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Consuming new narratives: Second order design fictions as transition objects for planet-centric consumption habits

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Consuming new narratives: Second order design fictions as transition objects for planet-centric consumption habits

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Abstract

The current dominant narratives of endless economic growth are contributing to unsustainable conditions that prevent humans from living within planetary boundaries. Many present sustainable alternatives fall short of embodying regenerative and equitable principles, casting doubt on the human capacity for mitigating climate change. This highlights the need for options that redirect the future of consumption. Second-order design fictions (SoDFs) is a method for reframing our relationship with the entrenched fictions that are part of dominant narratives. These half-familiar, tangible artefacts allow for critical sense-making that playfully provokes questions around the power structures, values and assumptions that uphold the consumption patterns that we engage in daily. SoDFs seek to interfere with consensus and allow observation of observations on how to address tensions between structures of thinking and formulate complexity of reality and possibility. The project builds upon work by Dulmini Perera, 'Superflux, The Liminal Space' and 'Do The Green Thing'.

Keywords: Sustainable design, Second-order Design Fictions, Narratives, Artefacts

Introduction

My second-order design fictions (SoDFs) relate to speculative planet-centric habits of consumption that both incorporate necessary basic needs (healthcare, energy, water, sanitation, clean air) and what can be deemed as luxuries (hot drinks, fashion, cosmetics). The *Dandelion Latte* suite (Image 1) provides a potentially locally abundant alternative to the unsustainable and fast-declining supply of tea and coffee (Kollipara, 2021). As a discursive artefact, *Dandelion Latte* integrates the familiar with the unusual, allowing the continuation of a comforting ritual and synthetic caffeine to provide stimulus, while rejecting threads to historical and modern-time extraction and exploitation of the Global South. Instead, it points to a local commons, culture and place. The spring-harvested taproots have a sweeter taste than fall-harvested ones, which taste more bitter. An accompanying café menu integrates the actual cost of items into the price, tapping into choice editing and nudging literature for voluntarily changing harmful consumption behaviours (Vowles, 2019).

The *Advanced Interconnectedness Meter* (Image 2) shows real-time data from your household (Catapult Energy Systems, 2021) and compares it to the city resident average, highlighting the energy and CO_2e consumption, sequestration and production. An integrated Cantril scale happiness meter used to measure citizens' wellbeing (Gallup, 2013), allows users to self-anchor themselves according to their mental state. It is inspired by Mathilda Tham's work *Me to We to World to Back Again* (2022) and her quote "Here Me is the person, We a unit of collaboration, and World our home, consisting of the ecological system and human-made systems". The meter provides a wider perspective and sense of co-evolution through which a participant may contribute to and follow the collaborative progress to reduce energy and water use. *National Veterinary Service Card & Council Tax Bill for Co-evolving Mutualism* (Image 3) imagines a future where the effects generated from inter-species symbiosis and co-evolution are granted greater value and

therefore converted into abstract financial metrics to possibly justify their decommodification and the existence of these artefacts.

Browser Warning Pop-up for Added-Friction Consumption (Image 4) is inspired by warning labels on cigarette packets, seatbelt alarms in cars, Do The Right Thing's *Amazero* campaign, highlighted by Popova (2009), and Postcards from the Future (Postcard Futurists, n.d.). This voluntarily installed browser pop-up activates when you enter websites that sell high-carbon services and products (such as Easyjet, Asos, Amazon) and that may also harbour obscure traceability of supply chains, enabling agnotologic or unintentionally harmful consumption. Adding friction to a sometimes otherwise frictionless transaction, it informs the customer of the potentially harmful repercussions of their purchase and queries whether they can meet their need for the product or service in an alternative way. To add emotion to an otherwise flat and detached experience, an image depicting the local effects of climate change (to the purchaser) is presented and a high-pitch alarm noise plays until you select your answer. The perceived added anxiety from this experience by the viewer (similarly induced by seatbelt alarms and cigarette packet warnings) can be put in context with the possible precarity and stress felt by the most vulnerable stakeholders in the advertised product's lifecycle.

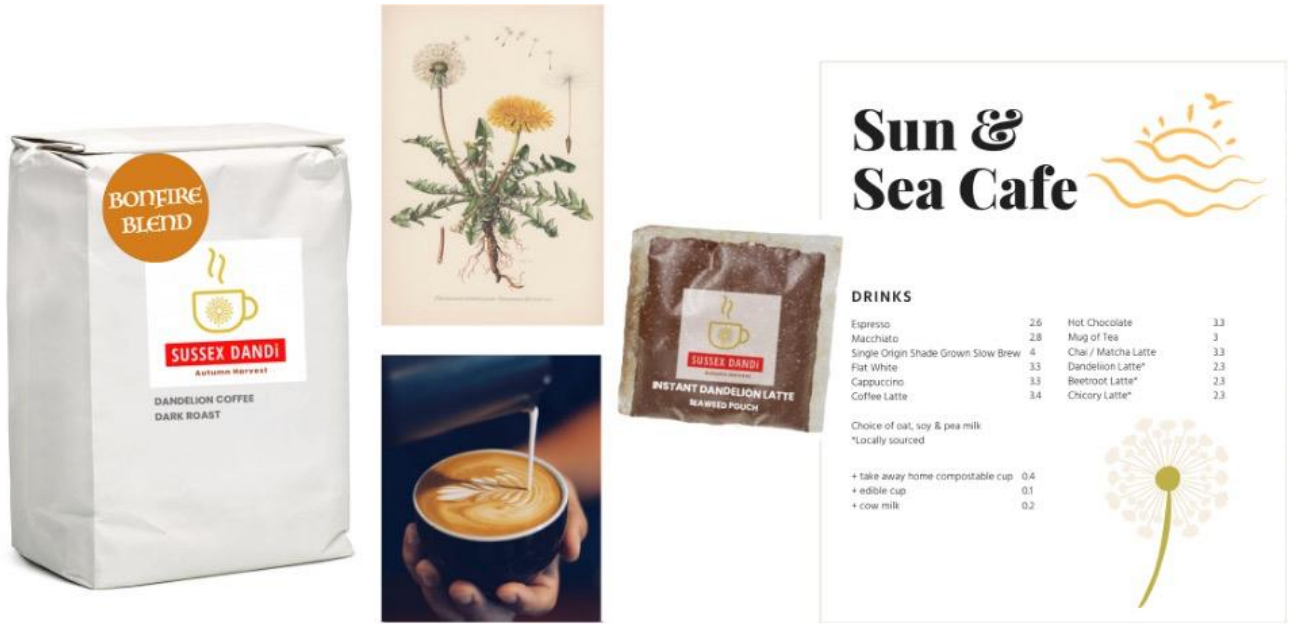

Image 1: Dandelion Latte suite.

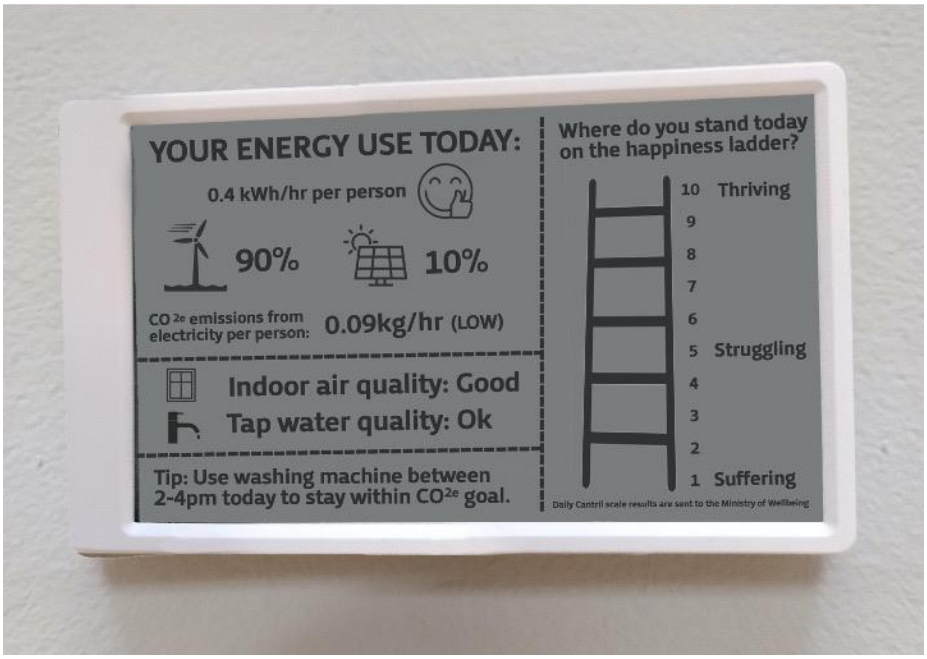

Image 2: Advanced Interconnectedness Meter.

Image 3: National Vet Service Card & Council Tax Bill for Co-evolving Mutualism (derived from a Brighton & Hove City Council tax bill).

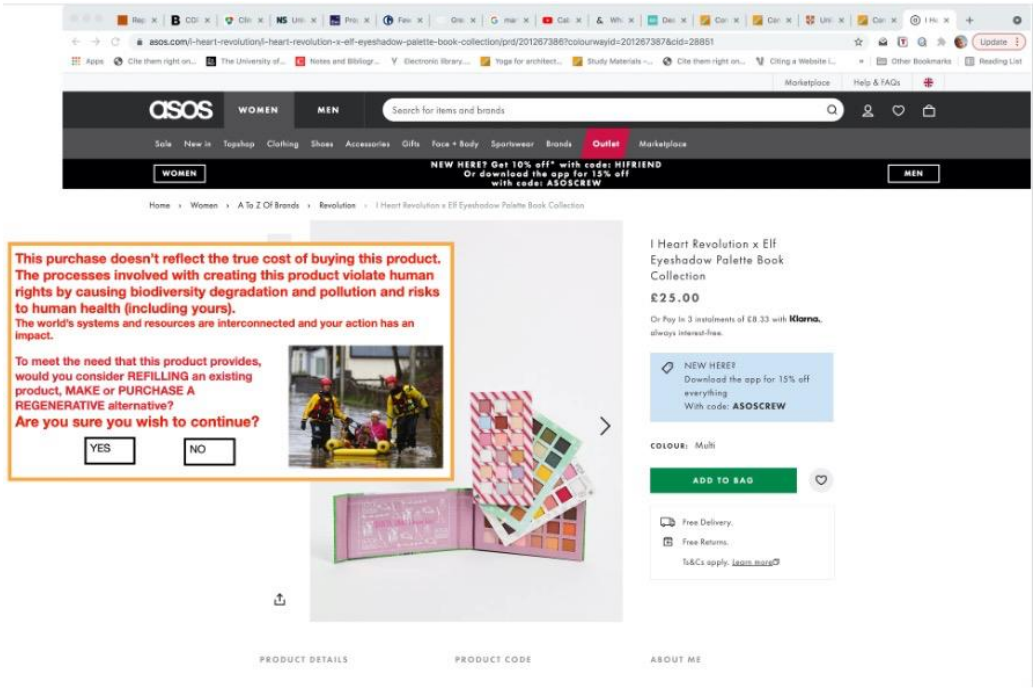

Image 4: Browser Warning Pop-up for Added-Friction Consumption.

Context

The project lies within the context of the urgent need to confront ecological overshoot caused by unsustainable consumption habits in the Global North (Economist Intelligence Unit, 2021). Although the cause for this issue has been attributed to a growing world population attaining a higher quality of life, scientists believe that it is more pressingly caused by the ecological footprint intensity of inhabitants in high-consuming countries and the unequal distribution of resources, according to the Global Carbon Project (Our World in Data, 2021). Ian Gough (2017) proposes three carbon-eliminating strategies to reach climate goals: 1) increasing the eco-efficiency of production and reducing energy demand and emissions, 2) by recomposing consumption using low-carbon services and products and 3) by going towards a steady-state economy through reducing and stabilising levels of consumer demand. Recomposing consumption refers to a shift from high- to low-carbon goods and services without decreasing general consumption expenditure. He states that the first strategy is currently dominating the climate discourse, as this aligns well with the neoliberal capitalist meme that the most desirable way to gain a better life and to save the planet is through "green" consumerism and sustainable business. This will however not be adequate on its own, due to the embedded emissions of carbon-intensive consumption.

The other two strategies are yet to capture the imagination of society, although all three are required to meet the agreed-upon climate goals by 2050. According to Lorek et al. (2021), each EU citizen emits 8.2 tCO_2eq on average per year, compared with the global average of 4.8 tCO_2eq. To keep within the Paris Agreement target of a 1.5°C average global temperature limit, individual emissions need to be reduced to 2.5 tCO_2eq by 2030 and 0.7 tCO_2eq by 2050. Effectively, each person's greenhouse gas emissions will need to be halved each decade to keep global warming from having challenging effects on ecosystems and human wellbeing. Although a carbon footprint is only one responsibility metric with which to quantify the

effects of human impacts on ecosystems, it can mitigate the other pressures on the planet, according to Engström et al. (2020).

Hubacek et al. (2017) argue that climate equity is vital for reaching climate neutrality because it will have the largest impact on the most vulnerable, while high-income groups contribute significantly more to climate change through carbon-intensive activities. The Well-being of Future Generations Act (Future Generations Wales, 2022), implemented in Wales in 2015, shows the possibility of design justice in public procurement and the notion of the "human right not to harm" through consumption. However, according to Prys-Hansen and Klenke (2021), as the recent COP26 conference showed, the collaborative efforts to reach the goals set out at the recent climate summits are driven by the tensions between different countries' priorities, capabilities and value systems, which in turn form expectations and responsibility acknowledgements. Since the current patterns of production and consumption are unsustainable, as they are tied to short-term economic goals and the goal of perpetual GDP growth, alternative planet-centric paradigms are needed to initiate "1.5-degree lifestyles". Highlighting the role and responsibility that designers hold as creators and "experts" in this regard, Peters (2019) states, "Design creates culture. Culture shapes values. Values determine the future. Design is therefore responsible for the world our children will live in".

Artefacts for enhancing our powers and comforts have become increasingly accessible since the Great Acceleration, primarily for the nations that have benefitted from global extraction and exploitation, according to Steffen et al. (2015). Johar and Raworth (Design Council, 2021) observe that living within the ecological carrying capacity will require a distinct set of values for governing transactional activities. The challenge then is to design a future that ensures well-being for all and fair allocation of resources. My drawing (Image 5) shows a combination of Voros' *Futures Cone* and Di Giulio and Fuchs' *Consumption Corridor* model to illustrate the context and the speculative future "corridor space" where my designed artefacts *belong*. The *Futures Cone* provides a simplified model with which to facilitate exploring ideas about the future. The *Consumption Corridor* concept describes the space within which people may get their basic needs met and dwell as they wish within planetary boundaries; it is illustrated by Lorek et al. (2021) as having the minimum consumption standards as the floor and the maximum ceiling to equally protect others' ability to live well. While minimum basic consumption standards are present in many countries to mitigate poverty, Tham and Fletcher observe that the concept of "less" is the largest provocation associated with the transition to sustainability (CFS+, 2020). I believe this may be also true for implementing rather paternalistic consumption ceilings.

While the consumption corridor concept provides opportunities for designing much-needed references for planet-centred consumption narratives, this provocation fosters temptations to veer into "techno-fixes". The belief that we can consume ourselves out of unsustainable consumption is perhaps the greatest tension and cause of cognitive dissonance. In the present absence of consumption corridors and prevailing climate anxiety amongst young people, according to research by Crandon et al. (2022), I believe that design plays a critical role in providing positive references for recomposed consumption.

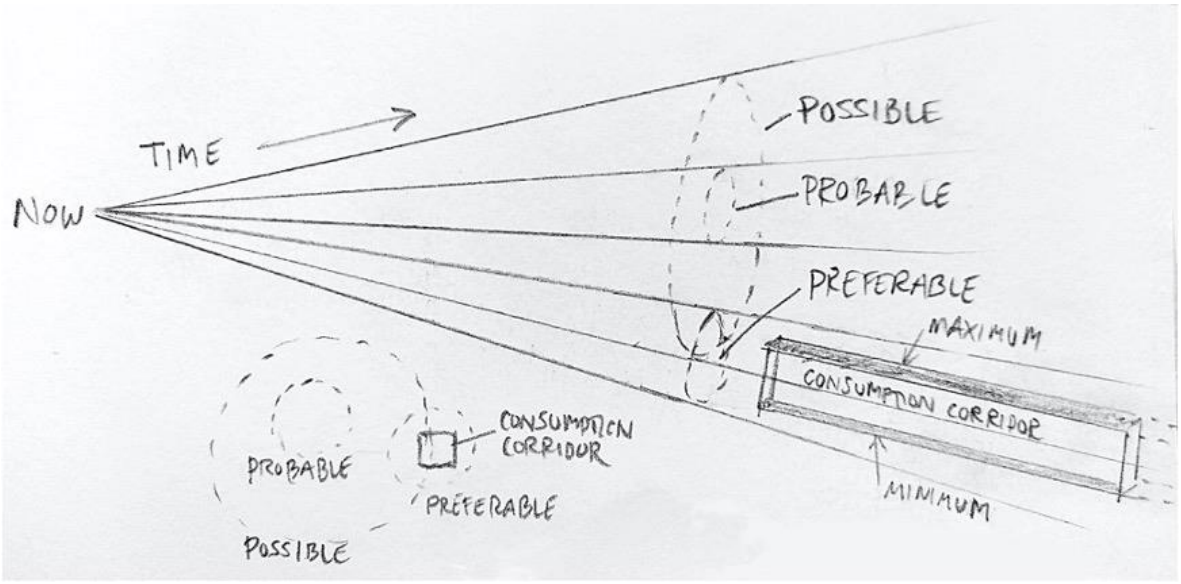

Image 5: Author's drawing derived from the Futures Cone by Candy (2010) and Hancock and Bezold (1994), and the consumption corridor by Di Gulio and Fuchs (2020).

