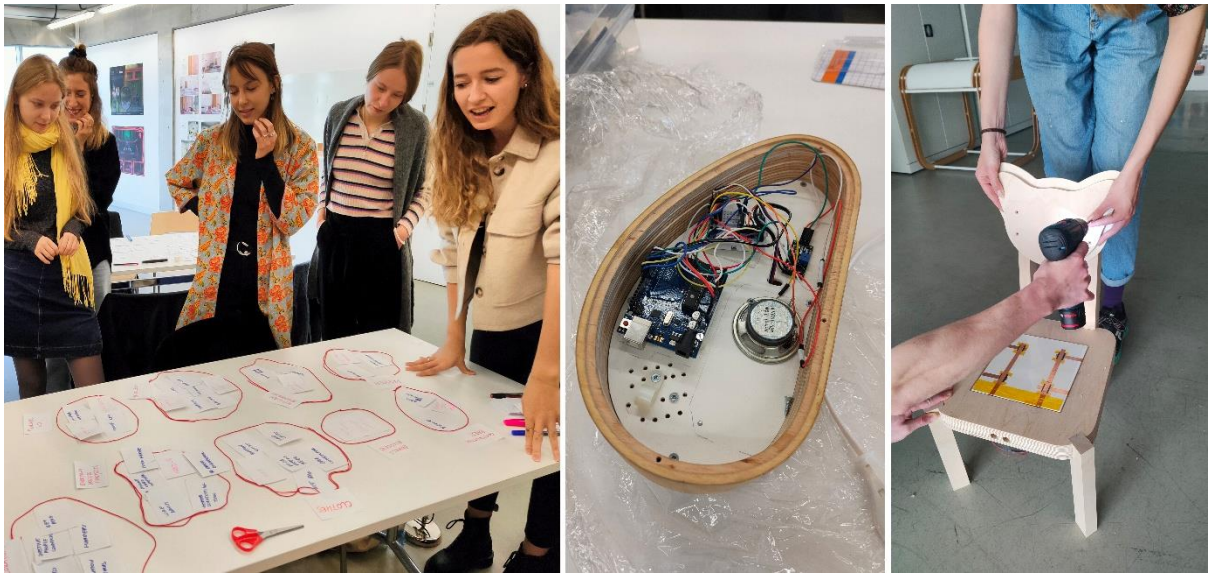

Figure 3.

Note. Students at work at Mindful Design Studio of the Eugeniusz Geppert Academy of Art & Design in Wroclaw, Poland, 2021. Own work.

A key focus at the Mindful Design Studio is the accessibility of tools, enabling even those with no prior programming experience to create and modify functions. The studio fosters a design methodology that goes beyond aesthetics and functionality—aiming instead to cultivate a deeper connection between individuals, their surroundings, and the technologies they engage with. Moreover, Mindful Design Studio shares knowledge, encourages experimentation, and disseminates pro-social and pro-ecological approaches through teaching. This mission is actively promoted through the *Empathic Design* exhibition, where experimental solutions and prototypes are showcased to broad audiences. In this way, the studio creates environments that empower communities through shared learning and collaboration.

These projects also strive to "humanize" technology by making it more empathetic and accessible, ensuring that it responds to social needs and values (Rawsthorn & Maeda, 2007). Here, "humanize" refers to the principles developed by designer John Maeda (2006), who argued in his influential works that technology should not only fulfill utilitarian functions but

also engage users on an emotional and artistic level. Maeda's design philosophy is rooted in simplicity and a clear purpose, which he considered essential for the future of technology. He observed that modern technology had become overly complex and burdened by corporate concerns, diminishing its potential as a tool in service of humanity.

For example, for the flagship exhibition project *Empathic Design or Technological Concern for a Better Tomorrow*, students at the Wrocław Academy of Art and Design engage in a critical analysis of the role of technology in society and develop alternative narratives of progress. This project, conducted year on year, aims to inspire a generation of designers equipped with compassion and critical thinking skills to envision a more sustainable and equitable future. The works are presented to a wider audience as part of the *Empathic Design* exhibition, and thus have the potential to engage broader spectators in imagining, critiquing, and debating these speculative futures and ways of living (Sobolewska, 2021a).

Often, the process of creating these prototypes blends traditional commercial design methods with novel approaches. For example, by borrowing and adapting advertising narratives from the commercial world, the creators surprise users with subtly embedded messages. The professional execution of prototypes, reinforced by equally polished advertising campaigns, is a backdrop for the expression of deeper identities rooted in activism, speculation, criticism, and visionary thinking. The projects created by Mindful Design Studio function as provocative imaginaries—hybrid forms that exist at the intersection of commercial aesthetics, artifacts, and interfaces. These are not conventional products, but rather "anti-products" standing in opposition to the profit-driven offerings of consumerist markets. While they borrow elements from the world of consumer design, their true purpose is to challenge and subvert the principles that drive mass production and consumption. These prototypes encourage users to reconsider their relationship with consumerism and the planet. Over fifty prototypes have been developed over the past five years. I will present some of these here and reflect upon their alignment with post-growth thinking on innovation in my conclusion (Pansera & Fressoli, 2021).

For example, Kaja Onichimowska's *Do Not Wear* (Figure 4) offers a futuristic solution designed to foster sustainable clothing behaviors. This interactive closet prototype

incorporates an integrated RFID reader, which scans tags embedded in garments to track how frequently each item is worn. An intelligent lighting system then alerts users when a piece of clothing has been left unworn for too long. In this way, technology promotes mindfulness by making users aware of their ecological footprint and inviting them to reflect on the environmental consequences of overproduction and waste. Additionally, the prototype stimulates empathy by visually conveying the impact of neglect on our shared environment. *Do Not Wear* not only critiques consumerist practices but also encourages a more responsible, eco-conscious approach to consumption by prompting users to reconsider the social and environmental impacts of their purchasing habits.

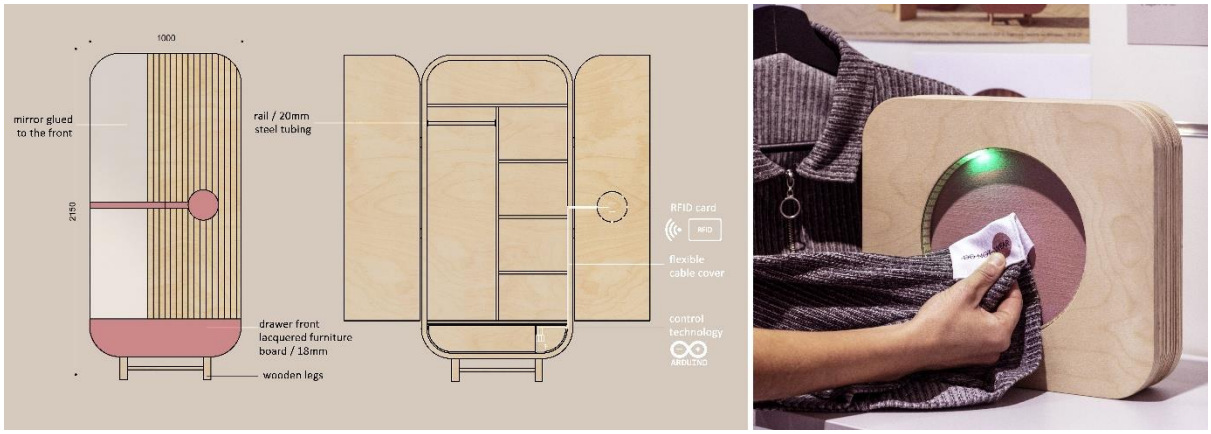

Figure 4: *Do Not Wear.*

Note. The *Do not Wear* project by Kaja Onichimowska. Presented as a prototype-slice of a wardrobe during the first edition of the Empathic Design exhibition at *Czysta Gallery* during the Eklektik Session BOXED Festival, 2020. Photograph copyright 2020 by Tomasz Augustyn. Reprinted with permission.

The flow of water from the tap causes the mirror's edge to light up and its surface to show illuminated cracks after 20 seconds, symbolizing the statistic that every 20 seconds someone dies from lack of access to clean drinking water. Controlled by an Arduino unit and synchronized with a flow meter, this prototype aims to generate empathy for contexts impacted by water scarcity by equivalencing this experience to the visually demonstrated cracks experienced locally by the user. Technology in this project acts as an emotional stimulator, amplifying empathy by creating a direct, emotional connection between the user's action and the global issue, making the user feel the consequences of their water consumption. By drawing attention to the dire reality faced by those without access to clean water, the design fosters empathy for their suffering, urging users to acknowledge their

privilege and reconsider their consumption patterns.[3]

Julia Jeziorna's project *Become Genie* (Figure 5), meanwhile, addresses economic and social disparities through an interactive installation made from an old lamp. The project evokes empathy by contrasting the dreams of individuals in different life situations, using a simple interactive technology to bridge the gap between vastly different experiences. The lamp's hoop, when rubbed, generates voice messages about two categories of dreams. These recordings are the result of the creative invention of the artist, who incorporated interviews with various people into the project. The dreams range from superficial desires, such as "I wish I could spend more time in the Maldives. Two weeks is definitely not enough..." or "I wish I had a new smartphone, this one has terrible specifications," to more profound dreams emerging from challenging life circumstances, like "I wish this war would end and my dad could come home..." or "I wish I could walk again...." This distinction is emphasized by placing the activator for dreams the maker considered more profound on the inside of the rim, and the superficial ones on the outside. The metaphorical approach, reminiscent of Aladdin's magic lamp, underscores the varying nature of people's aspirations based on their socio-economic conditions.

Comparably, *SouLamp* by Magda Matysiak (2022) fosters empathy by encouraging users to embrace and connect with diversity in a fun and meaningful way (Figure 6). The object invites users to play with color as a metaphor for individuality and equality, demonstrating that differences can be a source of fun and connection. The prototype activates when someone approaches, using a camera to match the color of the user's clothing with its light. Through its colorful interactions, the object promotes feelings of being "seen" and the acceptance of diversity.

[3] Agata Grasza, "20", 2024. https://youtu.be/fzqCkS8JcD0?si=aJbg012NppDTlHT2.

Figure 5: *Become Genie.*

Note. Become Genie project by Julia Jeziorna. Testing the prototype, 2021 Mindful Design Studio. Photograph copyright 2021 by Julia Jeziorna. Reprinted with permission.