The actual cost and agnotology of consumption

Despite an increasing awareness among citizens about unsustainable consumerism, scholars have identified several barriers to curbing over-consumption. These can be attributed to the increasingly frictionless nature of hyper-consumption by the perceived normalisation of affluent lifestyles and to the *value-action gap*, which is the contradiction between values and behaviour. Anthropologist Graeber (2001) defines values as "the way people represent the importance of their actions to themselves", which highlights the complexity of human behaviour. Also, the ideologically condoned social condition of *affluenza*, according to Denniss (2017, p.10) can be increasingly recognised. It refers to socially and economically privileged citizens' insatiable pursuit for *more* and their inability to perceive the consequences of their actions.
The harmful impacts of our day-to-day activities can easily be ignored, either knowingly or unknowingly, according to Anti-Slavery International (n.d.) and True Price (n.d.), as the concealment of the actual impact of our demands, considering factors such as social and environmental impacts, benefits the economic growth logic, illustrated by Tham and Fletcher (CFS+, 2020).

Agnotology describes the study of culturally generated deliberate ignorance. This framing can be applied to the obscurity with which the products and services that we consume daily are produced and disposed of (see Image 6). Modern consumption is upheld by obscure supply chains and complex geopolitical market forces which sustain considerable vagueness and knottiness around *"Who is responsible?"*. Betancourt (2010) argues that this agnotology allows for the prevention of the possibility of dissent to this system in society, where this question does not need to, nor can, be answered. He posits that *agnotologic capitalism* is a feature, not a bug, in that it **"**enables the economy to function as it allows the creation of a "bubble economy". This poses the question: is it humanly possible to (even imperfectly) *know* through whom and how all the things we consume come to be?

Efforts to establish transparency within supply chains of products and services through technology are in their infancy and are yet unviable, as current blockchain technology requires all actors involved in a supply chain to have the means to interact with the system to achieve transparency, according to Sunny et al. (2020). As the current discourse within sustainable business management now focuses efforts on shifting the narrative from shareholder capitalism to stakeholder capitalism, the possibilities, challenges and limitations that the dominant paradigm offers are being examined. As sustainability is not inherently valued

in Western culture, strategies to shift harmful production processes need to align with companies' purposes and goals, which are predominantly revenue-based. Considering this agnotology of production and consumption and the invisible threads that bind the tight knots that keep the sometimes ambiguous violations against human rights, dignity (Slavery Footprint, n.d.) and ecological collapse in place, according to Pinto (2017), does the dominant narrative give consent to consumerism as an indirect act of violence and (eventual) self-harm? (Carrington, 2021). The ontological aspects of everyday design objects and the importance of being a *good ancestor* come to mind.

Gough's (2017) need theory helps us to differentiate between needs and wants. What we feel that we *need* and what we *want* are often blurred, as our needs are often contextual, and our wants frequently relate to whom we consider our "consumption peers" to be. Deranty and Breen (2021) link this "new consumerism" to the self-perpetuating work-spend cycle of precarious work lives and hyper-consumption driven by increased inequality, as summarised in a quote by Juliet Schor (1998): "the more people consume, the more people must work". Blowfield (2013, p.273) suggests three ways to meet future demand for products; "expanding supply, increasing productivity and altering the nature of demand itself". Johar (Bristol+Bath Creative R+D, 2021) believes that the notion of "growth" requires careful handling and the singular word hides a lot of injustices and nuances. He posits that while some parts of the world will need to grow to meet the basic needs of their populations, together with our intangible economy, the richest 20% of the world population needs to "de-grow" and reach a state of regenerative homeostasis.

Figure 6: Author's sketch of the notion of the obscurity and lack of supply transparent information in chains, awareness and understanding, contributing to the agnotology of consumption.

I believe that citizens' everyday tensions lie in the fact that, although there is an increased demand for sustainable consumption (Economist Intelligence Unit, 2021), the current paradigm does not provide diverse alternatives, according to O'Neill et al. (2018), nor many positive references for consuming differently. Meeting the required level of dematerialisation of society requires the notion of *less* to be decoupled from the association with hardship and loss of social status. As Kimmerer states (2013, p.111), "In a consumer society, *contentment* is a radical proposition. Recognizing abundance rather than scarcity undermines an economy that thrives by creating unmet desires". I believe that bearing the capacity to stay with, and work from, this understandable resistance, is critical when designing explorations for positive references and alternative ways of meeting our needs. Krippendorff (2012, p. 74) suggests that "designers need to question prevailing ontological beliefs", and that "designers need to explore what it takes to unfreeze cherished habits or convictions, or to get people to learn something new".

A change of narrative

Kuhnhenn et al. (2020) believe that it is possible to stay within the global carbon budget of 1.5°C warming if today's consumption levels are reduced, but that this reduction in production and consumption requires

a “democratically planned socio-economic transformation with the satisfaction of people’s needs at the centre”. The global carbon budget looks at all nations’ carbon emissions and the amount of reductions that is needed to reach the Paris Agreement goals (Future Earth, n.d.). However, Riedy (2020) highlights the point that most historical discourse shifts were not planned but were the product of many ideas that aligned and knotted together over time, strengthened by adversity, and that resonated with and benefitted increasing numbers of people. Research shows that social tipping points for overriding social norms happen when a minority group, dedicated to a specific cause, reaches a certain size (“critical mass”). This in turn gives rise to wider acceptance of the minority view across the broader population, as research by Centola et al. shows (2018). The critical mass of the minority group required to reach the tipping point depends on the cause. In cases such as the UK smoking ban, the minority group grew after scientific papers were published that presented proposals for educating the public and offering options for voluntary shifts, eventually reaching legislation and compulsory compliance. Soaring evidence of the negative effects, together with offering options for change, led to further growth of the initial minority group (Institute for Government, n.d.). Mont et al. (2013) argue for a more considered framework for communicating, policymaking and prioritising and placing new ways of generating wellbeing as the primary strategy for recomposing consumption (Image 7). Could this model be a guide conducive to **“**consumption corridor” innovation and design?

Haidt’s (2006, p. 4) simplified model of the “elephant, driver and path” for behaviour change offers a snapshot of the conditions that designers can draw inspiration from. However, Riedy (2020) argues that storytelling is recognised to be a powerful driver for social change and can “inspire and persuade people to adopt new practices”. It is interesting to think about how Riedy’s plural discourses and Gough’s proposed strategies might affect society, work, leisure, business, production and which new stories we must now tell ourselves? As I believe our habits of consumption shape the narrative of our future(s), by enabling the coexistence of diverse economies, a larger number of alternatives may allow for equitable planet-centred living. Putting different limits on the ways we meet our needs may allow us to discover new possibilities of entangled value flows within a planet-centred paradigm. Capitalism has worked well for some of the world’s population over a relatively brief period in human history. However, it has proven to be an insufficient model for the pluralistic facets of humanity and life-giving systems that we share and need to consider going forward, taking inspiration from the mitigating impacts generated by the Montreal Protocol, the smoking ban and the plastic bag charge, to name a few policy changes that have saved lives and shifted narratives.

I am interested in how design may renegotiate current values and change the discourse in tangible ways. Examples where design has been used to intentionally shape societal shifts include the “acceptera!” manifesto, world expos and media campaigns where preferred future narratives have been curated, although they have often been inevitably paternalistic. Some present radical shifts in the dominant work/consumption ontologies are emerging through initiatives such as the “4 Day Week Campaign” (Platform London, 2021), “Tang Ping” [*lying flat*] (BBC News, 2021) and the “Buy Nothing” movement, according to Telford (2021).

Ecological economists such as Kallis et al. (2012), believe that change cannot happen within the dominant economic model. I believe that rather than dismissing it, new discourses will have to work from the dominant ones to un-tame the wicked problem of overconsumption and shift societal and behavioural patterns of participation. A certain degree of compassion is needed to sit with these tensions. Co-participatory storytelling through interaction with new artefacts may help generate previously unexplored possibilities.

In Bergthaller and Mortensen's work (2018, p.6), the sustainable communications agency Futerra states that "we must build a visual and compelling vision of low carbon heaven". If positive references for dwelling well within planetary boundaries in the Global North are lacking, a gentle shaking of the ideological tree may be the most ethical and effective way of shifting the story of our future. Let us explore artefacts with which to tangibly play a new story into being.

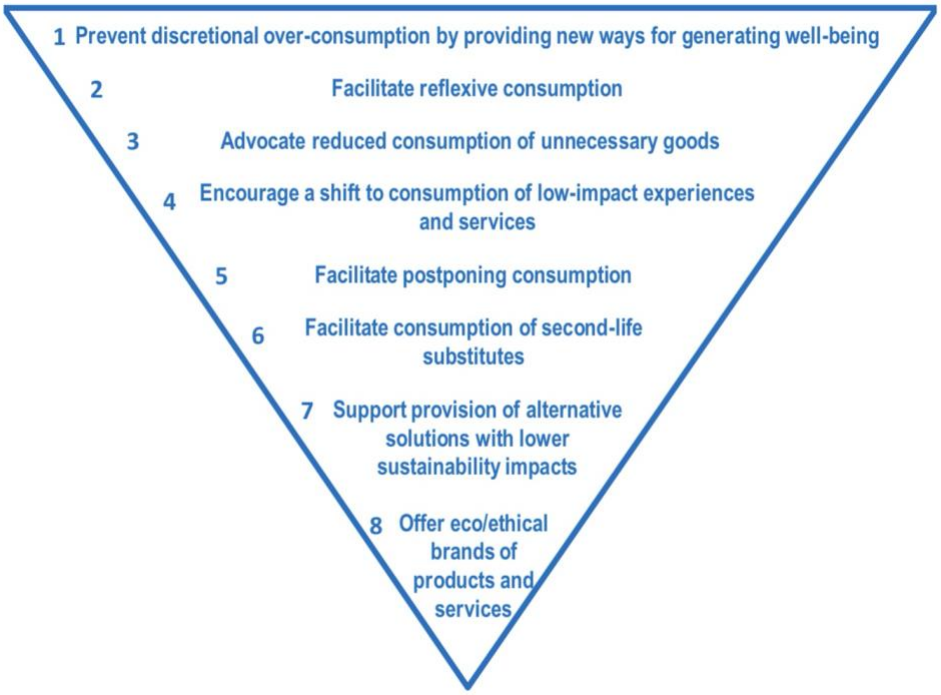

Image 6: "A suggestion for a consumption hierarchy (in order of priority)" by Mont et al. (2013).

Second order design fictions and wicked possibilities

Oxman (2016) declares that "Good Design, for example, is good exploration: it questions certain belief systems—physical and immaterial—about the world. Then it releases some embodiments of these speculations into the world, contributing to the build-up of what we know as culture".

At the heart of design collective Superflux's (2021) practice lies critical sense-making and speculative storytelling to enable future uncertainty in choices in the present day. Their conceptual film *The Intersection* highlights the importance of co-future with humility, a wider consciousness paradigm, and acknowledging the potential and power of agency. I believe that this demonstrates qualities coincident with us as adults of a species, of a deeper way of knowing. However, their featured artefacts may feel far removed from most people's contexts and other relatable objects, which may hamper their desired impact on their audience. According to Tharp and Tharp (2019, p. 217), discursive design artefacts "experiment with the relationship between objects and the stories they support and are supported by". *Tomorrow's Home* exhibition by The Liminal Space (n.d.) showcases how embedding healthcare technology in household objects may shape homes of the future, through translating academic research into tangible and accessible interventions. This aligns with my fascination with how World Expos and design manifestos have enabled societal change in the past.

Seeking to label my work within the design discourse, I would describe it as adversarial, since it concerns the political perspective of agonism, as described by Di Salvo (2015, p. 2), and highlights the potential positive outcomes of a conflict or tension. Going beyond the questioning qualities that define critical design, *agonism* emphasises the importance of having compassion for the *problem* in design struggles;

to celebrate and acknowledge a productive and good struggle. This echoes Haraway's (2016) notion of *staying with the trouble;* not being paralysed by fear or eager for solutionism. I've designed these artefacts to help make sense of the present and articulate tangible alternatives for positive narratives about the future, both for myself and for others. We must remember that the future does not yet exist, but actively emerges from the basis of a society's hopes, fears and images of the future. As Mouffe states in Benhabib's work (2021, p.255), "conflicts and confrontations, far from being a sign of imperfection, indicate that democracy is alive and inhabited by pluralism".

I initially dubbed my designed artefacts "transition objects", as they embody a liminal space in the necessary transition we need to make in our consumption habits, bridging the familiar present to an equitable and regenerative future of planet-centred consumption. Upon learning about second order design fictions (SoDFs) through Perera's (2021) work, I realised that my understanding of my "transition object" aligned better with this concept. Perera (2021) sees the methodology of design fictions as a way of interfering and playing around with consensus, as "they go beyond the neo-liberal design logic notions of fact and fiction, blending the familiar and different, and offer a stimulating tactility to facilitate the questioning of complex tensions". Fry (2021, p. 3) states that second-order design fiction can contribute towards "redirective practices" and a renegotiation of values. He posits that second-order design fictions have appropriated "lessons of observations" from second order cybernetics and that "the conceptual essence of second-order design fiction is the observation of observation". Second order cybernetics is used here as a tool to generate the desired effect of change through interaction. These are more than mere artefacts for provoking dialogue but are objects of interrogation that "invite recursive re-engagement".

The household context provides additional context and meaning to the artefacts, and the tangible characteristic of the artefacts is an important aspect. This makes the observation "real" and gives the objects authority, as if this alternative narrative is established and these artefacts *make sense* in that parallel reality. Interacting with these artefacts-as-conversation contributes to the effects of participatory design and puts the participant in the scenario to co-author a new story. Krippendorff (2012, p.75) argues that "because design becomes real in communication with others, inquiries into what makes a proposal compelling are inquiries into how people understand and act on narratives pertaining to desirable worlds". I would argue that this is the desired outcome of my design fictions: a new insight or shift in perspective, generated by the observation from the "conversation" between participant and artefact. The detritus that might be generated by the interaction with an artefact can be taken away and used to build upon existing culture. Although these SoDFs allow me to research through design, I have not yet developed the resources to measure the potential success of this research.

SoDFs play with both product semantics and the definition of design as a sense-making activity. Inspired by Donna Haraway's *implosion method* of analysis through various value dimensions as described by Dumit (2014), I have considered using this methodology for designing artefacts to explore and ensure how these might belong in a planet-centric future. The implosion method highlights the messiness and knottiness of stories and worlds that artefacts hold, analysed through the following dimensions: symbolic, professional, labour, material, technological, political, economic, textual, bodily, educational and historical. This is not to attempt to design "crisis-management models" (Perera, 2020) or utopian solutions for problematic everyday objects, nor to merely raise awareness of issues. It is important for the designer to make this implicit information apparent and contextual, as Tonkinwise and Lorber-Kasunic (2006) remind us, "because the knowledge embedded within an artefact is rarely made explicit, it can only be accessed and communicated by those who can interpret it".

The problem of recomposed and post-material consumption is a wicked problem, as it cannot be predicted, nor measured to be solved. By adding to, rather attempting to tame wickedness, designers acknowledge the uncertainty, plurality and diverse paradigms in which all stakeholders dwell and act. People's needs, values and motivations are contextual, fluid and irrational. Tham (2022) also highlights the importance of these tensions and cruxes, positing that "if we don't encounter this friction, change is not taking place". These may be a gentle provocation to imagine safe ways of living with both compulsory and voluntary demateriality, low-carbon and overall sufficiency in ways that are not primarily associated with hardship, precarity or loss of status by the participant. I am, however, aware of the subjective notions of these concepts and the ethical consequences of imposing my own beliefs about what is considered safe and precarious. As SoDFs are artefacts that belong to a different narrative, encountering and interacting with these may generate new ways of seeing, knowing and valuing. It poses the question "If this object exists, where do I exist within this narrative?". However, Tonkinwise (2015) and Tham (2022) remind us why discursive design artefacts need to remain unpolished and open to participation, to avoid merely normalising "a pretentious taste regime". Hence why I have focused on designing artefacts of the mundane.

Each of my exhibited objects presents a structure for playful exchanges, aiming to engage diverse participants in imagining and making sense of the changes needed to mitigate crises with a less precarious outcome. It suggests a "hopeful continuation" to counter the dominant *defuturing* (Fry, 2021) narrative that has been generated within the cognitive dissonance of capitalism's failure to provide. According to Lorek et al. (2021), "1.5-degree lifestyles can be diverse as long as they stay within ecological boundaries". I look forward to further exploring how design can provide reference and innovative ideas for all to dwell well.

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An ecology of media, technology and design

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Abstract

It is a mediated experience through designed artefacts, systems and environments that human beings relate to the earth. The already transformative effect of this mediated existence has accelerated sharply with digitalization. In this research, we take the dichotomies of nature/culture and human/environment and the consequent miscalibration between human intentions and ecological results as the root cause of the current ecology and mind crisis, and we approach the situation as a 'design failure'. We intend holistically to propose a conceptual design guideline, as a contemplation tool to be able to 'think like a mountain,' which proposes a set of common principles that healthy ecosystems are supposed to carry.

Keywords: Mediation, Digital technologies, Design, Systems approach, Ecology

Introduction: A deep and digital media ecology

Being human comes along with designing media, which in turn designs the way we relate to the world around us. Human beings experience the world through mediation and mediated environments, be it language or technologies. This is also the source of the so-called nature/culture dichotomy. Through this dualistic epistemology, nature is comprehended as a body of entities to control, manipulate, utilize and liberate from, and technologies mediate this externalization and transformation of nature into industrialized cities, artefacts and culture (Stuart 2007, pp. 418-419). David Abram invites us to an embodied understanding of the phenomenon:

> *"Today our relation to the enfolding earth is filtered through a dense panoply of technologies – from air conditioners that mask the heat, to electric lights that hide the night, from capsuled automobiles that hustle us hither and yon to earbuds and headsets whose self-enclosed sounds eclipse the layered silence of the land, blotting out the hum of bees and the whooshing wind whose voice swells and subsides into the belly of that silence*." (Abram, 2010, p. 263)

Considering our mediated relation to the planet and the members of our species, what we see consequently is a world in ecological crisis. This is not only an environmental, but also a 'mind' crisis. It has almost been a century since Bateson (2000) took his bold steps towards an understanding of 'an ecology of mind', bringing together ecology, anthropology, evolutionary studies, and cybernetics from a 'systems' perspective; yet the world seems to be getting further and further away from this vision. What is the role of mediation in this?