Figure 6: *SouLamp*.

Note. SouLamp project by Magdalena Matysiak. Testing the prototype in the educational space of Mindful Design Studio, 2022. Photograph copyright 2022 by Magdalena Matysiak. Reprinted with permission.

Similarly, *Balak*, a poetic interactive installation by Patrycja Letniowska (2022), champions the value of unity in diversity. Created as a counterpoint to the tragic events of February 2022, when Russia invaded Ukraine, *Balak* is a deeply reflective piece that fosters dialogue and empathetic relations between geographically close yet historically divided cultures. The installation uses personal family objects to address the integration of Polish and Ukrainian cultures, symbolized through the *Balak* dialect—a linguistic blend spoken in the Lviv region. It features two sentimental objects: a Ukrainian domra and an oil lamp, both used by the artist's grandparents during gatherings with Polish and Ukrainian neighbors. When touched, the objects generate words in the *Balak* dialect, embodying the hope for a harmonious coexistence between these two cultures. By integrating tactile experiences, which provide users with momentary agency, with auditory content delivered through the speaker, the installation invites users to engage with both the personal and shared memories of the author. Through the interactive nature of these technologies—combining users' live gestures and generating simultaneous responses—*Balak* creates a space for personal reflection, empathy, and deeper involvement. With its poetic and interactive design, it highlights the power of shared traditions and languages to bridge divides and inspire the creation of united futures.

These designs provoke reflection on environmental, social, and ethical questions. By blending commercial aesthetics with deeper philosophical questions, the prototypes transcend mere functionality, urging users to rethink their relationship with the objects around them and to question the systems that shape their daily lives. This approach is also seen in projects which interrogate the relationships between humans and other life forms. The Mindful Design Studio also materializes a symbiotic philosophy by creating spaces and objects that reflect the interconnectedness of all life forms and promote empathic relations with nature. These prototypes take an approach we previously explored through Reed's symbiotic collection, *Beyond Biomimicary,* illustrated in Figure 2*,* which is explained more at length in J.W. Moore's (2015) *Capitalism in the Web of Life*. Here, Moore argues that we must reject the anthropocentric view that our environment is a separate entity to be exploited and take a more-than-human perspective that recognizes that humans are not autonomous beings but rather intertwined with the complex networks of relationships that include plants, animals, and entire ecosystems.

For example, *Plant Station* by Marta Kluba (2022) is a modular, interactive sound installation designed to deepen the bond between plants and their owners. The project is based on the hypothesis that sound, perceived as a physical phenomenon (vibration), can stimulate plant growth. By generating music with frequencies tailored to different leaf types, this project encourages people to engage with plants by listening, and thus fosters deeper relationships, awareness, and feelings of responsibility and care. Similarly, her project *Fasola si do* (Figure 7), aims to increase appreciation of plants' needs and their role in our shared ecosystems. The installation works by activating sound when the user gently touches a wire probe near the plant. The sound system, embedded in a wooden cabinet, triggers three pre-recorded violin melodies which are designed to strengthen the user's connection to the plant. The prototype promotes a thoughtful approach to interactions with plants and contains within it a speculative future in which individuals take time to listen to plants and reflect upon their responses.

Figure 7: *Fasola si do*.

Note. Fasola si do project by Marta Kluba. Testing the prototype, 2023 Mindful Design Studio. Photograph copyright 2023 by Karolina Planik. Reprinted with permission.

Joanna Wojtaszek's *Naturophone* (Figure 8) is another example of this integrated approach. Using upcycled materials, she transforms a piece of furniture into a device that rewards silence by playing recordings of nature sounds captured during her field research. By engaging with the system, the user is invited into an interactive scenario where their silence triggers the soothing sounds of nature, fostering a connection based on listening and mutual respect. This encourages relationships grounded in attentiveness, emphasizing the importance of recognizing natural rhythms, rather than human-made ones, as part of everyday life. By giving voice to nature through sound, the project promotes empathy toward the environment and encourages a deeper, more mindful bond with the natural world.

Figure 8: *Naturophone Prototype.*

Note. Naturophone prototype by Joanna Wojtaszek, 2022 Mindful Design Studio. Photograph copyright 2022 by Alicja Wojtaszek. Reprinted with permission.

One final example invites us to consider a tension at play with innovation and design. The prototype *Peace Palm* by Paulina Wozny (Figure 9) encases a palm plant in a capsule. Here, the plant acts as an air purifier, releasing oxygen through photosynthesis. The project critiques rising CO2 emissions, which exacerbate climate change and contribute to respiratory illnesses such as asthma and lung cancer. Equipped with sensors to monitor CO2 levels, the object indicates when the air has been purified, signaling that it is safe for

inhalation by the human. From one perspective, *Peace Palm* urges us to recognize our interconnectedness with the environment by imagining a future where clean air becomes a rare luxury. The prototype confronts us with a potential future in which survival depends on limited resources, forcing us to reflect on the necessary actions to prevent such scenarios from becoming a reality. On the other, the project illustrates how human ingenuity might "out innovate" the challenges we face, potentially ensuring our survival in a world increasingly defined by environmental degradation. This raises a critical question: is the goal of technological innovation merely ensuring our survival while maintaining present behavior, or should we strive to build artefacts which transform our ways of being and foster environmental stewardship?

Figure 9: *Peace Palm Prototype.*

Note. Peace Palm prototype by Paulina Wozny, 2020 Mindful Design Studio. Photograph copyright 2020 by Anna Ogulewicz. Reprinted with permission.

4. Techno-Empathy and Participatory Design

In this final section of my paper, I introduce the potential of participatory design through my own work. We have explored how speculative design aims to forecast futures by creating visionary prototypes that can serve as warnings and sources of inspiration. Critical design is a concept which describes how the making of objects can provoke questions about

consumer mechanisms. Mindful design emphasizes creating with awareness and empathy, fostering a deeper connection between individuals, their surroundings, and the technologies they interact with, which encourages reflection on social, emotional, and ecological impacts.

This final section presents an example which fuses the aforementioned approaches with participatory practices (PP). PP actively involves communities in the design process to create relevant and useful solutions that address real needs and aspirations. This approach enriches the creative process and contributes to building a sense of community and responsibility for the common good.

I am going to discuss the material results of a three-year artistic research project called *Deplastification* (Sobolewska, 2021a) which focused on the critical issue of plastic pollution in the marine environment. The measurable outcomes of this research are artifacts and signposts for reflection, as well as educational tools designed to foster conscious participation in environmental protection efforts and social engagement. *Deplastification* was born out of a need to critically engage with the environmental damage caused by plastic waste in the oceans. My work in this area has been multifaceted, spanning from community-led beach cleanups to interactive installations and design objects that support environmental awareness and empathy.

As part of this project, I conducted participatory processes whilst on artist residencies that brought together local communities and experts to collectively reflect on and combat the growing plastic crisis. Key initiatives included beach cleanup campaigns in Gran Canaria (2021) and Ilhabela (2022), where local communities were actively involved in removing plastic waste from their natural surroundings (Figure 10). During the beach clean-up initiative in Brazil, I worked with my 7-year-old daughter, teachers, and students from Dr. Gabriel Ribiero dos Santos High School, and volunteers from Instituto Baleia Jubarte. Over the course of three weeks, our group systematically cleared plastic waste from the shoreline, transforming what initially seemed like an endless task into a shared ritual of care for the environment.

The culmination of our efforts was the collective creation of a site-specific installation—a powerful, visual manifesto against marine pollution. Together, we arranged the recovered plastic into the word NÃO ("no to plastic"), making a bold statement that resonated deeply with the local community. Each day, more people joined in, reinforcing a sense of solidarity and collective resistance against the environmental threat posed by plastic waste.

Figure 10: *Meditative Plastic Collection Campiagn*.

Note. Summary of the meditative plastic collection campaign with the involvement of artist Dominika Sobolewska and volunteers from Ilhabela (Brazil), 2022. Photograph copyright 2022 by Luca Demarchi. Reprinted with permission.

I have not yet formally enquired into participants' wellbeing during and after these participatory actions, but the feedback I received has been overwhelmingly positive. Citizens expressed a strong sense of collective agency and remained fully engaged in all activities until the very end, as captured in this quote,

> *On a personal level, I experienced a profound sense of calm, as if my mind was aligning with the rhythm of movement—echoing the principles of walking meditation, which emphasizes the peaceful unison of body and mind* (Nguyen Anh-Huong, Thich Nhat Hanh, 2019).

The collective activities were complemented by site-specific installations which engaged the public in discussions about ecological challenges. The physical results were interactive design objects—lamps titled *YOU* and *SOS*, produced in Wrocław (2021/22). Made from

reclaimed wood, 3D-printed parts, and glass tubes filled with plastic waste, these pieces utilize discarded plastic collected with local communities to inspire participatory action such as beach clean-ups. The lamps are interactive and transmit a message to humanity via Morse code—echoing the slogans *YOU* and *SOS* and reflecting environmental manifestos co-created with the local community during these initiatives.

Light It Up (Figure 11) is a new version of the *YOU* prototype, still under development. Designed as a compact DIY lamp, it is intended for educational and workshop activities. Its portability and accessibility make it suitable for younger participants, who can assemble it themselves. The *Light It Up* lamp encourages users to actively engage with environmental issues and reinforces their personal agency by enabling them to re-purpose materials. This process of assemblage is based upon a meditative experience. With the help of the accompanying instructions, users are guided through a "meditation in motion"—a practice of mindfulness that integrates movement with mental focus, and thus encourages individuals to remain present and aware as they perform physical activities. This transforms routine or challenging tasks into opportunities for introspection and connection with the environment.[4]

Further, *The Light it Up* lamp is intended to introduce an element of personalization through an interactive Morse code messaging system. When the user integrates samples of collected meso-plastics into the structure of the lamp, it generates a personalized message in Morse code. This concept incorporates aspects of gamification, transforming the experience into a kind of environmental campaign. Users are not just passive recipients of a product, but active participants in a larger narrative about sustainability. The challenge of collecting plastic waste, filling the glass tubes, and then unlocking the Morse code message reflects a playful yet thought-provoking approach, urging individuals to reflect on their role in environmental stewardship while engaging in a meaningful, meditative process. This gamified interaction is not intended to simply aestheticize waste or legitimize its production

[4] As a person with ADHD, I have found this method to be a therapeutic tool for improving focus and fostering a sense of calm. I believe it holds the potential to serve as an effective intervention for individuals with similar neurodivergent conditions, offering not only a creative outlet but also a meaningful way to engage with both oneself and the environment.

under the guise of a circular economy. Instead, it serves as a critical intervention that fosters behaviors and values in others, specifically introspection, communal responsibility and action. As we navigate the complexities of climate crises and technological advancements, *Light it Up* asks: how will we choose to live and act, and what legacy will we leave for the generations to come?[5]

Figure 11: *You Lamp*.