Pioneer ecologist Eugene P. Odum states that design practices affect the whole of human civilization in the hierarchy of society and environment, and 'a holistic approach is necessary when dealing with complex systems such as human civilization' (1997, p. 315). Design, however, is a field that is inclined either to exert anthropocentric values or to follow the 'value-free' discourse of science and technology. Considering the effect range of design practices and assuming that there is a mind and ecology crisis, we focus in this research on the design of mediated environments, the artefacts that mediate our every bit of experience from a normative ecological perspective.

Every artefact that has come to be invented is an embodiment of technology. The change that technology brings is ecological and thus holistic, as it not only adds a new value to the system but also changes the whole relational structures of the body, mind, society and environment (Postman, 1993, p. 18). Although this fact encompasses even most 'primitive' tools, such as glasses or a cane, the process has accelerated sharply with the advent of digital technologies. Over the last decades, digitalization seems to be overtaking life so much so that even most basic daily practices become embedded with them and gain this aspect of interactivity.

As of today, we do know that "to design digital artefacts is to design people's lives" (Löwgren & Stolterman, 2007, p. 1). These are meta-technologies or meta-media with the capability to change it all (Lauria, 2001). The transformations that would take decades and even centuries after the invention of each technology now take place only in years. The boundaries between the body and artefacts have blurred, and digital media, which is ubiquitous and pervasive, has become more than extensions of man (McLuhan, 1962). Apple designer Jonathan Ive, one of the most prominent designers of our age, however, declared during his knighthood ceremony that they 'don't spend much time thinking about [their] impact' on the modern world (The Guardian, 2012). And this was an argument yet limited within the scope of the human world. In the world of computer technologies and interaction design, environmental impacts are mostly regarded separately from social/physiological/cognitive impacts of design.

Being one of the prominent causes of environmental crisis, the miscalibration between human intentions and ecological results is a design failure, and the solution is 'better design' (Orr, 2002, 14). If a better design is the design that is calibrated to ecology, then we need to shift the mindset of designers so that they can think ecologically. The term *ecology* here refers both to environmental ecologies around planetary ecosystems and to the holistic and inter-related systematics that these ecosystems run. Thus, it refers to the law, the *logos* of such systems from a systems theory perspective.

As designers and scholars, we need tools to be utilized right at the design stage, so that we can foresee the vision of the future that our designs contribute to, from an ecological perspective. Aldo Leopold (1968, p. 129) proposes the statement 'thinking like a mountain' as a metaphor for the holistic thought process of ecological view. This research, accordingly, focusing on the strategies that planetary ecologies have brought up from an evolutionary perspective, aims to reveal the characteristics of a healthy (eco)system, be it in a mountain or cybernetics. A guideline will be presented with those characteristics as heuristics, as a tool for 'thinking like a mountain' in human terms, for designing interactive media and technologies and for a holistic contemplation of occupational ethics.

Background: Ecological approaches to the design of digitally mediated environments

Ecological notions approach

Although the very roots of media technologies can be considered cybernetics, let alone ecological thinking, holistic systems thinking has been a rather recent approach in the design of digitally mediated environments. The earliest ecology-related concept that played a prominent role in the field was Gibson's ecological psychology, with the best-known and most common adoption being the concept of 'affordances' (Norman, 1988). In the frameworks that have been proposed more recently, complex configurations of people, interactive systems and artefacts (with digital technologies embedded in them) surrounding the environment and practices and values of the people in that context are interpreted as ecology in themselves. Some of the notions that these ecological perspectives propose are (1) product/device/artefact

ecologies, (2) information/interaction/service ecologies, (3) ubiquitous ambient ecologies and (4) personal/user ecologies.

Although we can see several technology or process-centered notions, these perspectives can be broadly addressed as either 'artefact-centered' or 'user-centered'. These approaches take ecological notions metaphorically and out of the environmental context, and the common research question behind them is 'how to adopt ecological notions in settings of human-artefact interactions' (Blevis et al., 2015; Raptis et al., 2014).

Environmental design approach

When we shift our focus from the artefacts, humans and their mediated environments to the environmental issues, earth ecologies and a broader selection of design fields, including architectural, industrial and urban design, we come across the fields of sustainability, environmental design, regenerative design and so forth. These eco-design notions, contrary to the previously mentioned ecological approaches, are either eco-centric or still anthropocentric, with the understanding of the human as a species that cannot survive if the planet fails. There is a huge literature and background with distinct perspectives behind these. Some of the common and key concerns from our point of view are product life cycle, energy consumption, green materials and community.

As for the design of digital and interactive mediated environments and new technologies, just recently a growing community has emerged with environmental concerns and an interest in environmental design. Following the fields of environmental informatics or eco-informatics, the common research questions behind these are how to make interaction designers aware of environmental implications of their design decisions to contribute to designing more sustainable products, and/or how informatics can increase our preparedness for 'future of scarcity' scenarios (Blevis et al., 2015; Raptis et al., 2014).

Bringing together two approaches

In this research, we are interested in the world vision, the mindset that our designs contribute. Our research question is how an interactive media design product could behave as (part of) a healthy ecosystem itself. Our approach is neither human nor artefact-centered; we hold the planet-wise concerns of the eco-design approach. Mediated environments are situated on the planet not only physically but also as a part of the interaction network. What kind of interaction, experience and attitude a design artefact or system asks from a user-human is quite interrelated with the behavioral and even spiritual patterns that are exhibited by the user-human as they interact with another species of the planet. 'An interaction designer takes part in creating a dynamic gestalt', argue Löwgren and Stolterman (2007, p. viii), comparing interaction design with performing arts rather than architecture and industrial design.

Ecology is about relations. Our designs not only contribute to the material cycles like product life, energy, waste and feed cycles of the earth, but also behavioral, relational, perceptual and spiritual cycles and transactions in between all. Thus, we intend to propose another eco-design guideline for designers, yet focusing on not the materialized discussions but the minds, and along with it we also intend to transfer ecological notions into the design context, yet without losing the 'earthly' context of ecology itself.

Guideline: A humble step to an ecology of a mountain's mind

> *"…I picked up a vague mystical feeling that we must look for the same sort of processes in all fields of natural phenomena – that we might expect to find the same sort of laws at work in the structure*

of a crystal as in the structure of society, or that the segmentation of an earthworm might be comparable to the processes by which basalt pillars are formed." (Bateson, 2000, p. 74)

To take this step, as an attempt to unearth the thinking patterns of a mountain, we delved into a list of distinct but inter-related fields of nature, poetry, science, philosophy, politics, design and media, all of which have an environmental/ecological stake. We analyzed the proposed 'solution patterns' and came up with a conceptual model that first categorizes and then unites all solutions as the requisite principles of a healthy system.

In the following section, we summarize our guideline, which consists of six concepts. These can be elaborated as both guiding principles for designing and criteria for evaluating design. Each concept has three defining parameters to be used as a list of heuristics. The parameters are presented in the final paragraph of each concept and Figure 1.

We invite the readers to contemplate these six concepts, the relational structure they constitute and the vision they paint overall. We suggest a simplified visual representation of our principles, their mottos and parameters as in Figure 1 to accompany the discussion below.

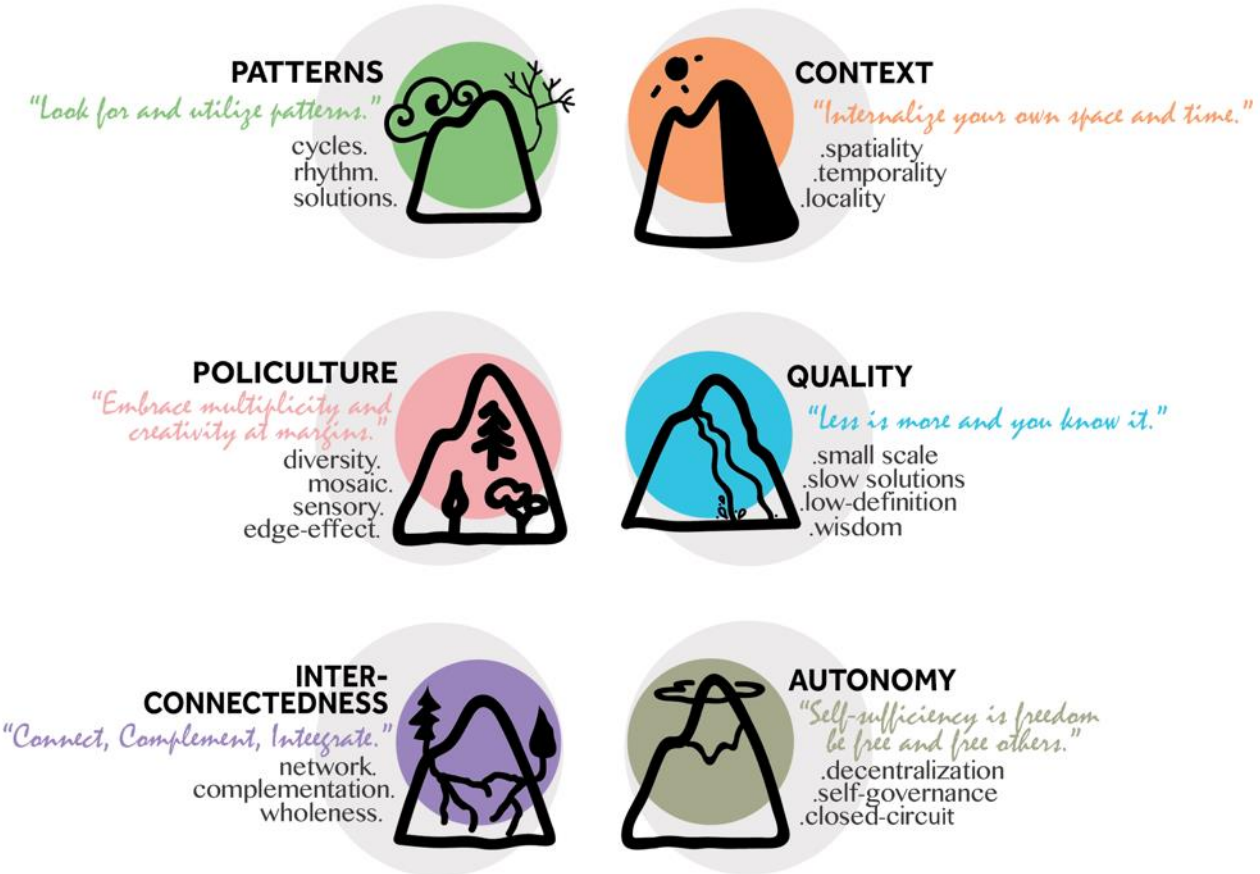

Image 1: Ecological principles for design.

Patterns: Find and utilize them

Natural forms, structures, processes, behaviors and interactions are all woven by repetitive patterns and strategies. These prominent patterns speak in mathematics, geometry and rhythm. Cycles and spirals are

among the most common patterns from plant structures to the activity patterns of animals, a hawk skydiving into its prey for instance, from storms to oceans, from galaxies to nature's time of seasons.

Rhythm in terms of self-similarity or modular repetitions are also among the 'the patterns which connect' all living beings from a crystal to society (Bateson, 2000). Fractals (as in tress, mushroom, broccoli etc.) are a specific implementation of this pattern.

The mountain asks the designer to begin by asking and observing how nature would solve this. The reason nature displays similar patterns as strategies and why local and traditional cultures have utilized patterns so much in their art and culture, is because 'these are the ones that have proved successful' over millions of years of evolution (Orr, 2002, p. 38). Artificial modern systems, on the other hand, which are mostly linear and hierarchical, represent an unsustainable world vision that is bound to end (Orr, 2002, p. 162). What if the first iteration of the Macintosh had shipped, Lanier asks (2010, p. 13), in which the whole computer experience was designed on a completely contrary metaphor of a singular structure without a hierarchical file/folder system?

When we go with nature, not against it, we then realize there is indeed no problem in nature, but only knowledge and solutions. A taproot weed in barren land may not be a problem to be solved by using force and removing it. Information about the argillaceous soil whispers the solution that one should first heal the soil, otherwise one can only grow taproot plants here.

To integrate the 'patterns which connect' in your design, get equipped with the proven wisdom of nature, by tracking the flows in natural processes and relational transactions. Specifically, be aware of and utilize cycles, and let your design beat it by rhythms through repetitions and self-similarities.

Inter-connectedness: connect, complement and integrate

The inter-relatedness of all and unity as such is the first principle of ecology. In cybernetics, as in biology and ecology, holistic systems are woven not by singular entities (nodes) but by the relations and interactions (edges) in between them (Bateson, 2000, p. 316).

How we see the world changes how we relate to it. Local and indigenous cultures perceive the world as a network of relations where every living or non-living being is related to each other in a reciprocal responsibility (Orr, 2002, p. 10). A summary of this principle is *Mitákuye Oyás'iŋ,* the sacred phrase of the indigenous Lakota people of North America, which is translated to 'all my relations' or 'all are related'. A law execution practice that embodies this principle, as narrated by the cultural anthropologist Michael Wesch (2010), is a practice by a remote indigenous culture in the rainforest of Papua New Guinea, in which 'the relationships' are brought to the court instead of individuals, with the intent to restore the relations, not to punish individuals. This indeed is an approach in harmony with ecology, for the unit of survival is not the species in a bloody competition but the common habitat in which species are interdependent with each other (Odum, 1997, p. 200; Bateson, 2000, p. 332). The predator, for instance, by hunting the old, the sick and the weak, controls the population of the prey animal, prevents over-grazing and maintains the health of the herd. This is part of the knowledge that Aldo Leopold (1968, p. 129) had read in the eyes of the wolf he killed, part of the wisdom that only those who think like a mountain can hold (Odum, 1997, p. 193). The mountain knows that the human is not *in* the environment but a part *of* its relational total-field (Naess, 1973, p. 95).

A permaculture designer does not settle with the observation of individual entities. In accord with Gestalt's 'the whole is more than the sum of its parts' principle, the relations are observed and designed, as in the case of building a coop so that it could also provide heating for the house or planting unions of different vegetables that complement each other's mineral or water necessities (Mollison, 1994, p. 5).

The mountain has witnessed that anything is hitched to everything else in the universe (Muir, 1997, p. 91). The ecological design begins with the realization of the ubiquitous inter-connectedness around us. In your designs, implement a network of wholeness where parts do not compete but cooperate for integration over fragmentation and for harmony over hegemony (Lyle, 1996, p. 39; Orr, 2002, p. 29).

Polyculture: Embrace multiplicity and creativity at the margins

Contrary to the evolutionary procedure that requires the organism to regulate itself according to the environment, human beings organize their environment and create monoculture ecosystems. The disappearance of almost all non-human species in urban environments, fields that grow only one type of crop, bacteria cultures and mice colonies in laboratories and many other monoculture investments are all driven by technological progress. These domestic species, however — controversially argued to include modern humans, too — are not suitable for evolutionary survival (Bateson, 2000, pp. 446-453; Orr, 2002, pp. 114-115; Shiva, 1993).

City culture recalls diversity. However, when this diversity is distributed and diffused into the city texture without context, it homogenizes, as in the case 'when many colors are mixed, in many tiny, scrambled bits and pieces, [and] the overall effect is grey' (Alexander et al., 1977, pp. 42-50). To prevent this homogenization, Alexander et al. propose a *mosaic* distribution with many local centers of sub-cultures (1977, pp. 42-50). As well as preventing assimilation, this is necessary also for the *edge-effect* to take place, like in a coral reef where two distinct existences intersect, and hallmark ecology emerges out of this synergy (Mollison, 1994, pp. 28). Large margins for transitions, frontiers and interfaces increase resilience.

As for media and technology, one of the two remarkable aspects is the dominance of seeing and visuality in sensory perception. Human beings have lost their primitively more inclusive olfactory, auditory, and tactile sensual capabilities mostly to the eye, which, by creating subject/object dichotomy, has externalized the experience of the world (McLuhan, 1962, pp. 28-29). *Monotechnic* is the other underlined problem as in the case of the medium of the car, which does not leave space for other types of transportation, or in the case of smartphones, which, by bringing them together in it, has assimilated many other 'old' media (Mumford, 1993, pp. 235-239).

The mountain is plural. From steep sides to vast highlands, from barren canyons to fertile valleys, from hidden caves to sharp peaks, from meadows to trees and from wolves to bees, the mountain contains so many. For *polyculture*, aim for *diversity* in every area from technology to sensual perception, a *mosaic* of heterogeneous distribution of these varieties and an emphasis on the *edge-effect* in between.

Context: Internalize your own space and time

In cybernetics, the fact that the relation of every node to the larger systems around it is different from the relation of other nodes to the same system, is *context* (Bateson, 2000, pp. 332). A letter in a word, a word in a sentence, a sentence in a text and all other content is meaningful only in a context and 'context is the precursor to communication' (Bateson, 2000, pp. 408).

Time and *space* are two variables of context and, ecologically speaking, every situation or transaction is bound to *its own* time and space. The biological and social rhythms of beings that think like a mountain are integrated with the cyclic clocks of nature. Their time ticks simultaneously with their heartbeats, and their space is the muddy land underneath their feet. Both are hardwired in and cannot be comprehended separately from their momentary experience. For local communities, the land is not a commodity but an entity that embodies the souls and the memories of their ancestors, the past and the future of their children, their identity and culture (Alexander, 1977, p. 37; Orr, 2002, p. 11;). Whereas the ethical, political and economic protocols of locality inherently limit and prohibit the damage that a community can cause to their ecosystems, remoteness opens up the way to 'tyranny' (Odum, 1997, p. 303; Orr, 2002).

The modern human, on the other hand, perceives time and space as external, linear and quantified concepts and abstracts them through maps, clocks and calendars. From ambient to mobile, context-dependent design in smart systems has been a concept on the rise. With the advent of sensory, biofeedback and location-aware technologies, the spatial, temporal, physiological and/or environmental situation of a user can be tracked very easily. Yet, this abstracted and information-processed context paradoxically separates people from the real time and space they inhabit, when the user experiences a place as 'mere coordinates', rather than a 'meaningful existential locale' (Vollrath, 2016). 'The map is not the territory', and it can only represent reduced and quantified information about the land, which is why our relationship with the map vs the land must have different ethics (Bateson, 2000, p. 408; Mollison, 1994, p. 34).