Note. A symbolic photo of the *YOU Lamp,* prototype made by Dominika Sobolewska, 2022 Mindful Design Studio. Photograph copyright 2022 by Karolina Planik. Reprinted with permission.

5. Conclusions: Tying Design to Postgrowth Thinking

This article has presented examples of various types of design practice, particularly speculative, mindful, and participatory design. In my conclusion I will now consider these examples in light of relevant literature on post-growth innovation, particularly Pansera and Fressoli's approach in *Innovation without Growth: Frameworks for Understanding Technological Change in a Post-Growth Era* (2021).

[5] In its initial, prototype version, YOU Lamp has been showcased at international conferences such as Technarte 2024 in Bilbao, the European Society for Ecological Economics in Pontevedra 2024, and the New Media Art Conference at the CICA Museum in South Korea 2024. At the CICA New Media Art Conference the lamp became a symbolic centerpiece, appearing on the main poster promoting the conference as well as on the cover of the event catalog.

Here the authors argue that innovation, when driven solely by growth imperatives, often exacerbates inequalities by prioritizing profit over social and environmental wellbeing. Typically, design produces commercial products. It is clear that the Mindful Design Studio prototypes are provocative in this regard—these hybrid forms exist at the intersection of commercial aesthetics, artifacts, and interfaces. I position them as "anti-products" which use technology as a tool for inspiring empathy and understanding across socio-economic divides. Rather than viewing innovation solely as a driver of economic expansion, this work promotes alternative socio-technical imaginaries (Jasanoff & Kim, 2015), blending aesthetic innovation with critical inquiry to open up new possibilities for reimagining technology's role in society. Mindful and speculative projects perform a dual role of questioning and imagining, and thus not only interrogate existing systems, but also envision how human ingenuity might navigate or transcend contemporary obstacles.

The approaches presented in this paper could be considered post-growth because they align with thinking in Pansera and Fressoli (2021) who, responding to work by Schumpeter (1934), Illich (1973), and the Appropriate Technology Movement, developed a matrix for interrogating whether forms of innovation challenge capitalist logics and are therefore post-growth. This matrix examined relatedness (*What does it bring about between people?),* access (*Who can produce/use it? Where and how?)*, adaptability, biointeraction (*Does it interact with living organisms*), and appropriateness (*What is the relationship between the input and output considering the context?*). The authors emphasize the importance of grassroots initiatives, bottom-up initiatives, DIY cultures, and open-source communities for challenging conventional knowledge commodification and bringing about innovation aligned with post-growth thinking.

The prototype artefacts, or "innovations", produced by the Mindful Design Studio can be considered in such a way. The approach of Mindful Design Studio aligns closely with Illich's (1973) concept of "convivial tools", particularly through "relatedness" and "appropriateness". Relatedness means technology should encourage active, direct interactions between humans and their environment, helping individuals understand their role within the ecological cycle. The projects at the studio go beyond utility, inviting participants to deepen their connections with the world around them, fostering ethical

values and empathic relationships with both people and nature.

The studio also prioritizes accessibility, teaching students with no prior programming experience to design interactive technologies. This democratizes the technological experience, empowering people to create and adapt technologies. In addition, the prototypes realized as part of the *Deplastification* initiative, use upcycled and local materials, and thereby cater to different user needs and available resources, much like convivial tools that support various scales and ownership models. This aligns with the notion of grassroots innovation, where small-scale, localized interventions can challenge the prevailing mass-production model and inspire broader societal change. As noted by scholars like Feola and Nunes (2014) and Seyfang and Haxeltine (2012), grassroots initiatives often serve as catalysts for environmental and social sustainability, offering a more humane and localized alternative to mainstream consumer culture. Similarly, the Mindful Design Studio prototypes are speculative objects which could intervene in and even replace models of mass production and excessive consumption.

Furthermore, the studio emphasizes bio-interaction, promoting sustainability by using upcycled materials and contributing positively to ecological systems. Appropriateness is evident in the consideration of local knowledge, values, and the time needed for social engagement, balancing efficiency with community-building. These synergies reflect how Illich's (1973) principles of convivial technology are embodied by the studio's projects, which create tools that are accessible, adaptable, ecologically integrated, and foster relationships rooted in care and respect.

Moreover, parallels can be drawn between the concept of vitality-oriented economics, as discussed by Pansera and Fressoli (2021), and the design practices fostered at Mindful Design Studio. While Pansera and Fressoli focus on how alternative, bottom-up initiatives challenge the hegemonic, growth-oriented dynamics of mainstream capitalism—proposing a reorientation towards "vitality oriented" pathways that prioritize diversity and social wellbeing (Gibson-Graham, 2006)—the Mindful Design Studio initiative similarly embraces a "unity in diversity" approach. We emphasize inclusivity, ecological responsibility, and participatory process which value community and wellbeing over the pursuit of relentless

growth. This convergence of values and strategies reinforces the potential of design to offer transformative alternatives to traditional development models.