In what time does a transaction occur between a human organism that is based on continuous sensory-motor and cognitive processes that have to be synchronized precisely in time and a computer that is based on discrete, asynchronous and timeless events (Lanier, 2010, pp. 11-12; Varela et al., 1993; Lakoff & Johnson, 1999)? The remedy to moral, behavioral and economic failures of information technologies may be in the fact that in nature every creative process including evolution is bound to the local *context* (Lanier, 2010, p. 138) and to *spatiality* and *temporality* in unity with momentary experience.

Design for real people in their real context and consider their unique 'season' that abounds in the physiological cycles and rhythms of both themselves and the earth and their own 'place' in the environment that they are situated in and out.

Quality, less is more, and you know it

Defining intrinsic qualities such as intelligence or excellence of phenomena through quantities has been in favor since the dawn of modernity. This has led to the perception that the value or goodness of phenomena increases by numbers. Development, progress and acceleration (the more, the faster, the better) have been economic and political reflections of this paradigm shift.

However, on a planet with finite resources, no phenomenon can grow infinitely without damaging its environment. And quantities are not proper tools to define organisms and their interactions in ecological, biological or cybernetic systems. Form-wise, relational and pattern-wise qualities are prior; 'sometimes small is beautiful,' and both biological and social systems have optimum ranges (Bateson, 1979).

Small scale and locality bring virtue by limiting the scale of the damage that humans can do. For instance, not only human beings but also other organisms and processes in nature release toxins. The latter do this,

however, in very small numbers and in a closed-circuit system, which is why theirs are ignorable as opposed to the human-driven toxic waste problem.

Technologies both connect and alienate by scaling up time and space. The automobile, which promised to bring people closer, has wiped the human scale out of urban design by scaling them up in metal bubbles and alienated them from each other, the city texture and the land. High-rise buildings, similarly, have separated habitats from hearing, smelling, experiencing and participating in the street life below (Alexander et al., 1977; Mumford, 1993, pp. 235-239).

As for information technologies, from wisdom to knowledge, to information and to data, the rise of the communication age has freed information from spatial and temporal contexts that are bounded by the human scale. We are exposed daily to a flood of information of which speed is before its content. And its waters are shallow because information under-represents reality (Lanier, 2010, p. 132). Another bell rings for the myth of crowd wisdom, that enough quantity will turn into quality, and its duality that trolling and intended harm to others are on the rise. If '[q]uality is the response of an organism to its environment' (Pirsig, 2000, p. 254), what kind of a response these high-speed new media environments trigger in us is a game-changer.

The 'bigness' of a mountain comes from its age-old time. Indeed, it is so slow that it is as small as its time permits. Time and space are abundant in quality and wisdom. Even modernists have come to know *multum in parvo* as 'less is more' when it comes to design solutions. Carry this motto to a broader context, as sometimes *small* is beautiful, *slow* solutions are the resilient ones, and only *low-definition* channels can convey wisdom.

Autonomy: Self-sufficiency is freedom, be free and free others

Generated from *auto,* i.e. 'self' and *nomos*, i.e. 'law' in ancient Greek, the simplest definition of *autonomy* is *self-governance*, which requires decentralization and horizontal reorganization of once unilateral and external power structures. The distribution of control, power, wealth and knowledge is inherent in ecological organizations like local cultures, and in cybernetics no component can exert unilateral power on others as a built-in rule (Bateson, 2000, p. 315; Lyle, 1996; Orr, 2002, pp. 114-115). The natural or cultivated sustenance of all autonomous systems depends on an internal organization of interconnected input and output variables in balance, so as not to become toxic by exceeding threshold values. Complex cybernetic systems are *homeostatic*, i.e. self-corrective through 'governing loops' that not only constantly check and keep the variables in between optimum threshold values, but also dynamically prevent habits from occurring due to a variable getting stuck in a static value and becoming hard-programmed (Bateson, 2000, p. 511; Bateson, 1979, pp. 26-73). The control mechanisms and limits that are intrinsic in small-scale and local systems may have to be introduced specifically in digital systems. In design, limits do not restrict; on the contrary, we need them as they free us (Orr, 2002, p. 122).

Another parameter that increases autonomy is *redundancy,* which requires every component to have a backup in the system. In permaculture this is formularized in two ways; (1) each element has as many functions as possible, (2) each function is supported by as many elements as possible (Mollison, 1994, p. 6).

Autonomous systems and beings are instantaneous like the sun and do not 'steal' from the future. They limit transactions with the environment, and non-renewable resources are only consumed for evolutionary transformations 'as a chrysalis in metamorphosis must live on its fat' (Bateson, 2000, p. 504).

From *distributed* and *decentralized organizations* to *self-governing* loops, these mechanisms are most possible and efficient in a *closed-circuit* system. Because '[o]nly the autonomous can plan autonomy, organize for it, create it' (Bey, 1991, p. 102), be like a mountain, as there is no better matching metaphor for autonomy but the mountain.

How to use this guideline

Despite carrying the same '*patterns* which connect', in nature there are various strategies for incorporating them. It is the same with this guideline. The strategies and methods that would work best depend on the *context* of the (design) problem. This multiplicity of strategies is supposed to be a *polyculture.* Due to its *qualitative* nature, we cannot present an objective and fast-proven generic method. That is why we propose 'contemplation' as the first method to consider.

PATTERN	Observance and use of natural patterns in forms, structures and problem solving methods.	**CONTEXT**	Socio-cultural, historical or ecological context. Tempo-spatial awareness and locality.
cycles	Non-linear, circular, spiral patterns.	***spatiality***	Intrinsic spatiality, place bound experience.
rhythm	Self-similar, rhythmic, fractal structures.	***temporality***	Cyclic time (age, season, etc.) intrinsic to experience.
solutions	Long-term and eco-mimetic solutions.	***locality***	Ecological context and local belonging.
POLYCULTURE	Support variety, multiplicity and encounters.	**QUALITY**	Quality over quantity, small, slow and wise solutions.
diversity	Diversity of languages, media, and culture.	***small scale***	Smaller and human scale.
mosaic	Non-uniform and heterogeneous distribution of polyculture.	***slow solutions***	Slower solutions.
sensory	All-sensory awareness rather than dominance of visuality.	***low-definition***	Low-definition and contextual information flow.
edge effect	Stress on marginal, edge areas where encounters occur.	***wisdom***	Consideration of higher systems, wisdom over data.
INTER-CONNECTEDNESS	Holistic approach and focus on the relationships between the parts.	**AUTONOMY**	Self-governing closed systems with distributed/decentralized power structures
network	Weaving relations between system nodes/subjects.	***decentralization***	Horizontal and decentralized organization of control and power
complementation	Stress on not competitive but complementary relations.	***self-governance***	Self-regulating control and limit mechanisms.
wholeness	'The whole is more than the sum of its parts'.	***closed-circuit***	A closed-circuit systematization of product / service life cycle.

Table 1: Quick reference card for principles as design heuristics.

The concepts are presented one by one due to format issues; however, there is no linearity among them. Each one is an *autonomous* and self-proclaimed characteristic, yet also a part of the guideline as an *inter-connected* network.

As an example of this relational structure, observe in Figure 2 that there is a balance of 'singularity vs. plurality' in the system maintained by two relations. The first is the 'dependency/inter-dependency balance

between *interconnectedness* and *autonomy*, and the second is the 'multiplicity/essentiality' balance between *polyculture* and *quality*.

We chose to begin with *patterns* and cycles and end with *autonomy* and its cyclic closed circuits so that we could turn back to our starting point and close this cycle. *Patterns* are the beginning of all and *context* is our base.

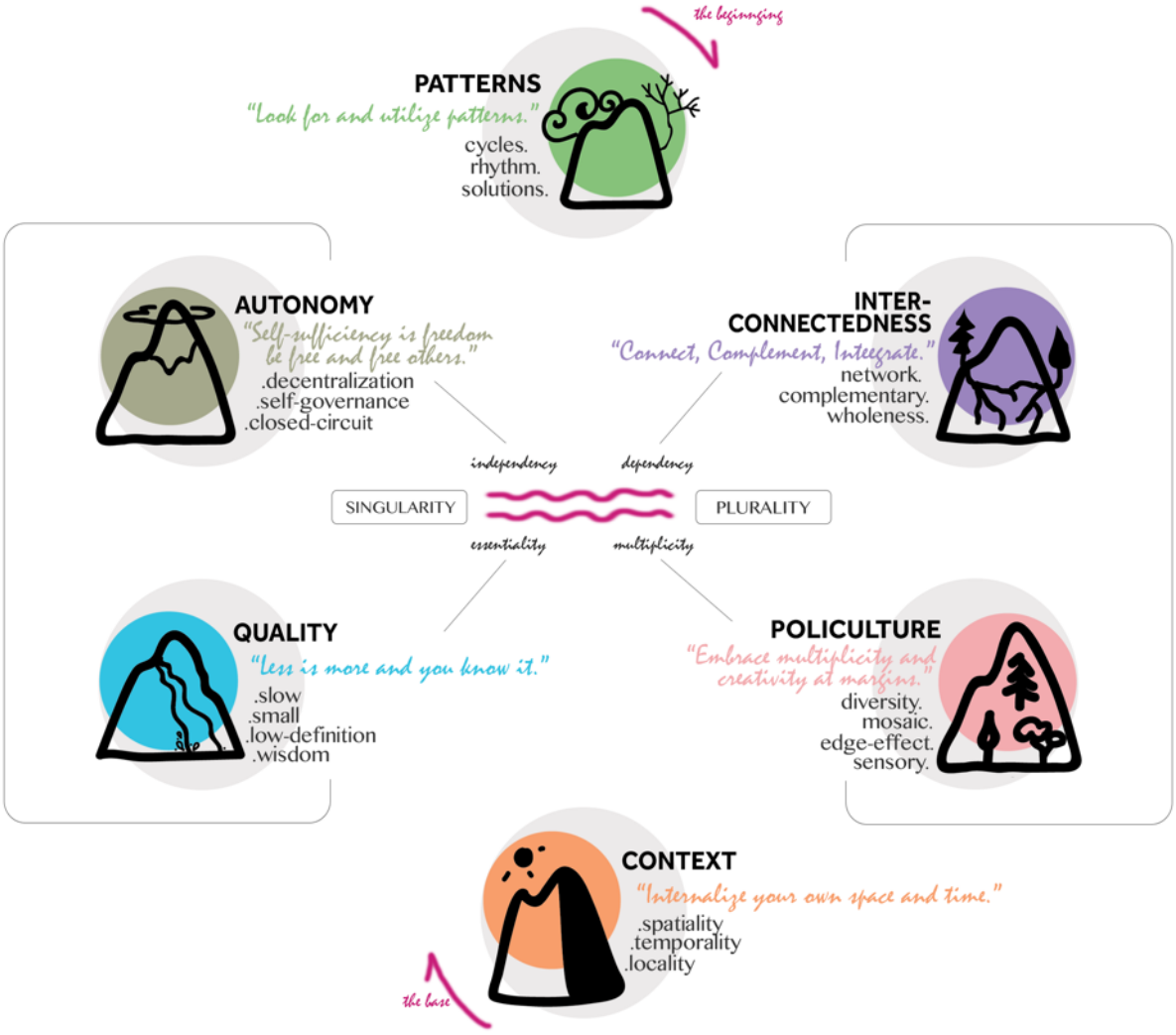

Figure 2: A relational reflection on principles.

Conclusion, many ecologies

> "Single and free like a tree, and in fraternity-like a forest" (Ran, 1966)

According to Abram, 'the glimmering stars of the night sky appeared much closer before the invention of the telescope (2010, p. 154). Yet, is the telescope to blame? It is a fact that an ever-expanding complex of technology is mediating between our bodies and the earth. Contrary to indigenous people who talked 'to' the earth, in our mediated world we talk 'about' it from a distanced, hygienic and synthetic comfort zone (Abram, 2010, p. 188). With the advent of digitalization, which imposes its interaction networks, the

interfaces between our bodies and the earth have become pervasively ubiquitous. However, a purist 'anti-technology' stance in eco-philosophers 'seeks to unravel the traditional dualism between nature and society, may contrarily be serving to strengthen this dualistic epistemology' (Stuart, 2007, p. 422). Pessimism in the face of media and technologies has roots in overall disappointment with humanity and modernization, beyond media and design. According to Horkheimer and Adorno (2002), the only thing that man tries to learn from nature is how to use *techne* to dominate nature and other men. According to the mainstream evolutionary theory as depicted in the *Dawn of Man* scene in *2001: A Space Odyssey* (Kubrick, 1968), indeed it is. Violence and dominion were the first actions of the primate beings that awakened to the use of a tool: a bone as a weapon. Yet, a weapon is not always a 'weapon'; sometimes it is language. Depending on the point of view, the telescope does make the glimmering stars much closer to some. Depending on how it is designed, in the Heideggerian sense, it can reveal a hidden truth like the *poiesis* of a seed sprouting or a poem being written. The watermill brings forth the flow of the river and utilizes its energy without ever manipulating its course and intensity, contrary to the hydroelectric power plant, which changes the ontology of the river such that the river may stop being a river (Heidegger, 1977).

As another instance, let us consider the horse. 'If the horse is your primary mode of transportation, there are some things that you cannot do' (Orr, 2002, pp. 5-6). You cannot farm more than you need, for instance, you cannot desire to take over your neighbour's land, you cannot blow up a building and escape, you cannot escape the time and space of your land (Orr, 2002, pp. 5-6). Because the horse limits the size, the speed and the power you can have and control, you have to become an active observer and part of the time and processes of your land. Yet the horse is not a human tool but a living being that knows how to think like a mountain. What we need in the bottom line is a design that metaphorically behaves like a horse, as in the case of the watermill or the telescope. Each is a perfect example to meet our guiding ecological principles of *patterns*, *interconnectedness*, *polyculture*, *context*, *quality* and *autonomy*.

The purpose of this research was to seek an ecological approach for designing interactive media and technologies that contribute not to the cause but the relief of the current mind and ecology crisis. In the guideline we propose, we seek answers that come from 'the patterns which connect' and which might naturally answer the problems of much other design and life-related fields.

Although 'blue mountains are constantly walking' among us, they can still be hard to climb (Snyder, 2010, pp. 110-111). If we have the telescope or some other poetic media, however, we may get closer to the glimmering stars.

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Twelve potluck principles for social design

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Abstract

The term 'social design' is used in a variety of contexts, but—or maybe because of this—it is far from clear what it means. The starting point for this paper is that there is a need for stronger and more critical community discourse to understand and clarify what social design is and what it does. By analyzing key texts, the paper identifies commonalities, disagreements and unresolved questions in relation to social design. Drawing on the example of citizen science, the paper argues for a need to develop principles for social design for further inquiry and discipline-building for social design. The paper offers twelve principles that focus on the notion of the social in social design, its methods and practices and its normative intent, as well as its critical reflexivity. These principles are intended as a 'potluck' boundary object to kickstart a stronger social design community. The paper reports feedback from two workshops where these principles were discussed and tested with design academics suggesting how the principles can be applied.

Keywords: Social design, Design principles, Manifesto, Boundary objects, Design research

Introduction

Design skills and knowledge are today used in higher education, business, the public sector and civil society to address social and public policy issues, such as the climate emergency, migration, air pollution and community inequalities. These many instances are being described as *social design.* Indeed, the term has been applied to encompass a diverse range of design work: creating community food projects, gathering pollution data, designing circular textiles, supporting charities and companies, and creating governmental strategies to reduce energy consumption or childhood obesity. Contemporary social design spans a gamut of practices, scales and political affinities from pro- to anti-capitalist, bureaucratic to anarchist, object- to system- and community- to governance-focused (Armstrong et al., 2014). What do these practices have in common?

This paper provides a short literature review to highlight the contradictory ways 'the social' is invoked within the literature that has (Markussen, 2017, p. 162) led researchers to question whether there is such a thing as social design (Tonkinwise, 2019). Markussen (2017) notes that "social design has become a murky concept" (p. 161) and that "the field of social design has become so multifaceted in theory and practice that it seems to deter anyone from trying to say exactly what social design is" (p. 162). We argue that forging social design as a single discipline and field of practice requires a stronger and more critical discourse around the concept of social design, resulting in a more critical, reflective and reflexive social design community. Based on observing parallel work that has taken place within citizen science around the creation of a set of shared principles (Robinson et al., 2018), we propose that social design should follow a similar collective articulation process. We thus offer twelve *potluck* principles of social design to kickstart the development of more informed discourse. A 'potluck' is a collective meal where people bring dishes in an unplanned way—resulting in surprising combinations. Together, these twelve principles offer a broad characterization that both acknowledges the irreducible diversity of social design while aiming to

consolidate and simplify commonalities to advance practice and research.

What is our motivation? We do not want to discipline practitioners and researchers to adhere to the 'right' way of doing and thinking about social design nor do we want to force conformity. We are interested in facilitating sense-making among different and conflicting worldviews to create a transition in social design. We are not proposing a new paradigm for social design but instead aim to facilitate examination of the existing claims about social design. In doing that, we are supporting transition by taking on the role of 'boundary spanners' (Klerkx et al., 2010) that create principles as a boundary object to drive change, but do so without imposing top-down solutions. These twelve principles are intended as a provocation to practitioners and researchers involved in social design and a contribution towards consolidating a community of practice and inquiry.

Key texts on social design: Commonalities, disagreements and questions

What is social design, and how has it been defined in the literature? Below, we review a sample of texts to highlight some commonalities, disagreements and unresolved questions in key texts on social design. We identified contributions that were specifically attempting definitional work and that capture the current academic discourse on social design, rather than its long history. These are a mixture of papers, books and blogs. Some of these contributions used the term 'social design', whereas others used related terms like 'socially responsive design' or 'design for social innovation'. While some authors like Manzini attempt to establish a difference between social innovation as focused on social forms and social design as focused on social problems, Manzini acknowledges that in practice they are hard to differentiate (2014). We include the range of these texts based on their engagement with the broader social design discourse.

Commonalities

It is widely agreed that social design is done *with* people as "a social activity" (Tonkinwise, 2019, p. 10). Chen and colleagues observe that all the social design papers they examined involved situated social activity with people (2016, p. 3). Markussen argues that social design is "a collaborative design process where designers involve a specific group of citizens, public and private partners to achieve social change" (2017, p. 169). For Manzini, (2015) the participatory nature of social design, where designing is distributed across multiple social actors, raises questions about the specialist role of the designer. Thorpe and Gamman identify three modes of collaboration within social design: a *paternalistic* mode where the designer assumes responsibility, a *maternalistic* one that involves the designer enabling others, and a *fraternalistic* approach where the designer is one among many in a collaborative process (Thorpe & Gamman, 2011, p. 221). These discussions show that social design has developed a sensitivity toward the dynamics and power relations involved in participatory processes and infrastructure practices (Björgvinsson et al., 2012; Hillgren et al., 2011).

The literature is also in agreement that design, including social design, operates with and through objects as a material or materializing aesthetic practice. This attention to materiality makes social design different from other disciplinary communities operating on the social: "designers bring to the social a focus on materiality, how things can promote, sustain or obstruct certain types of social life" (Tonkinwise, 2019, p. 11). Some authors suggest that social design involves *socio-material things* rather than inert objects (Binder et al., 2011, 2015). These discussions highlight the way social design exists as a meeting point between a variety of social and material concepts and practices.

Disagreements

Some argue that social design involves *regular* design skills and practices that are applied to specific kinds of social problems instead of commercial interests (Thorpe & Gamman, 2011). In this framing, *social* is a synonym for "particularly problematic situations (such as extreme poverty, illness, or social exclusion, and circumstances after catastrophic events)" (Manzini, 2015, p. 64). This framing encompasses graphic designers making public health posters and architects building public housing. In contrast, other authors argue that social design is unique because it involves a distinctive way of designing (Chen et al., 2016; Kimbell, 2020). What these specificities amount to is, however, disputed. Another source of disagreement is whether social design does or does not aim to improve social realities. Some authors claim social design is "design with a conscience," (Resnick, 2019, p. xiii) has "a noble ethical nature" (Manzini, 2015, p. 65) and has the intention to "improve people's lives" (Del Gaudio et al., 2016, p. 53). Papanek's foundational text, *Design for the Real World* (1973) is in this tradition, as well as contributions such as Victor Margolin, who claims: "the ultimate purpose of design is to contribute to the creation of a good society" (2019, p. 19). Yet other authors are not convinced by such claims, labelling them as "utopian" (Koskinen & Hush, 2016), highlighting the inability of designers to control change and protect good intentions from co-option (Chen et al., 2016; Thorpe & Gamman, 2011). Koskinen and Hush note that sociologically-informed social design struggles to create designed outcomes "equal to its critical ambitions" (2016, p. 68). In practice, the design proposals created by social designers are often not implemented (Bailey, 2021) or are intended as speculative future-making (Catoir-Brisson & Watkin, 2021). This presents an issue for people who want to make a strong claim for the positive outcomes of social design and forces us to distinguish between intentions and impacts. Controversies persist regarding the actual outcomes versus expectations placed on social design.

Questions

The overview of key social design texts surfaced several questions which spotlight future avenues for inquiry. These include questions of scale, the role of social theory and the significance of politics. Some authors distinguish between different kinds of social benefits and scales of impact (Markussen, 2017, p. 161). Koskinen and Hush identify 'molecular' social design, which aims to intervene in small-scale social worlds to "do good design work, humbly, close the door and go home" (2016, p. 67) and "sociological social design", which integrates sociological and critical theory into the design. These discussions highlight that social design has unresolved issues around how to address different scales of social structures and the need for new methods and concepts that can expand beyond the village.

Some authors suggest that the solution involves a more substantive engagement with social theory, sociology and other disciplines dealing with ideas of the social (Kimbell & Julier, 2019). Tonkinwise emphasizes the need for all designers to be aware of the systems within which their designs exist, and since these are social (not just technical) or even socio-technical, a specific set of concepts is required to grapple with them (Tonkinwise, 2019). Koskinen and Hush speculate that the difference between social design and other kinds of design may be "not so much in the actual design work, but in the conceptual and motivational scaffolding of the work" (2016, p. 65) and suggest that sociology can provide useful conceptual and reflexive tools. Similarly, Kimbell suggests that what matters more than methods is the conceptual positioning of social design: its "purposes, assumptions, reflexivity, forms of analysis and modes of organization" (2020, p. 5).

These observations indicate that social design may be more complex than other domains of design practice, leading several authors to highlight the political ambiguity of social design. Markussen points out that social design arose in the middle of "an ongoing ideological debate about democracy, empowerment and civic

resistance against systems of power and control" (2017, p. 165). Chen and colleagues (2016) identify a variety of political positions and ideas in social design practices and projects: Scandinavian Marxism, critiques of unsustainable economic and political structures, social and industrial psychology, and – in 'user-centeredness' – a rejection of the political content of participatory design. The implication is that social designers

> *"…cannot choose their sides in the manner of early participatory designers. Whatever commitments they make, the implications of their choices are not in their control. Social design projects have ambiguous ends and articulate several agendas and visions, and their outcomes are ambiguous and unforeseeable."* (Chen et al., 2016, p. 3)

What emerges from this overview is a plurality of understandings, positions, and practices of social design. While there are commonalities, the discourse around social design encompasses fundamental disagreements and questions about its core objective of *the social*, with a lack of a shared language and common definition.

Methodology

To develop a framework within which the different approaches to social design can co-exist and support self-definition, we examined some parallel domains. Citizen science has some similarities with social design. It involves members of the public working with scientific experts and creating their research (Haklay, 2013). In the last decade, it has gained prominence and institutional support and funding and yet lacks a stable theoretical foundation. The role of the *citizen* has proved difficult to define and has parallels with the elusive quality of *the social* in social design, while the concept of citizen science is contested between the natural and social sciences as well as activist practitioners. So, while citizen science has taken place for more than a hundred years, the lack of a shared definition has made interdisciplinary collaboration difficult. However, in the last decade citizen science has undergone a significant process of community self-definition that offers a useful guide on how to proceed with social design. In the period 2013 to 2015, an independent body called the European Citizen Science Association started a consultative process that led to a document entitled the *Ten Principles of Citizen Science* (Robinson et al., 2018). This document was generated by a working group as a long list of potential principles, followed by an iterative two-year public consultation. The resulting principles are written in straightforward language that tried to synthesize academic and practitioner discussions. For example, Principle 3 states that: "both the professional scientists and the citizen scientists benefit from taking part" (Robinson et al., 2018, p. 29), noting a recurring issue within citizen science around who benefits from the activity.

The Ten Principles document has now been translated into 26 languages and proved useful in reaching out to people who have not been in contact with citizen science before. From the start, another goal had also been to use them as a "common set of core principles to consider when funding, developing or assessing citizen science projects" (Robinson et al., 2018, p. 27). The principles thus acquired a coordinating and disciplining function of delimiting what can be considered citizen science. This function has been very successful with the principles being used by funding bodies such as UK Research and Innovation to adjudicate what should be funded as citizen science (UK Research and Innovation, 2020). Yet within the broader citizen science community, there has been some concern about how well the Ten Principles function to adjudicate what is citizen science and arguments for curtailing their purpose. In a follow-up piece of work, a group of academics developed a process of community characterization rather than a definition—the difference being a focus on the description of empirical citizen science practice rather than axiomatic concepts (Haklay et al., 2020). The process involved generating more than a hundred vignette descriptions of citizen science practice as well as edge cases. The broad community of citizen

science was then asked to rank these vignettes in terms of how closely they represent citizen science (Haklay et al., 2021). Significantly, the result of this effort was a characterization of citizen science that is broader and more diverse than that which was captured by the initial Ten Principles. Other follow-up research analyzed the impact of definitional labelling on the citizen science domain (Cooper et al., 2021). In summary, these definitional and anti-definitional efforts are a powerful example of a community of practice working together to articulate and contest the boundaries of its domain.

We believe that translating such a process to social design could reap similar community-building benefits and raise critical discussion about the effect such definitions might create for social design. As in citizen science, we propose kickstarting such an effort by creating the Twelve Principles of Social Design and then opening them up to the wider community to rewrite and improve them. We consider that the social design principles could function in these ways:

- As a series of axiomatic truths, attempting to capture the fundamental nature of social design. While conceptually neat, we are not convinced that such 'truths' exist or would be useful for the social design community.

- As regulative ideas. In contrast to constitutive ideas which capture how reality is, regulative ideas make proposals for regulating human conduct. Rather than expressing truths, regulative ideas do not define notions such as social justice but set attitudes and expectations. This way of understanding principles bridges the axiomatic and the boundary object way of thinking about principles.

- As a design prototype to be iterated before reaching a revised or even final set of social design principles that are agreed upon by the whole social design community. Given the variety of locations, intersectional positions and perspectives within social design, we question whether such community agreement could ever be achieved and believe it might be more useful to see the principles as a transient process for supporting community building.

- As a potluck meal where each guest contributes a different dish to be shared with others without there being a central plan. Rather than aiming at creating consistency and uniformity, the goal is for the principles to function as a coordinating mechanism for bringing the community together. Social scientists have referred to this as a "boundary object" (Star & Griesemer, 1989), a device that is adaptable enough to encompass different viewpoints while being robust enough to maintain its identity across them. This means individual principles can use different theoretical and practical assumptions of the social if they can remain distinctive as a whole. While this is a balancing act, we suggest that aiming at social design potluck principles is achievable and helpful for bringing together the traditions of social design that exist in different silos.

The principles we offer in this paper were created via team discussions adopting a potluck approach that integrates the different perspectives of the authors. They combine concepts of "the social" from Actor-Network Theory (Latour, 2005), which focuses on including non-humans, as well as humanist ideas of social inclusion and normative change. This fusion represents what the philosopher Andrzej Nowak has called a "fire and water" synthesis that brings together humanist ethical-political sensitivity with post-humanist ontological insights (2013). Nowak suggests it is only by creating such unlikely combinations that it is possible to acquire an ontological imagination for transforming the world. Nevertheless, developing this ontological imagination is difficult (Nold, 2021a) and the principles are an experimental chimaera that

is receptive to further input from other traditions and approaches.

The principles have been shared with the social design community since late 2020 in the form of a publicly editable online document, and two participatory workshops in 2021 and 2022 with 20 and 45 participants respectively. The participants included design students, senior design educators running their own social design courses as well as neighborhood design activists, commercial designers and academic design researchers. These events offered up the draft principles for collective discussion and evaluated them against a series of empirical case studies of social design contributed by the workshop participants.

Principle 1: Social design claims that the 'social' is made through and with things

This principle suggests it is not enough to design for human users and social groups—social designers must wrestle with collectives where people and nonhuman "things" are intermingled (Brassett, 2018). This notion of the social is made up of combinations of human and nonhuman entities. Arguing that social design can redesign "the social" is a powerful claim because the theoretical literature merely offers tools for analysis, rather than design, of post-human socials.

Principle 2: Social design operates on the relational practice between human and technical systems where human-centred design is inadequate

This principle highlights that social design must tackle technical and human problems together and at the same time. Dualistic separations between technologies and people such as "human-centred design" have made it hard to engage with notions such as systems in design (Nold, 2021b). Drawing on post- and more-than-human relational perspectives, (Bennet, 2010) social design has to recognize the diverse embodied beings, living forms, ecologies and materialities that participate in configuring the social.

Principle 3: Social design extends across an object and planetary scales, domains and sites

A socio-material approach demonstrates that social design is not confined to obvious sites of social activity such as community organizations or social services. Instead "the social" permeates and extends across scales—even to the planetary scale of climate change (Hunt, 2020). This approach allows social design to engage with multi-scalar issues, such as the deployment of artificial intelligence into society and disaster-related displacement of people.

Principle 4: Social design acknowledges that there are many ways of operating in the social

This principle acknowledges that social design takes place in many ways and sites from interpersonal relations to formal institutions, informal organizations and projects. Professional communities beyond traditional design such as managers and policymakers have long been "designing" social things. The principle recognizes the diverse logics of acting on the social, which include methods, tools and skills as well as bundles of resources existing within institutional logics (Armstrong et al., 2014; Kimbell, 2021).

Principle 5: Social design is an anticipatory materializing practice that proceeds through inquiring into and reconfiguring narratives, sites and worlds

Building on studies that emphasize the situated practices of those involved in designing and using designed things, this principle points to the inventive, generative and creative character of designing. The concept of "anticipation" (Miller et al., 2018) highlights the capacity of designing to exceed current possibilities and reconfigure ways of knowing, being and doing in and through social worlds.

Principle 6: Social design engages multiple kinds of knowledge — no single discipline has a privileged methodology for operating on the social

This principle emphasizes the synthetic, interdisciplinary character of social design as an assemblage of many epistemic claims and methodologies. One of the key encounters is between Actor-Network Theory and humanist ideas of normativity and reason. Social design is thus a place where ethical-political sensitivities and post-humanist ontological insights can meet (Nowak, 2013).

Principle 7: Social design is underpinned by normative intent, whether or not deliberate or explicit

This principle highlights that the effects of social design can be for good as well as ill; it means that the forms of social designing need to be justified and critiqued. Being engaged in social design means participating in an activity that is subject to personal and collective judgement as well as public evaluation.

Principle 8: Social design forms issue-publics by creating collaborative endeavours with communities through discussion about purposes, needs, values, agency and consequences

This principle captures the nature of social design as not just socially embedded but also capable of generating new social formations. The point emphasizes that collectively constituted design processes can create issue-publics that are (re)formed in and through the process of social design (Marres, 2012). This raises questions about what binds those communities of inquiry and practice together and how long those collectives last.

Principle 9: Social design builds new democratic relations between places, living beings and things

This principle attends to the political character of social design and its consequences and implications. It outlines an intention to achieve equitable relations between living beings, things and ecologies that can be represented and have agency. Here design expertise and traditions are in dialogue with understandings of co-production and democracy (Durose & Richardson, 2015; Saward, 2021).

Principle 10: Social design is critically aware of its political, systemic, institutional, and environmental situatedness

This principle builds on observations about the socio-technical embeddedness of designing but recognizes that, in the case of social design, the systemic context is more-than-technical. This means asking critical and reflexive questions (Alvesson & Skoldburg, 2000) about design practice: “Whose interests does this serve?” and “Is this the appropriate scale for intervention?”, as well as about the designer as a person: “How is my understanding influenced by my standpoint?” and “What other perspectives might help me?”

Principle 11: Social design problematizes the history and modes of professional design, its inequalities, absences and exclusions, such as its Eurocentric assumption, and racialized and gendered outcomes

This principle builds on the history of social design as a critique of the mainstream and proposes social design as an ongoing critical practice (Mazé, 2008). This means understanding the problematic histories of both the mainstream and social design itself, recognizing the epistemic regimes within which they have arisen and excavating the complex power dynamics inherent in designing and designs (Abdulla et al., 2019; Schultz et al., 2018).

Principle 12: Social design tries to mitigate against the unintended and damaging outcomes of designing.

The world is littered with the damaging effects of design, both intended and unintended (Monteiro, 2019). This principle, responding to social design's humanist tendencies, proposes that what is needed to realize well-meaning ambitions is an additional loop of critical reflection. If design typically asks about the possibilities with an inherently optimistic slant, social design must also ask "What's the worst that could happen?", "Do we risk exacerbating a problem rather than helping it?" and "Is design the appropriate response?"

Discussion

Whenever one sees principles or a manifesto, it is easy to have a knee-jerk reaction: "This is wrong!" and "That doesn't make sense!" Even amongst the authors of the paper, we do not agree on all the principles, and yet we believe that they are meaningful and productive when seen as a collective potluck gathering. We see our role as offering the principles as a boundary object that can be used "to drive transitions through bridging conflicting logics without constraining their diversity" (Franco-Torres et al., 2020, p. 34). Boundary objects work to support sense-making not despite but *because* they "hold different meanings for those involved" (Tharchen et al., 2020, p. 9). It is thus the blend of differences in the principles that are intended to kickstart a community and help support the social design discourse.

When we presented these principles to researchers and practioners working in social design via the online document and the two participatory workshops, we received constructive as well as challenging feedback. Some of the requested changes were minor, but other feedback was more substantial, such as the need to emphasize the participatory nature of social design, the impossibility of applying all the principles at the same time and the difficulty of picking which ones to apply. The most oppositional comments were made anonymously to the online document, and they challenged our assumption that social design is normative by suggesting, "it can just be a pleasure, not a cause". This range of feedback has informed the present principles by forcing us to further clarify them and to explore how they can be applied within real-world contexts. The participants suggested that the principles function as a diagnostic device for designers to reflect on their practice. They also emphasized the use of the principles with external partners and stakeholders to articulate what is involved in social design and to establish a common set of reference points to enable better collaborations. One interesting observation was that the participants argued that the principles permit designers to be *more* normative—social design does not mean having to be disinterested and impartial and that the principles encourage designers to pick which stakeholder agendas they want to support. Finally, the participants argued that the principles can assist the broader design discipline by promoting transparency and analysis of what takes place within social design projects.

One challenge identified was the academic language in which the principles are expressed, which might not be suitable for a practitioner community. Reflecting on this point, we note that social design currently has to borrow theoretical concepts to talk about 'the social' as socio-material. Despite research emphasizing its relationality, much design *practice* is still framed as 'human-centred', and practitioners do not have a way of talking about the entanglement of people and technologies. In addition, we believe that retaining the multiple phrasings of social design might be beneficial for generating more robust and honest soul-searching about the goals and assumptions within practice and research. This is in line with the way boundary objects have been used to develop "pluralistic tolerance" (Stirling, 2011) and cooperation without consensus. So, for now, we retain the mix of academic and plain, emotive language in the principles to represent the multiple nature of social design itself.

The other challenge we received was that there is a benefit to the current ambiguity around social design. Participants worried that the principles might end up as a regulatory—and exclusionary—checklist. Our response is to point to citizen science where the creation of principles also triggered other definitional processes that contested the principles. We argue that this kind of dialogue is productive and can contribute to building a base for conceptual and methodological formation necessary for a field of inquiry to be established. As academics researching and practising social design, we hope the potluck principles are a step in building social design into a distinctive discipline in the same way other areas such as Service Design and Cultural Studies have managed to achieve. These disciplines have created enough 'gravitational pull' for practitioners and researchers to coalesce around a common language and to establish concepts, methods, and approaches. Our concluding thought—perhaps a call to action—is that the social design community needs to come together to better articulate its concepts and approaches in order to take ownership of its central object of *the social*.