Crucially, mindful design and the concept of techno-empathy illustrate the potential of design to foster empathic relationships between humans and natural beings while simultaneously critiquing and transforming consumerist culture. I see these techno-empathic design practices as forms of innovation which are decoupled from growth and reoriented toward fostering collective wellbeing, environmental responsibility, and more inclusive technological engagement. Here, the discourse on development, agency, and autonomy is positioned beyond the imperatives of large-scale technological systems and industrial efficiency. Instead of reinforcing passive consumerism, these approaches envision innovation as a catalyst for participatory, ethical, and context-sensitive transformations. Moreover, by operating within creative practices at the intersection of design and visual arts, this approach uniquely blends aesthetic innovation with critical inquiry, opening up new possibilities for reimagining technology's role in society.

By incorporating techno-empathy into the design process, these projects introduce alternatives that challenge the idea of a singular, predetermined trajectory of technological progress. Instead of reinforcing the notion that technological development follows an unavoidable, linear path, these solutions encourage the exploration of diverse, context-sensitive possibilities. This approach aligns with the post-growth potential of design to challenge mainstream ideas of traditional development policies. Techno-empathic design questions the societal, cultural, and economic conditions that shape technology, revealing the potential for multiple, coexisting paths of innovation. Through this approach, Mindful Design Studio disrupts the narrative of technological determinism and opens the door to futures that prioritize sustainability, inclusivity, and collective wellbeing, while emphasizing the role of human agency in shaping the direction of technological change. In doing so, we challenge the illusion that technology's evolution is inevitable and invite a more reflective, participatory approach to innovation.

However, this vision is not without its tensions. The context and scale of implementation must be carefully considered. If such products were to be produced on a large scale, there

is a risk that their original purpose—provoking meaningful change—could be overshadowed, potentially contributing to further environmental degradation. Transforming the consequences of overproduction into more products might be perceived, by some, as justifying waste rather than addressing it. Thus, a niche context is proposed for these artifacts. Speculative fabulation is not a tool of mass culture but rather a product of smaller, localized interventions.

This approach mirrors the DIY culture of the makers' movement, which thrives in alternative, experimental spaces rather than through industrial-scale production (Honey and Kanter, 2012; The Economist, 2011). Cultural changes often originate from grassroots, small-scale initiatives that gradually influence the mainstream, catalyzing broader transformations. Objects such as the DIY lamp *Light It Up* find their place in these non-market-based contexts: museums, galleries, and institutions promoting conscious education. Treated as items that support ecological actions and social participation, they can gradually inspire a wider audience.

A small-scale yet thoughtfully planned production, combined with educational and promotional initiatives, is prioritized. Workshops involving DIY creations—such as kaleidoscopes or lamps made from collected plastic—offer opportunities for reflective engagement, particularly among children or neurodiverse individuals. These activities exemplify the low-cost innovation niches explored by Von Hippel (2005), where user-led creations contribute to both social awareness and environmental change, supporting the transition toward a more sustainable future.

By fostering a creative process that emphasizes participation, sustainability, and relational wellbeing, design can challenge the inevitability of destructive progress and open the door to more responsible, constructive forms of innovation.

Conflict of interest

The author has no conflict of interest to disclose.

Funding

The author did not receive any funding for this research.

Acknowledgements

A huge thank you to everyone who contributes to the Mindful Design Lab community by dedicating a lot of energy and effort to building alternative counter-growth prototypes. Special thanks to my daughter Mira, who participated willingly in all *Deplastification's* participatory activities.

References

Beck, U. (1992). *Risk society: Towards a new modernity*. Sage Publications.

CERN. (2022). *CERN and art: Collaborations for global challenges*. European Organization for Nuclear Research.

CICA Museum. (2024). *CICA New Media Art Conference 2024*. https://cicamuseum.com/nmaconference/ [Accessed 18 September 2024].

ClimART. (2023). *ClimART: Art and design for climate action*. ClimART Initiative.

Costanza, R., & Daly, H. E. (1987). Toward an ecological economics. *Ecological Modelling, 38*(1), 1–7. https://doi.org/10.1016/0304-3800(87)90088-2

Creative Europe. (2021). *Creative Europe Programme: Supporting art and design for global challenges*. European Commission.

Cross, N. (2020). *Design thinking: Understanding how designers think and work*. Berg.

D'Alisa, G., Demaria, F., & Kallis, G. (Eds.). (2014). *Degrowth: A vocabulary for a new era*. Routledge. https://doi.org/10.4324/9780203075067

Daly, H. E. (2005). Economics in a full world. *Scientific American, 293*(3), 100–107. https://doi.org/10.1038/scientificamerican0905-100

Ellul, J. (1964) The Technological Society. New York: Vintage

European Cultural Foundation. (2022). *The role of culture in sustainable development*. European Cultural Foundation.

Feola, G., & Nunes, R. (2014). Success and failure of grassroots innovations for addressing climate change: The case of the Transition Movement. *Global Environmental Change*, *24*(1), 232–250. https://doi.org/10.1016/j.gloenvcha.2013.11.011

Funtowicz, Silvio, and Jerry Ravetz. "Post-Normal Science: A New Science for New Times." *Scientific European*, October 1990.