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Nurturing public value for community resilience. A tentative discussion around co-production of narratives through a civic design approach

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Nurturing public value for community resilience. A tentative discussion around co-production of narratives through a civic design approach

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Abstract

Within a society characterised by growing complexity, communities attempt to address wicked problems (Rittel & Webber, 1973), which impact how people live together. The concept of community resilience has been discussed in public policy and social-ecological systems studies for communities to be prepared for emergencies. Recently, evolutionary resilience (Davoudi, 2012) has been proposed in the context of communities facing wicked problems evolving within uncertain worlds. Evolutionary resilience highlights the growing need for flexible adaptation towards more dynamic social change. We argue that nurturing public value could be a strategic approach for taming wicked problems beyond resource control and the capacity for communities to achieve resilience in a rapidly changing society. Indeed, the broad literature about public value already implies that it can be properly developed as an outcome of collaboration between public institutions and citizens. However, the processes nurturing public value are still under investigation, especially within design studies. We propose that the co-production of common narratives between public institutions and citizens fruitfully produces public value, by linking design narratives to the interpretive approach tightly associated with the concept of evolutionary resilience. Moreover, we suggest that the emerging realm of civic design could be a consistent approach for communities and public institutions to produce and reproduce these kinds of common narratives.

Keywords: Public value, Community resilience, Evolutionary resilience, Sustainability, Storytelling, Design narratives, Civic design

Complexity within liquid society

Society is changing, and it is changing rapidly due to the liquid nature of the relationships characterising it (Bauman, 2000). All human systems are exposed to unexpected risks and fragilities, which trigger hectic and multifaceted transitions that are increasingly more common, profound and dramatic. These transitions generate a growing complexity requiring creative solutions addressing a high degree of situatedness. Within this scenario, we argue that design narratives and civic design can effectively engage with this multi-level complexity, resulting in new resilient communities moving towards sustainability at an environmental, social and economic scale.

Towards community resilience by nurturing public value

Community resilience beyond conventional approaches

While conventional approaches to resilience have been adopted within emergency preparedness and planning, focusing primarily on resource control and capacity (Chubb et al., 2021), the resilience of communities has been discussed in public policy and social-ecological systems studies. Scholars in these areas of study commonly understand resilience as the capability of a system to absorb disturbance, experience change and preserve its fundamental functions, structure, and identity (Resilience Alliance, 2010).

Since communities are composed of people, community resilience hinges on, yet is not limited to, its people's relational structure (Sang Baek et al., 2015). Within communities, social bonds are not fixed and continuously evolve, led by diverse trajectories and dynamics of interaction, transformation and adaptation. Hence, within the context of communities, the notion of resilience is not conceived as a return to "normality": it is understood as the capacity of complex socio-ecological systems to transform and adapt with or without external catalysts. Davoudi (2012, as cited in Monna & Auricchio, 2020) refers to this conception of resilience as "evolutionary resilience". This concept shifts beyond conventional approaches to resilience because transformation may be triggered by

> "…*internal stresses with no proportional or linear relationship between the cause and the effects. This means that small-scale changes in systems can amplify and cascade into major shifts (reflecting Edward Lorenz's idea of "the butterfly effect") while large interventions may have little or no effects*". (Davoudi, 2012).

This framework requires constant learning of an evolving and uncertain world, where communities moving towards sustainability need to deal with the indeterminacy of wicked problems.

Communities addressing complex issues

Although all the issues a community seeking resilience faces are contextual and ever evolving, many of them impact how people live together and how they experience and give shape to their spaces. Since these issues are complex and ill-structured, they acquire the nature of "wicked problems" (Rittel & Webber., 1973). Indeed, they are identified by the following qualities:

- there is no definitive formulation of the problem, since it is understood during the development of a possible solution. Each potential solution uncovers new facets of the problem, which require further investigation;
- positing that there is no definitive problem, and there is no conclusive neither right nor wrong solution;
- each solution is a "one-shot operation" and has no given alternative solutions;
- every wicked problem is unique and might be the symptom of another problem;
- around every wicked problem, there are conflicts about its values and objectives. Choosing to explain a wicked problem in a certain way determines the nature of the solution.

Communities engage with the explosive combination of centrifugal and centripetal forces surrounding these issues, seeking to redirect self-interest towards the common good and shared responsibility for "our joint world" (Landry, 2017). How do communities engage with these wicked problems? How do they determine what they deem as their common good?

Taming wicked problems beyond resource control and capacity

Traditionally, the complexity, dimension and scale of situated wicked problems are a prerogative of the polity, which addresses them through resource control and capacity, putting the accent on a deficit-based approach (Chubb & Jennings, 2021). However, "taming wicked problems requires crisis leadership that addresses challenges and issues [also] through relationships" (Chubb & Jennings, 2021). Indeed, only through relational structures can a community collectively shape and socially govern its commons (Basu et al., 2017; Ostrom, 1990), intended not only as a "utilitarian concept but [also as] the moral and political condition of human life" (Matei, 2011). In this perspective, "the common good is determined by

broadly inclusive dialogue and deliberative processes. Citizens are seen as co-creators actively engaged in creating what is good for the public" (Stenvall et al., 2022) or, in other words, "public value" (Moore, 1995).

Moore (1995) proposed the concept of public value as the counterpart of shareholder value within public management. Initially, this notion advocated for public officials to value public services' benefits and costs not only according to money "but also in terms of how government actions affect important civic and democratic principles such as equity, liberty, responsiveness, transparency, participation, and citizenship" (Kavanagh, 2014). Despite this, today, the term is not limited to the public sector, but it broadly relates to the contribution to the common good by any kind of organisation (Meynhardt, 2009).

Moore (1995) suggests considering the entire chain of value production, starting from the inputs, moving to the processes and finally focusing on the impact on stakeholders, which eventually spurs the intended social outcome (Kavanagh, 2014). Moore (1995) explains the entire chain of public value production through what he refers to as the "strategic triangle" (Figure 1). "The model consists of three concepts, public value, legitimising environment, and operational capacity" (Salemans & Budding, 2021). It illustrates that public value is produced when a strategic action is both given democratic legitimacy, (i.e. it has been supported by the involved community) and is endorsed by an authorising environment, such as a governing board and when an institution has the operational capacity to implement the strategic action adequately.

Moreover, Moore (1995) shows a relation of interdependency among the three elements of the strategic triangle: the more public value is created, the more citizens gain trust in the government, the easier it is for elected officials to obtain resources, and, finally, the simpler it becomes for a governing board to endorse new strategic actions, restarting the feedback loop. In a few words, public value is "about delivering a service that is sustainably valuable" (Salemans & Budding, 2021).

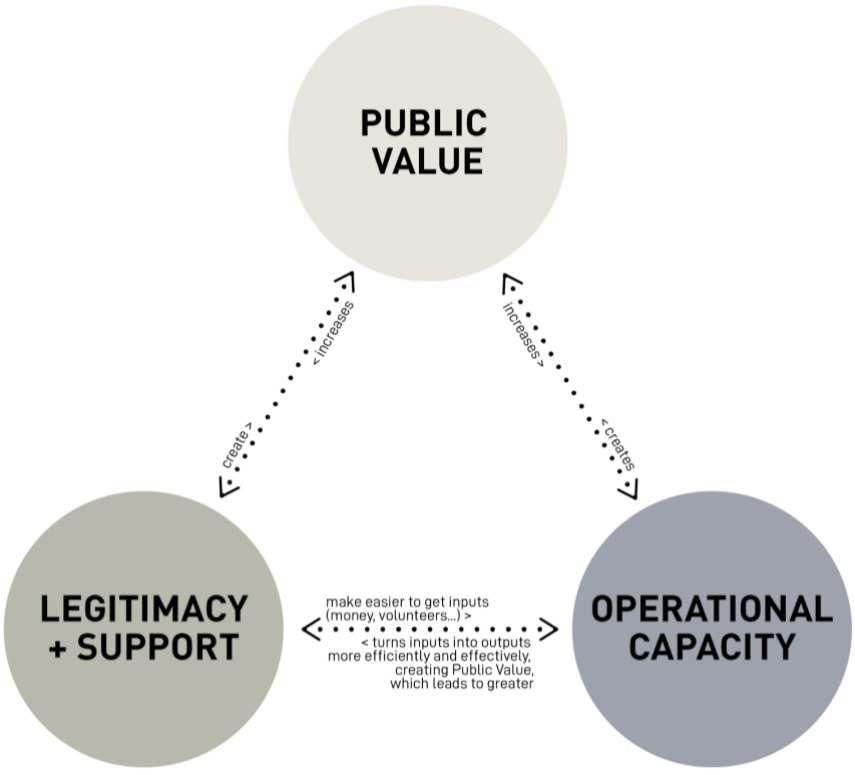

Figure 1: Public Value Strategic Triangle. Adapted from Moore, 1995.

When a governing board takes decisions concerning wicked problems, its choices "reflect local public values" (Stenvall et al., 2022). This means that a community's resilience is highly influenced by its public values and is considerably grounded in situated relationships. Hence, how can public value be nurtured?

Power of narratives to nurture public value for community resilience

To nurture public value, we propose that narratives can be powerful drivers to facilitate and coordinate two components of Moore's strategic triangle (1995), namely "legitimacy and support" and "operational capacity". Through promoting collaborative interactions among public institutions and communities consisting of citizens and diverse types of stakeholders, narratives can generate dynamics and trajectories encompassing shared values. Hence, public values generated by common narratives between public institutions and communities function as a solid foundation of a resilient community, since the processes and outcomes are negotiated and shared by potentially all the stakeholders.

Narratives by design as nurturers of public value

Narratives have increasingly been addressed in design fields due to their essential properties, which comprise both a human cognitive process (Polkinghorne, 1988) and a mode of communication (Fisher, 1985, 1987). Narrative — a plot of sequential and interconnected events with a beginning, a conclusion and a basic structure — allows humans to use it as a sensemaking currency (Fisher, 1985; Boje, 1991). Its essential properties of being a human cognitive process and a mode of communication (Bruner, 1986) allow the conceptual use of narratives in many disciplinary contexts, such as sociology, history, psychology, communication, anthropology, philosophy, business management and design studies (Rhodes & Brown., 2005).

In the field of design study, narratives and storytelling have been studied in creative practice (Lloyd & Oak, 2018) and from broad dimensional aspects, such as "narratives as competency", "narratives as process", and "narratives as artefacts" (Hayama et al., 2021). Especially in the context of communication design, narratives have been underlined as enablers for the inclusion of people in the social innovation process (Ciancia et al., 2014). Narratives and stories unlock people's potential and relationships in participatory design processes by collecting stories, expectations and wishes from the community as tiny tales from everyday life (Ciancia et al., 2014). In this sense, narratives and stories can play a significant role in developing a common language and building empathy with people in a specific community context.

Regarding public value, narratives are considered to develop clear goals and legitimisation by stakeholders (Salemans & Budding, 2021). Salemans and Budding (2021) argue that using narratives is a fruitful way to communicate ambitions and results in terms of public value. However, they also warn about the potential risk of influencing management and inducing bias, given the capacity of narratives to convince people (Brennan & Merkl-Davies, 2013; Beattie, 2014).

In these lines of argument, we suggest that narratives can be potential enablers to generate public values, facilitating the co-creation of social commons among public institutions and communities. A designerly approach can perform effectively as a powerful facilitator to generate common narratives among citizens and different social actors through active engagement, a common language and empathy building. Any story consists of three essential elements: "a narrative subject in search of an object, a destinator (an extratextual force, the source of the subjects' ideology) and a set of forces that either help or hinder the subject in acquiring the desired object" (Fiol, 1989). Following this pattern, community stories might be structured accordingly: the narrative subject as the citizens or the community; the ultimate object or goal

of the narrative as sustainable community development and maintenance; and the destinator as the community and societal environment in which the narrative subject operates. In this context, a designerly approach can facilitate collaboration with communities and peers to set a common ground for discussion, engagement and moving people together. Performing the double roles of "storylisteners" and "storytellers" (Ciancia et al., 2014), designers can collect potential fragmented stories from community members and organise information in a structured manner. As Ahmad and Thompson (2009) state, "storytelling as a means to sharing knowledge, building trust, and cultivating identity" could allow communities and public institutions to collect shared knowledge, build trust in each other and develop an intersubjective identity through a participatory approach. Consequently, a solid basement of trust and an identity shaped by narratives enable a fruitful ground for democratic legitimacy, a fundamental part of public value.

Not only do narratives facilitate the generation of democratic legitimacy, but public managers can also use narratives' benefits to build up another important basement of public value creation, which is the support of an authorising environment. Indeed, once a specific public matter is democratically legitimised, public managers can easily align their mission with values articulated by citizens. Strongly supported by citizen-driven legitimacy, public managers can contextualise their mission on the common narratives and position themself in democratic political discourses. In other words, by relying on common narratives, public managers can easily involve essential stakeholders, such as formal authorities (e.g., the governing board), impacted citizens, especially citizens whose voices are commonly unheard, the media and the broader citizenry, as well as influential individuals outside of formal organisations.

From the perspective of Moore's strategic triangle, once democratic legitimacy has been built up, it triggers the community to get easier access to the essential support of public authorities (Moore, 1995; Kavanagh, 2014). Then, the managers of the public institutions who have collaborated with the community can easily access inputs (e.g., money, volunteers). Hence, a loop of public value production and amplification would be triggered, since the public institutions and citizens would collaboratively achieve two pillars of the strategic triangle of public value: legitimacy and support and operational capacity.

Focusing on democratic legitimacy building at the beginning of a shared project would enable public institutions and communities to make the most out of the narratives and storytelling produced to generate public value in an interdependent way, activating a feedback loop. A designerly approach to storytelling and narrative creation could potentially trigger public value generation by achieving a firm foundation of democratic legitimacy towards a specific public issue through collaboration, which unlocks the potential of people and the relationship among all the stakeholders of a community.

Potential roles of narratives towards community resilience

Public institutions could use the potential roles of narratives to nurture public value and, thus, develop community resilience. As mentioned above, the capability for a community to tackle complex, wicked problems flexibly, in other words, nurturing evolutionary resilience, is becoming increasingly crucial. Since evolutionary resilience emphasises "fluidity, reflexivity, contingency, connectivity, multiplicity and polyvocality" (Davoudi & Strange, 2008), Davoudi (2012) proposes that the "interpretive approach" has good parallels with it. Indeed, contrasting with the naturalist-positivist approach, the interpretive approach "considers knowledge to be a matter of understanding rather than an explanation" (Davoudi, 2012). Certainly, social phenomena diverge from natural ones because they hinge on people's meaningful and intentional actions. Hence, instead of explaining the causes of behaviours, social sciences seek the meaning of action, making sense of them individually and on a social scale.

Within this perspective, narrative as a mode of communication and a mode of knowing is endorsed as an original scientific approach based on “narrative rationality” (Bruner, 1986; Czarniawska, 2004; Fisher, 1987). As narratives are intrinsically “interpretative flexible” (Pinch & Bijker, 1984), they can be shared with diverse audiences, stimulating multiple ways of thinking and enabling individuals to draw inspiration from concepts, ideas and events concerning their understanding and contexts. In this sense, narratives are considered a boundary object (Star & Griesemer, 1989). Indeed, they are both coherent enough to bring together individuals' expression of different facets of communities and pliable enough to let them draw inferences that fit their unique contexts. According to Fisher’s (1987) “narrative paradigm”, human beings are storytelling animals that make sense of their world and their own lives through narrative understanding, as their interpretations of the world.

Consequently, as a solid interpretative artefact, narrative can have strong potential to develop evolutionary resilience within a community through an interpretive approach. Then, how can citizens and public institutions generate common narratives which can function as enablers of nurturing public value towards an evolutionary resilient community? We argue that Civic Design might be the preferable approach.

Civic Design fostering common narratives

Even if the notion of Civic Design is yet to be theoretically clarified within design studies, we agree that Civic Design “is an approach for inclusive and productive conversations” (We Who Engage MIT, 2020), contributing to “new forms of living together” (DiSalvo & Le Dantec, 2017). This means that there is the need to consider new modes of encounter — new ways of working with communities, with government and non-government agencies, with all manner of civil society and even (perhaps especially) with those who work beyond the normal conceptions of what is appropriate of civil action (DiSalvo & Le Dantec, 2017). This last point is critical when talking about co-producing narratives that actively involve all the impacted stakeholders, which is crucial for the successful creation of public value. Indeed, Civic Design aims to create a space where, even if unanimity is hardly present if treated as a place in common, diverse voices can be heard, enabling a process resulting in negotiated resilience (Harris et al., 2017). This space would allow stakeholders to discuss both the symbols and the structures on which society is based, opening the opportunity to create new common narratives around problems, sparking new publics into being (Dewey, 1927; Marres, 2005). Common narratives could challenge and rethink established ideas that citizens have of themselves. This would transform the situated community’s public value which, potentially, could activate the community towards the open-ended remaking of its governance structures.

Discussion

Although the literature about public value has been long-standing, it has barely crossed the field of design studies. We propose an original yet quite raw view on how public value might be nurtured through designerly approaches and processes. Specifically, we have bridged the concepts and practices of Design Narratives and Civic Design with significant debates around public value management and evolutionary resilience concerning communities. Our reflection emphasises that a designerly approach to public value generation is meaningful in terms of legitimisation. Indeed, both Design Narratives and Civic Design generate inclusiveness through engagement, participation and collaborative actions. These actions contribute to the production of public values resulting in a resilient community hinged on inclusiveness.

A limitation of the presented contribution is that it does not clarify how Civic Design builds common narratives. Indeed, the operational framework of Civic Design is yet to be defined, and it is the subject of ongoing PhD research.

Moreover, we consider an empirical study essential. Here we propose a reflection to open a discussion about the designerly opportunities nurturing public value, which are yet to be investigated by design scholars. However, we suggest proceeding with an empirical study grounded in real projects within the Design Narrative and Civic Design realms.

Furthermore, we suggest several research avenues regarding public values and community resilience through a design study point of view. For example, among the many, investigating the broader roles and contribution of design to strategic management in governments (Moore, 1995), such as Design Narrative for strategic sensemaking in governments.

Conclusion

Within design studies, the processes enabling the production of public value are yet to be clearly described and framed. The presented reflection brings the approaches and processes of Design Narratives and Civic Design into public value management and community resilience debates. This reflection critically considers complex relations between community and state, exploring common narratives nurturing public value as a fundamental agenda for democratic governance.

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Teaching design in emerging countries: A train-the-trainer methodology

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Teaching design in emerging countries: A train-the-trainer methodology

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Abstract

Design disciplines have constantly evolved to keep up with the emerging demands of the 21st Century. Design education is thus called to change its methods, tools and approaches. There is an increasing interest in emerging economies in design education, especially in India, where the role of creativity, communication and technology can support social and economic development. This paper aims to present the educational approach developed in the context of the Erasmus+ KA2 project entitled 'Design and Innovation Capacity Building in India/DESINNO'. The modernisation and internationalisation of Indian universities with innovative and contemporary design courses have been the main goals of a set of research and training activities. In this paper, the state-of-the-art methodologies in design thinking, sustainability, design research, social innovation and ethical issues in design are presented, leading to a bespoke educational approach that provides a platform for Indian design academics to apply modern educational approaches to their specificities and needs.

Keywords: Integrated product design, Interaction design, Human-centred design, Train the trainer, Strategic design, Blended learning, Design thinking, Indian universities

Introduction

The state of the art of practice-based design approaches undertakes the focus on the design studio and design workshop methods for learning. Contemporary design approaches and associated skills are moving design education to answer to emerging issues such as the service economy, digitisation and integrated product design that are new areas of education for the Indian design institutions participating in DESINNO. The research question explored in the DESINNO project and presented in this paper aims to answer this need with a solid understanding of the value of the practice-based design approach and its implication in the tools, learning methods and related programmes. This paper presents a methodology to create innovative design courses through the transfer of knowledge to academics. This train-the-trainer methodology aims to balance the global evolution of design discourse and pedagogy and local needs, competencies and challenges. The DESINNO project revolves around the role of design and innovation centres inside the universities as places that provide a common ground for:

1. The development of innovative and permanent methods for research and design approaches.
2. The establishment of cross-sectoral projects for collaboration and co-learning.
3. The establishment of inter-industry projects to facilitate the inclusion of design thinking approaches.
4. The development of extreme affordability principles for the benefit of developing nations while taking care of the accessibility and sustainability aspects of design.
5. The development of community-based programmes to enable designers, craftsmen and artisans.
6. The modernisation and internationalisation of Indian Higher Education Institutions (HEIs) by the improvement of university design courses that will encompass product and service design by following

state-of-the-art methodologies in design thinking, sustainability, design research, social innovation, ethical issues in design, etc.

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Design and innovation centres have a design lab with certain equipment and software for new product development and prototyping. These centres have a strategic role in the practice-based approach to design education. In addition to the establishment of said centres, courses new to the curricula of the three participating HEIs are to be added to support the use of the centres. Design can foster meaningful social change in emerging economies such as India, as it provides the tools to sustain economic growth, to better address the needs of citizens by providing low-cost innovation and create jobs. For the DESINNO project, we developed a social innovation approach that brings grassroots innovators in contact with designers to scale up tools and products created. Creating design-related social entrepreneurship by collaborating with academia through design and innovation tools is an important goal of the DESINNO project. To support the Indian academics in the creation of the novel courses, three capacity-building sessions were undertaken to provide them with material, content and educational methodologies to develop courses that better fit their needs and competencies.

The paper is structured in three main sections. First, the research approach, question, and state-of-the-art educational approaches concerning design pedagogy are presented. The second section presents the three capacity-building programmes put forward. In the last section, conclusions are drawn, and the lessons learned are reflected upon.

Design education

Teaching design today needs a specific training methodology and the establishment of new educational experiences and services in higher educational institutions and universities. In addition, the COVID-19 pandemic has accelerated changes towards remote and blended learning, and its consequences will be felt for years to come.

The theoretical framework for a new training methodology in design starts with the concept of the well-known ‘experiential learning theory’, which stems from the assumption that learning is best conceived as a process, not in terms of outcomes. According to this theory, ideas are not fixed and immutable elements of thought but are formed and re-formed through experience, and thus new knowledge, skills and attitudes are achieved through an immersive and concrete learning experience. Put differently, learning is a process where concepts are derived from and continuously modified by experience (Kolb, 1984). Such a learning experience works within a boundary between observation and reflection on the one side and theory and practice on the other.

Experiential learning theory offers an asset of awareness that is increasingly demanded by professionals and apprentices in all fields of design (strategic design, service design, fashion design, interaction and communication design, etc.). The boundary between theory and practice is one in which design finds its best nourishment.

According to the six propositions of Kolb’s theory, the specific focus of a new training methodology in design supports the application of an innovative didactic method (Vignati et al., 2017):

1 Learning is best conceived as a process, not in terms of outcomes.
2 All learning is relearning.
3 Learning requires the resolution of conflicts.

4 Learning is a holistic process of adaptation to the world.
5 Learning results from synergetic transactions between the person and the environment.
6 Learning is the process of creating knowledge.

The training methodology developed would therefore support the implementation of a learning experience by balancing abstract conceptualisation and reflective observation with concrete experience and active experimentation (Kolb, 2005). This methodology has been tested through three capacity-building programmes for a group of Indian delegates to train the trainers and improve an innovative design education scenario for new courses in the Indian universities. Moreover, building upon experiential learning and Kolb's theory, the didactic methodology proposed in the DESINNO project would notably offer a dynamic and innovative learning experience strictly linked to the practical and 'hands-on' dimension proper of the design discipline.

Design disciplines have constantly evolved to keep up with the emerging demands of the 21st century. According to Meyer and Norman (2020), the emerging challenges faced by designers can be grouped into four categories: performance challenges, systemic challenges, contextual challenges and global challenges. It becomes evident that design education for the 21st century can no longer focus on traditional skills. It must equip young designers with new knowledge and expertise that can help them tackle complex problems holistically, such as critical and systematic thinking.

Sanders and Stappers (2008) observed that traditional design disciplines tended to concentrate on the designing of *products*. Subsequently, these disciplines were defined by the outputs of the design process. To address emerging challenges, design practice has changed, and new design disciplines have emerged. These new design disciplines focus on designing for a '*purpose*'. The results are not limited to one type of output, e.g. physical products or built environments. In response to these changes, several traditional design disciplines have been redefined to help them stay relevant to the changing world.

This paper will focus on three emerging design disciplines, namely interaction design, service design and integrated product design, as they will become new core knowledge assets for the creative industries. To help students develop new knowledge and skills (such as systematic thinking), they must go beyond *surface* learning, where they are expected to reproduce materials, and adopt a deep approach where they focus on making sense of materials (Gibbs, 2010). This means that the educators also should move away from conventional ways of teaching, where most decisions are made by teachers, and adopt a student-centred approach, where the emphasis is on integrating learning across the curriculum (Cannon & Newble, 2000). Project/problem-based Learning (PBL) is one of the student-centred learning approaches that has been widely adopted, since it can help students develop critical and systematic thinking by engaging them in solving complex real-world problems (Nagarajan & Overton, 2019; Yew & Goh, 2016).

Two relevant methods for learning in design education were adopted to bring Kolb's theory and the process-based design education approach to practice, the design studio and the design workshop. The 'design studio' is central to the pedagogy of design (Demirbas & Demirkan, 2007; Shaffer, 2007). Design studios are a synthesis of the three diverse types of courses constituting a design curriculum (Uluoğlu, 2000). According to Hokanson (2012), the 'design studio' includes two main pillars, the public presentation of ideas to the teaching staff and the interaction between tutors and students. The basic elements of the design studio include the design brief, the design research, transitions between design thinking and practice, and the desk crit (Sagun & Demirkan, 2009; Schön, 1987) that happens on students' desks from the master designer and the design reviews.

The guided learning philosophy of the design studio is seen as the means to engage in 'learning by doing' (Schön, 1987). The design studio requires intensive, closely coupled cooperation for design work in teams with minimal supervision. For students' design competencies to flourish, emphasis is given to facilitating the three factors put forward by Christiaans and Venselaar (2005): knowledge of the design process, the integration of different disciplines and the integration of theoretical knowledge in practice. The role of the tutors is more to facilitate and provide high-level guidelines and links to resources rather than to teach or directly correct participants along the way. This is according to a problem-based approach to learning, which has been applied in previous projects in short-term learning activities (Koutsabasis et al., 2011) as well as during the duration of studio courses (Vosinakis & Koutsabasis, 2013). Additional principles of problem-based learning include that participants are provided with an authentic problem at hand, i.e. a) it is related to (their future) practice, and the design problem is ill-defined or wicked (Kolko, 2012), in the sense that it does not have a unique solution which can be good or bad (not 'optimal' or 'best'), b) the participants work in groups of complementary competencies, c) the participants are responsible for their learning about the problem at hand and d) the participants gradually develop a solution by practising design and engineering methods.

The second learning method investigated is the design workshop. In the context of design, workshops typically involve participatory or co-design activities and have been defined as "a form of participatory design, consolidating creative co-design methods into organised sessions for several participants to work with design team members" (Hanington & Martin, 2012). However, there can be several arrangements of a design workshop, depending on the learning goals and the problem context. Design workshops have been proposed in several contexts and forms to deal with complex problems that require a participatory design approach, including co-design activities (Holman et al., 2008), change management (Holmberg & Robèrt, 2000), urban studies (Hou, 2013) and urban planning (Wates, 2014).

Generally, design workshops entail several activities that facilitators plan and orchestrate. The workshops often begin with an overview of topics and an agenda, may continue with field visits (Goodman et al., 2012), observation or ethnographic research, followed by brainstorming and closely coupled cooperative design, modelling, artefact making and testing. In between these activities there may be breaks with short inspirational presentations or stakeholder visits.

According to this preliminary research, it is relevant to remark on the importance of the practice-based approach in the learning methods adopted in design education. Three key findings emerged as strategic pillars for the definition of an innovative teaching design methodology customised for the contemporary needs of Indian academics:

- Integration of different disciplines
- A problem-based approach in a real-life environment
- Co-design and co-creation of knowledge and values (trainer to trainer, trainer to student, student to student).

With the theoretical foundations and formative decisions on how to train the trainers set in stone, we moved to develop three capacity-building sessions. These sessions aimed to apply the state-of-the-art findings and give our Indian colleagues the content and scaffolding to build their courses that would make use of the design and innovation centres established and combining them with contemporary design pedagogy. In the next section, these three capacity-building sessions are presented and discussed.

Capacity-building sessions

In this section, the authors present the experience of running three capacity-building sessions aimed at supporting an HEI in India in planning and developing educational content to support the three design and innovation centres. The capacity-building sessions adopted a train-the-trainer methodology with a specific methodology and tools for training, research and applied research activities with companies and institutions. Before training design students, it is fundamental to train who is going to train them. The train-the-trainer methodology has equipped a panel of 35 Indian experts (PhD students, researchers and professors from three universities) with a particular method and set of design tools with the following aims:

- To start developing future courses and laboratories
- To practise a constructive, holistic, empathic and iterative approach that is flexible and that can be applied as both an educational and collaborative strategy
- To provide resources, content and an overall educational approach to teaching design in a hands-on, experiential way.

The methods and tools offered and explored during the capacity-building sessions can be further used by the Indian experts along with students in teaching and designing new services but also with local entities, external stakeholders and international partners. These choices were informed by desk research and fieldwork (Bofylatos & Azariadis, 2022). The synthesis of the research supported the establishment of the design centres as a focal point for the development of the design strategy in India. The train-the-trainer methodology was chosen as an effective method to scale up the interventions selected and to complement and strengthen the labs with both educational material as well as pilot projects. The following sections present the educational approach, the tools and methods adopted and the didactic organisation of the three capacity-building sessions.

Face-to-face session with a focus on integrated product design

Brunel University London hosted a capacity-building programme titled *Integrated Product Design* in Uxbridge, UK between 24 February and 6 March 2020 for nine delegates from three Indian partner institutions. The programme was developed based on the concept of T-shape designers. According to Hansen and von Oetiger (2001), the horizontal part of the *T* refers to a breadth of knowledge across various aspects of design, while the vertical part of the *T* is defined as the depth of knowledge of professional designers. Thus, this capacity-building programme aimed to build upon designers' core skills and broaden their knowledge in other areas. The subjects delivered under this programme can be grouped into four areas:

1. Professional practice (e.g. co-design and research-informed teaching)
2. Strategic design (e.g. strategic design management, branding and future forecasting)
3. Entrepreneurship (e.g. innovation process and innovation management)
4. Technical design (e.g. design for manufacturing and advanced manufacturing)

The programme is underpinned by the Double Diamond model (Design Council, 2019). The model was chosen because it reflects design practices in industry. It was constructed based on 11 case studies from diverse types of organisations, such as product and service design (e.g. LEGO® and Starbucks), physical and digital design (e.g. Whirlpool and Microsoft) and emotional and functional design (e.g. Xerox and Alessi). The process contains four main stages: discover, define, develop and deliver. The first two stages focus on exploring and framing the question(s), while the latter stages concentrate on creating and realising solution(s). At the heart of the process is the notion of convergent and divergent thinking in the design

process. Designers need divergent thinking to explore all possibilities at the *discover* and *develop* stages. However, they also require convergent thinking to systematically narrow down the scope and deliver practical solutions in the *define* and *deliver* stages. This model was integrated into many lecture materials and activities.

Although the programme offered several hands-on activities, it did not involve a task that linked all aspects together. At the end of the teaching activities, the courses were formally evaluated with questionnaires and a final group discussion. According to the feedback collected for the first capacity-building session, it would have been more useful to include a task that connects all subjects, such as portfolio development. In general, the delegates found the *process-oriented* approach useful. They observed that the application of the Double Diamond model in teaching and learning activities could help assure the quality of the process and outcomes, as well as avoid subjectivity in assessment.

Blended e-learning session focused on service design

Due to COVID-19 restrictions, Politecnico di Milano organised a remote capacity-building programme between 10 and 23 October 2020 for 18 professors and experts from the three Indian partner institutions. The programme took place through an exploration of blended e-learning potential and assets using both online interactions and offline activities:

1 Online interactions:
   - Lectures
   - Gamified learning experience (several challenges and feedback)
   - Microlearning (learning nuggets)
2 Offline interactions:
   - Assessments
   - Co-working activities and round table discussions

The topics, contents and tools were planned and offered to guide the Indian partners in starting to design their future courses and labs by envisioning possible synergies as systems, both internal and external to academia.

To achieve this goal, the training programme focused on service design and was implemented through a creative process based on the human-centred design approach and, thus, throughout three main phases of inspiration, ideation and implementation. The human-centred design makes systems desirable from a human point of view with what is technologically feasible and economically viable (Ideo, 2011). This approach enhances effectiveness and efficiency, improves human well-being, user satisfaction, accessibility and sustainability and counteracts possible adverse effects of use on human health, safety and performance (International Organization for Standardization, 1999).

According to the feedback, the Indian professors and experts appreciated the innovative ways of using online platforms and tools proposed during the programme. The topics and themes offered a fresh perspective based on a systemic approach that keeps participants' motivation and ambition high. Further reflections and improvements lie behind the possibility of cooperative sessions among the three Indian universities.

Blended learning session focused on interaction design

Due to the COVID=19 restrictions, the session offered by the University of the Aegean (UAEGEAN) also had to be delivered online with synchronous and asynchronous learning activities. During a two-week

programme, the university offered a multifaceted lecturing cycle to cover the main aspects of interaction design, ranging from theory to practical examples and case studies.

The presentations and dialogues on the selected theoretical issues implemented examples, and co-working activities were designed to offer inspiration and insights to both the UAEGEAN lecturers and the participants from the Indian universities.

UAEGEAN offered a broad and holistic view of the fields and connected them to digital heritage management (Chatzigrigoriou et al., 2021) and connected computer-aided design subjects to human-computer interaction (HCI) and its evaluation tools. Thanks to the assignments, the Indian experts had hands-on experience of usability studies in the local setting and implemented the empirical conclusions in the framework of DESINNO. Thanks to a selection of online platforms and tools, the Indian experts could work together remotely in a collaborative way.

During the capacity-building session, the lecturers introduced the concept of interaction design through an introduction to HCI. They presented how it is educationally approached as a theoretical course, as a studio course and in terms of research outcomes. In this direction, the participants were given specific scientific papers to discuss among them at the next online session. Hence, the first assignment focused on an overview of HCI and education in design engineering and research in the UAEGEAN by reading three relevant papers outlining different tools applied to HCI and usability, with digital heritage as the central case study. The second assignment focused on running a heuristic evaluation of the Indian Railways e-service and filling in the heuristic evaluation sheet through task analysis. The participants were asked to try to define the individual tasks involved in the process of booking the ticket, e.g. “you could use task analysis to determine the separate steps the user follows to book a ticket and turn them into tasks to measure their time and errors”. Thus, the third and last assignment was dedicated to running a usability test and producing a report of the key findings and directions to redesign the same platform.

Overall, the two-week programme managed to achieve a high degree of success. The participants evaluated the course highly. The lecturers provided an overview of the fields of HCI and interaction design, outlined the synergies with fields adjacent to it such as digital heritage management, design for all and service design and pushed the participants to reflect and gain a second-order understanding of interactive systems through the two evaluation assignments.

Conclusions

Lessons learned

After the completion of each capacity-building session, the participants were invited to provide feedback through an online questionnaire on their experiences of the training provided. Overall, all three capacity-building sessions were considered highly successful, receiving an average score of 4.5/5 on a Likert scale (1=Poor, 5=Excellent).

Thanks to the capacity-building sessions, 35 Indian experts received training on all three main design disciplines that the target Indian universities focused on, namely industrial product design, service design and interaction design. Additionally, a vast volume of resources has been produced, e.g. educational material, presentations, scholarly articles, videos and audio-visual material that can be used by the Indian HEIs for the development of their courses and lectures.

The blended approach adopted in the three capacity-building sessions allowed the authors to measure the impact of design education delivered both traditionally (face to face) and with an innovative e-learning approach. The most valuable insights collected from the practical application are:

- Design contents: In addition to the three focus of the design disciplines included in the teaching activities (product design, service design and interaction design), the Indian experts declared a high interest in exploring the fields of design for social innovation and human-centred design.