Ghosh, A. (2016). *The great derangement: Climate change and the unthinkable*. University of Chicago Press.

Gibson-Graham, J. K. (2006) *Postcapitalist Politics*. Minneapolis, MN: University of Minnesota Press.

Grasza, A. (2021). 20 seconds. In Sobolewska, D. (Ed.), *Signs of empathy in contemporary design*. Akademia Sztuk Pięknych im. Eugeniusza Gepperta we Wrocławiu. https://youtu.be/fzqCkS8JcD0 [Accessed 18

September 2024]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobótka, Patrycja Mastej.

Honey, M., & Kanter, D. E. (2012). *Design-make-play: Growing the next generation of science innovators*. New York, NY: New York Hall of Science.

Illich, I. (1973) Tools for Conviviality. New York: Harper & Row.

Jasanoff, S., & Kim, S.-H. (2015). *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*. University of Chicago Press.

Jeziorna, J. (2022). *Become Genie* [Interactive installation]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobótka, Aleksandra Sitek.

Joint Research Centre. (2021). Science and art: Collaborations for policy and society. European Commission Joint Research Centre.

Kabat-Zinn, J. (1994). *Wherever You Go, There You Are: Mindfulness Meditation in Everyday Life*. Hyperion.

Kallis, G. (2018). *Degrowth*. Agenda Publishing.

Kluba, M. (2021). *Fasola Si Do* [Interactive prototype]. https://youtu.be/4132arFm4Rs [Accessed 18 September 2024]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobotka, Patrycja Mastej, Ivan Juarez.

Kluba, M. (2022). *Plant Station* [Interactive prototype]. https://youtu.be/bewXa59rqDw [Accessed 18 September 2024]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobótka, Patrycja Mastej, Ivan Juarez.

Kordeusz, G. (2024). *SpottedPlants* [Online video]. https://youtu.be/3nGonLKPqrw [Accessed 18 September 2024]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobótka, Aleksandra Sitek, Mateusz Rukowicz.

Letniowska, P. (2022). *Balak* [Interactive installation]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobótka, Ivan Juarez, Aleksandra Sitek.

Love Death Design. (n.d.). *Gone to water*. https://www.lovedeathdesign.com/ [Accessed 18 September 2024].

Maeda, J. (2006). The Laws of Simplicity. MIT Press.

Matysiak, M. (2022). *SouLamp* [Interactive prototype]. https://youtu.be/UuQhjFGRYTk [Accessed 18 September 2024]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobótka, Aleksandra Biegańska, Michał Majewski.

Mindful Design Studio. (n.d.). *About*. https://empathicdesign.eu/about/ [Accessed 18 September 2024].

Moore, J. W. (2015). *Capitalism in the web of life: Ecology and the accumulation of capital*. Verso.

New European Bauhaus. (2021). *New European Bauhaus: Design for a sustainable future*. European Commission.

Nguyen Anh-Huong, T. N. (2019). *Walking Meditation: Easy Steps to Mindfulness*. Parallax Press.

Niedderer, K. (2010). Designing mindful interaction: The category of performative object. *Design Issues, 26*(2), 3–12. https://doi.org/10.1162/DESI_a_00095

Nixon, R. (2011). *Slow violence and the environmentalism of the poor*. Harvard University Press.

Onichimowska, K. (2020). *Do Not Wear* [Interactive prototype]. Research and design team from Mindful Design

Studio: Dominika Sobolewska, Sebastian Sobótka, Patrycja Mastej.

Oxman, N. (2016). Age of entanglement. *Journal of Design and Science*. https://doi.org/10.21428/7e0583ad

Pansera, M., & Fressoli, M. (2021). Innovation without Growth: Frameworks for Understanding Technological Change in a Post-Growth Era. *Organization* 28 (3), 380–404. https://doi.org/10.1177/1350508420973631.

Rawsthorn, A., & Maeda, J. (2007). Rethinking technology and the digital revolution. *New York Times*. https://www.nytimes.com/2007/05/04/style/04iht-design7.1.5567585.html [Accessed 18 September 2024].

Reed, K. (n.d.). *Beyond biomimicry*. https://www.biomimetic.io/ [Accessed 18 September 2024].

Schumpeter, J. A. (1934) *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit,Interest, and the Business Cycle*. Cambridge, MA: Transaction Publishers.

Seyfang, G., & Haxeltine, A. (2012). Growing grassroots innovations: Exploring the role of community-based initiatives in governing sustainable energy transitions. *Environment and Planning C: Government and Policy*, *30*(3), 381–400. https://doi.org/10.1068/c10222

Sobótka, S. (n.d.). *Ipreacher* [Interactive installation]. https://youtu.be/Dv1yV6IV4xU [Accessed 18 September 2024]. Mindful Design Studio.

Sobolewska, D. (n.d.) *Empathic Design or Technological Concern for a Better Tomorrow* [Exhibition]. Wrocław Academy of Art & Design. https://empathicdesign.eu/ [Accessed 18 September 2024]. Curated by Dominika Sobolewska. Research and design team: Dominika Sobolewska, Sebastian Sobótka, Aleksandra Sitek, Patrycja Mastej, Aleksandra Biegańska, Michał Majewski, Ivan Juarez, Foteini Kolaiti.

Sobolewska, D. (Ed.). (2021a). *Signs of empathy in contemporary design*. Akademia Sztuk Pięknych im. Eugeniusza Gepperta we Wrocławiu. https://www.academia.edu/73751283/Signs_of_Empathy_in_Contemporary_Design [Accessed 18 September 2024].

Sobolewska, D. (2021b). *YOU* [Interactive prototype]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobótka.

Sobolewska, D. (2022). *Techno-empathy in design as an expression of concern for a better tomorrow*. Powidoki. Akademia Sztuk Pięknych im. Strzemińskiego w Łodzi.

Sobolewska, D. (2024). *Deplastification* [Online video]. https://youtu.be/5IcDXZUG9WI [Accessed 18 September 2024].

Stichting Waag Society. (2018). *Citizen sensing* [Project]. ARS Electronica Festival. Funded by the EU's CAPS Program.

Streeby, S. (2018). *Imagining the future of climate change*. University of California Press.

UNESCO. (2019). *The role of art and design in addressing global inequalities*. United Nations Educational, Scientific and Cultural Organization.

Von Hippel, E. (2005) *Democratizing innovation*. Cambridge, MA: The MIT Press.

Wiseman, R. (2007). *The pace of life*. http://www.richardwiseman.com/quirkology/pace_home.htm [Accessed 18 September 2024].

Wojtaszek, J. (2024). *Naturophone* [Interactive prototype]. https://youtu.be/4yhwVnGoPOE [Accessed 18

September 2024]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobótka, Ivan Juarez, Michał Majewski, Aleksandra Biegańska.

World Economic Forum. (2020). *Shaping the future of the creative economy*. World Economic Forum.

Wozny, P. (2020). *Peace Palm* [Interactive prototype]. Research and design team from Mindful Design Studio: Dominika Sobolewska, Sebastian Sobótka, Patrycja Mastej.

Ziegler, A. (2019). *Mindful design: What it means and how to achieve it*. EPAM San Francisco. https://medium.com/epam-san-francisco/mindful-design-what-it-means-and-how-to-achieve-it-43fa62f269bd [Accessed 14 December 2023].

Image credits

Image 1. Sobótka, S. 2020. *iPreacher* installation from Mindful Design Lab, presented at Empathic Design exhibition, Czysta Gallery, Eklektik Session BOXED Festival [Photo]. Mindful Design Lab. CC BY-NC-SA 4.0.

Image 2. Reed, K. 2024. *Sea Sprouts* series, part of the *Beyond Biomimicry* collection, presented at TECHNARTE, Bilbao [Photo]. Courtesy of the artist. CC BY-NC-SA 4.0.

Image 3. Sobolewska, D. 2021. Students at work at Mindful Design Studio of the Eugeniusz Geppert Academy of Art & Design in Wrocław, Poland [Photo]. Mindful Design Studio. CC BY-NC-SA 4.0.

Image 4. Onichimowska, K. 2020. *Do Not Wear* project, prototype wardrobe, Empathic Design exhibition, Czysta Gallery, Eklektik Session BOXED Festival [Photo]. Mindful Design Lab. CC BY-NC-SA 4.0.

Image 5. Jeziorna, J. 2021. *Become Genie* project prototype, Mindful Design Studio [Photo]. Mindful Design Studio. CC BY-NC-SA 4.0.

Image 6. Matysiak, M. 2022. *SouLamp* project prototype, Mindful Design Studio [Photo]. Mindful Design Studio. CC BY-NC-SA 4.0.

Image 7. Kluba, M. 2023. *Fasola si do* project prototype, Mindful Design Studio [Photo]. Mindful Design Studio. CC BY-NC-SA 4.0.

Image 8. Wojtaszek, J. 2022. *Naturophone* prototype, Mindful Design Studio [Photo]. Mindful Design Studio. CC BY-NC-SA 4.0.

Image 9. Wozny, P. 2020. *Peace Palm* project prototype, Mindful Design Studio [Photo]. Mindful Design Studio. CC BY-NC-SA 4.0.

Image 10**.** Sobolewska, D. 2022. Meditative plastic collection campaign, Ilhabela, Brazil [Photo]. Mindful Design Studio. CC BY-NC-SA 4.0.

Image 11. Sobolewska, D. 2024. *YOU Lamp* prototype, CICA New Media Art Conference [Photo]. Mindful Design Studio. CC BY-NC-SA 4.0.

The author

Dominika Sobolewska is an associate professor of design, interdisciplinary artist, and curator at the Wroclaw Academy of Art & Design, where she leads the Mindful Design Studio for Interactive Spaces and Objects. Her work emphasizes socially engaged design, techno-empathy, and environmental care through participatory processes.

Dominika's practice blends technology with humanistic values, promoting an interdisciplinary approach to design. She co-authored the Interactive Playground project at the WRO Art Center and continues to explore new media's poetic potential in her work. Her latest projects include "Empathic Design," focusing on technology's role in fostering sustainable futures. She actively participates in international debates, including Technarte Bilbao 2024 and Exploring Humanitarian Designers Practices 2024 at CERN, contributing innovative perspectives on design's role in addressing ecological and societal challenges.