- Design methods: The hands-on and assignment-based approach to teaching was evaluated as effective. The opportunity to apply what the participants learned in practical assignments with a strong relation to real applications in new courses or new educational experiences was evaluated as a relevant outcome. The blended sessions were evaluated to be well planned and apt for the educational goal. The adoption of a practice-based approach in e-learning education allowed for the exploration of new ways of applying and including technologies in the design of teaching programmes.

- Design Tools: The participants enjoyed going through the exercises that were supported and facilitated using templates and formats.

The train-the-trainer methodology applied for field testing the design education in the capacity-building sessions has demonstrated the following:

- The effectiveness of the systemic approach in design education: train the trainer with a multidisciplinary and systemic approach to support the building of an innovative mindset for the future education of Indian students with contemporary skills and visions of the design discipline. Instead of providing a concrete framework of western design, our Indian colleagues were given a scaffold to create a bespoke approach that better addresses local challenges and existing design perspectives, hoping to decolonise Indian design education.

- The use of a blended approach demonstrated the possibility to adopt an inclusive approach in design education in emerging countries. The effectiveness of new tools using digital technologies can improve the number of experts and professors involved in train-the-trainer experiences without losing effectiveness and engagement.

- The capacity for social change through increased empathy developed by the adoption of human-centred design approaches. Both human-centred design, as elaborated in design thinking, and human-computer interaction usability and design for all tools foster understanding of the users in the context of creativity.

- The evolution of the diffuse design capacity of grassroots innovators in the context of the maker movement as part of the labs established. Leveraging design as a facilitator of bottom-up solutions can create new social value that is context-specific and embedded in everyday problems in a local context.

Repeatability and scalability

All capacity training programmes, namely integrated product design, service design and interaction design (or digital design) were developed to be turned into either new elective courses or new content that can be integrated into existing courses.

To scale up 10-day capacity training programmes into proper courses, further developments were carried out. Firstly, all teaching materials were gathered, formatted and shared on the online repository. In this way, all the professors involved in the train-the-trainer courses could access these materials and use them for their teaching and learning activities. The teaching materials and feedback were then used to form the basis for new elective courses or to add content to existing courses. Next, the three Indian universities engaged were asked to identify which courses they would like to develop further, and a benchmarking exercise was carried out. The aim was to capture the good practice of leading courses in related fields to develop the teaching materials further and address the feedback collected. The courses included in the benchmark exercise are shown in Table 1 below.

Topics	Courses included in the benchmarking exercise
Integrated Product Design	BSc Product Design & Technology, Loughborough University, UK
	MEng Design Engineering, Imperial College, London, UK
	MA Collaborative and Industrial Design, Aalto University, Finland
Service Design	MA Service Design, Royal College of Art, UK
	MDes Design Innovation & Service Design, Glasgow School of Art, UK
	MA Service Design, University of the Arts London, UK
Introduction to HCI	BA User Experience Design, University of the Arts London, UK
	MSc Human-Computer Interaction Design, City, University of London, UK
	MSc Human-Computer Interaction, University College London, UK

Table 1: Courses included in the benchmarking exercise.

After the capacity-building sessions, a concrete application of the tools and methodologies tested has been implemented through the definition of specific syllabuses for three new courses, with the involvement of the professors who attended the capacity-building sessions. The new syllabuses were developed based on key points extracted from the benchmarking exercise and the capacity-building training materials. After that, they were reviewed by corresponding staff at the Indian institutes. Once the syllabuses were approved, the tutor's guidance for each course was developed accordingly. The teaching teams who created and delivered the capacity-building programmes were also invited to add relevant information and to provide further feedback/comments to all syllabuses and tutor guidance. The practical application of the contents and the teaching methodologies in innovative design education programmes represent the beginning of the answer to the research aim of the authors, namely the modernisation and internationalisation of Indian universities with innovative and updated design courses with a set of methodologies based on design thinking, sustainability, design research, social innovation and ethical issues in design.

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Eco-development of biocomposites from water hyacinth: A sustainable integral design proposal for Xochimilco, Mexico City

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Eco-development of biocomposites from water hyacinth: A sustainable integral design proposal for Xochimilco, Mexico City

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Abstract

This work starts from the context of an environmental crisis that frames a growing trend of a search for alternatives of a sustainable nature as a proposal solution from the transdisciplinary approach of design. The objective of this work consists of planning an eco-development strategy to create biocomposite materials using water hyacinth (*eicchornia crassipes*) as raw material. The approach will be part of a collective research programme for future doctoral studies whose further objective is the sustainable integral community development of San Gregorio Atlapulco in Xochimilco, Mexico City. Theoretically, an approach is made from complex thinking and the sustainability paradigm, resulting in a vision of design as an integral sustainable activity, from the perspective of the formulation of new materials, appealing to movements like *Material Activism*, *Ecodesign* and *Material Designers,* in conjunction with a circular economy. Exploratory experimentation for bio bases and sustainable treatments for the water hyacinth fibre was carried out to establish the optimal formulations for the elaboration of biocomposites. From this, seven biocomposites with different properties were obtained that can be used with various low-impact processes for manufacturing sustainable design objects. By doing so, this stage ended with a prospective scenario that was proposed for further work with the community as the beginning of a social entrepreneurship initiative.

Keywords: Biocomposites, Integral sustainability, Water hyacinth, Eco-development

Introduction

The current situation of crisis in environmental, social, cultural, economic and health aspects is a consequence of the imbalance brought by industrial development, which has raised growth in terms of capital instead of ecological improvements. This is reflected for example, in accordance with sources like the Global Footprint Network (2020), which mentions that the planet has an average biocapacity of 1.63 global hectares (GHA) and that the ideal would be to have an ecological footprint that does not exceed that amount. However, the average per person is 2.75 GHA, which represents a deficit of 1.1 GHA. Today, humanity uses the equivalent of 1.6 Earth planets in terms of exploitation of resources and waste absorption; among them are deforestation and overfishing and carbon dioxide emissions, respectively. In a local context, we can think about specific problems in each community that can be added to the main ones. In this case study, the presence of water hyacinth with its impact on different areas and scales of Xochimilco is the main concern.

As a brief presentation, Xochimilco has an history of eco-development since ancient times, a balance between a wetland environment and anthropogenic activities. Nowadays, there is only a remnant of that antique land. Xochimilco “is a zone that includes a group of original towns, a net of water channels, lakes and the chinampas (which is a portion of land built on the water with soil and the help of the endemic ahuejote trees, with agricultural purposes) whose importance was recognised in 1987 by UNESCO when it was declared a historical and cultural heritage of humanity” (Soria, 2004, p. 261). Despite its natural tourist attraction, it has various problems in each of its neighbourhoods. With a population of 442,178 people

(INEGI, 2020), it expresses an environmental crisis promoted by water pollution, deforestation, irregular settlements in the protected area and in the socioeconomic dimension, due to abandonment of local activities such as agriculture, lack of opportunities, unemployment and migration, which together have returned to the town hall a very vulnerable area. One of the original neighbourhoods is called San Gregorio Atlapulco, a place that reunites a set of characteristics that led to proposing a project towards the sustainable development of the community from the design perspective. Beyond the political organisation of this town, San Gregorio has the characteristic of being well-organised through cooperatives with mainly commercial purposes. The people who work at chinampas defend their land, interests, customs and traditions, doing a very remarkable form of organisation in the zone.

It is proposed that a strategy for the eco-development of biocomposites with water hyacinth can be derived towards a proposal of sustainable integral design. For their part, these materials have properties that make them suitable for use in various design projects. At the same time, the strategy seeks to integrate a prospective proposal within comprehensive community development plans that can be adapted and adopted in areas with similarly vulnerable situations.

In the first place, the eco-development concept mentioned here is the one proposed by Ignacy Sachs (1974), which considers this form of development as an adaptation to the ecosystemic situations of each eco-region. The author mentions that one strategy for development will not fit all realities, given the complexity of the topic and multiplicity of operative variables. This concept aspires to define a development adapted mainly to third world rural regions, addressing specific solutions to specific problems, contemplating the ecological and cultural characteristics and the immediate and long-term needs. The eco-development then, is a reaction against the trend of universal solutions and master formulas.

On the other hand, a biocomposites, as defined by Bootle et al. (2001) is a combination of two or more constituent materials, which are the matrix and reinforcing component, with at least one being naturally derived. This new material must show an improved performance over its individual components. The reinforcing material can be fibres, whiskers, particles or flakes; meanwhile, the matrix is the binder that provides mechanical support.

In the last two decades, there has been a great interest in the development of alternative materials around sustainable design, given the problems of environmental deterioration that have forced us to rethink how resources are extracted and exploited and how objects are produced and disposed of at the end of their useful life. Greater attention has been paid to the life cycle of both the products and the materials used. The present work proposes a contribution to the exploration of new material alternatives and the link between design and social innovation through a project leading to co-creation. As designers, is necessary to rethink the activity in terms of the impact of what we design and how, so the main question is: What can be done from the perspective of design to transform the situation of a community with social and environmental issues?

This work offers an approach to the potential that a developing country can have by visualising opportunities where they do not seem to be found, taking advantage of local resources to contribute to the transition towards a deeper ecology, following the concept of *Ecopuncture* proposed by Casagrande (2011) combining ecology and acupuncture, where a pin prick in a determined place will carry a revitalising effect to the point and its surroundings, i.e. a reaction of positive refeeding to have a bigger impact than expected

with the initial move. In this case, San Gregorio is chosen as the *ecopunctural* site to have the incidence for further application of projects.

Literature review

Integral Sustainability

Sustainability, from its conceptualisation and foundation, is referred to as a complex paradigm, uniting scientific and technological, political and legal and social and cultural aspects to improve the global environmental situation through local plans, mainly in countries like Mexico, in growth. It is about substantiating pro-environmental actions that will lead to modifying the situation through changes on a small or large scale, involving very punctual or utopian actions that motivate a change of paradigm, implying "awareness, responsibility, ethical and cultural aspects, as well as patterns of consumption and lifestyles" (García, 2008, p. 73). For his part, Lopez (2004), in his essay on integral sustainability, mentions that "it is clear that the emancipatory mission, linked to arousing efforts and actions for the constant improvement of the quality of life of the population, cannot be left in charge of the only attention to the environment, but that it has to be given integrally, it must be assumed taking into account the social problem as a whole. In this case, we would talk about comprehensive sustainability". This paradigm implies recovering the transforming sense in different dimensions, since, in its practice, it tends to suffer different degrees of reductionism or, as mentioned above, it is easily manipulated in terms of convenience.

For Azamar and Matus (2019, p. 16), the challenge of building comprehensive sustainability involves two central aspects: 1. Thinking completely, considering the complex network of knowledge that a particular situation can summon; 2. Development of operational actions that merge science and practice into an interrelated whole. Sustainability, to face complexity, requires a degree of interdisciplinarity that needs material and logistical resources not currently provided for research. It implies not only the simple concurrence of disciplines but also an exercise in which situations are studied from articulated perspectives, linked to the processes that it defines and at the same time with those that integrate it (Tainter, 2006, as cited in Azamar and Matus, 2019). It will include the integration of productive, environmental, sociocultural, political, and technological processes, among others, that are evident on different spatial and temporal scales.

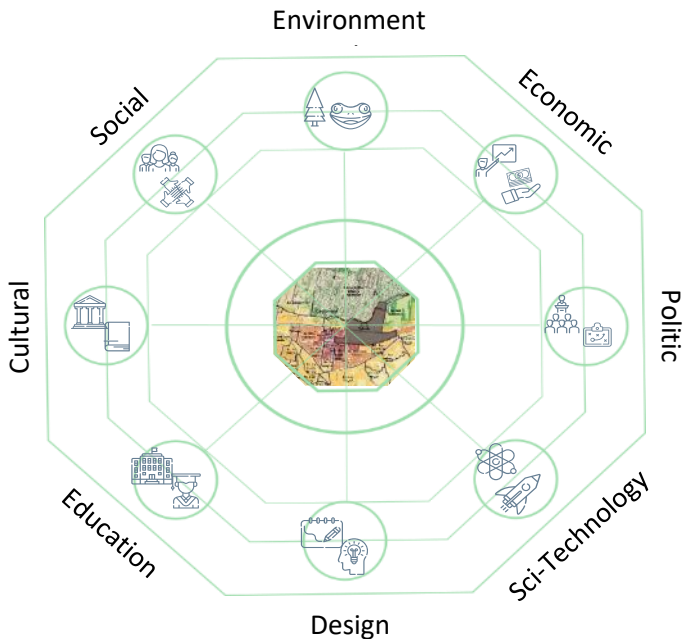

Image 1: Dimensions of Integral Sustainability.

Design in this context will play a vital role, being a determining factor through the points described in the work of García (2008, p. 25): “raw material extraction, selection of materials, determination of the production process, establishing how the product is used, distributed and discarded”, that is, influencing each stage of the production of products. Sustainable design contemplates the other seven dimensions of the context in which it will be carried out, to transform reality.

Integral sustainable design through material creation

The role of the designer has come to be perceived as “an original conceptually deliberative thinker, who, through an active dialogue with manufacturers, fosters the development of new materials or production processes or develops them himself” (Bürdek & Eisele, 2011, as cited in Karana, 2013, p. 169). And in either case, the request is the same: production must be based on renewable raw materials and recyclable and/or biodegradable products. For this, the following five complementary proposals were considered:

Circularity

In a complex way of thinking, products must be understood as systems that are connected to other complex systems. These connections will allow waste streams from one system to be the raw material for another system. It is in the hands of the designer to apply this principle of circularity in the development of services and products, both by creating some that last longer, and by thinking about the future of the materials when they become waste (Cléries et al., 2018, p. 14).

Upcycling

Alternatives have been explored mainly in the last decade, such as upcycling, understood differently from recycling (recycling) as an upcycling that “provides an opportunity for waste or discarded products to be transformed into new, reconfigured, readapted and improved articles […] in some versions even being ephemeral like bags made of food waste […] and others that range from soaps, carpets, lamps, furniture and even entire constructions” (Bramston & Maycroft, as cited in Karana, 2015, p. 123). Beyond being a phenomenon of mass production, it came to reflect on whether it is possible to compete with local

resources and techniques against industrial production. In time, more and more designers and experts from other disciplines such as biology joined the trend, products of this type entered the market, and material developments were increasingly elaborated based on this principle.

Material Activism

At the same time, there is another material concept called *material activism* (Ribul, 2013), whose purpose is to explore the democratisation of material production with do-it-yourself tools, in terms of materials and infrastructure that can be had at home and from there carry out experimentations. From this perspective, new materials can be developed with non-advanced technology, using the inputs at the discretion of each creator, but following some scientific guidelines that are shared "freely" on the Internet by activists ranging from bioplastics to biotextiles, from fungal or bacterial polymers for packaging to construction materials.

Material Designers

Recently, a proposal has been consolidated by the institutions Elisava Barcelona School of Design and Engineering, the Design Department of the Politecnico di Miano, and Ma-tt-er London. It is called Material Designers (Cléries et al., 2020), and it consists of a project, co-founded by the Creative Europe Programme of the European Union, whose objective is to promote talent towards circular economies on the continent. Material Designers consists of a platform, a training programme, an award and a series of events for the positive impact that material designers can have in all types of industry and the generation of an alternative that relates to the circular economy. According to Cléries et al. (2020), it is about empowering communities to search for alternatives applied to industry or the creation of activities from a creative sector, as it is through new explorations based on design and with the collaboration of other disciplines. The designer acts as a facilitator of materials derived from a reflection of the context, of the processes with which they can be created and of ideas for their application, since, based on the words of Manzini (1986), it has been understood that the designer not only can transform and create using the material for invention, but can invent the material itself.

Biocomposites

Nature has developed examples in countless presentations, according to García (2017), in wood, where lignin acts as a matrix and cellulose as a reinforcing fibre, bones made up of a calcium binder and collagen fibres, the nacre of molluscs, made up of calcium carbonate or aragonite and a conchiolin biopolymer. Now, in addition to proposing the manufacture of environmentally friendly materials, a more comprehensive approach is sought, so that these have relevant social, economic, aesthetic, scientific-technological and cultural impacts to contribute to the transformation of reality from design.

For Dos Santos and Lenz (2013) the most environmentally friendly materials are those formulated from biodegradable polymers and reinforced with natural fibres, which can be composted at the end of their life cycle. However, the challenge here is the balance between life performance because of the physical properties and the biodegradability. For its part, the biodegradable polymers can be obtained from plants, such as cellulose, starch, pectin, soy derivates, polypeptides and polyphenols and from animals, such as silk, wool, polypeptides, chitin, chitosan and glycogen. The natural reinforcements are used to improve mechanical properties, giving stiffness and strength to the matrix, and the main source is the vegetable fibres. These have many advantages besides the environmental, like low costs, easy processing, lower density and lower energy consumption. The main lignocellulosic fibres are flax, hemp, henequen, jute and kenaf, among others, that have the best chemical compositions to work properly on biocomposites. Dahy (2017) mentions that natural fibres like flax, jute, hemp, etc. have a higher cost and are not available worldwide as they are obtained from agricultural residues, which are those fibres retrieved after the crops

harvesting, also called *agro-fibres.* This has lead to a search for new sources other than the conventional ones to improve the production of material alternatives.

In recent years, there has been a great boom in the exploration of these types of material. To mention some that have inspired this work, we have The *paper pulp* by Debbie Wijskamp, a composite of newspaper and a bio binder, to fabricate furniture; the *ex-presso project* by Julian Lechner, taking coffee waste mixed with casein or bio resin to make cups and other receptacles, the *Zostera stool* by Carolin Pertsch, a stool fabricated with a composite made from aquatic plant waste and bio resin; *Sargablock* by Omar Vazquez, a brick made from sargasso and soil for the construction industry; *Coconut ecodesign* by Karina Sánchez, a composite developed from coconut waste and bioplastic made of starch; and the C*heer Project* by Gaurav Wali, a biocomposite that consists of pine needles and bioplastic made from starch.

As the main source of inspiration for this work, the *Cheer Project* of Gaurav (2019) and the thesis *Eco-regional Design for Xochimilco* by Reséndiz (2010) are the chosen works. These are examples of academic works with the intention of reaching another level for social innovation and entrepreneurship in developing countries. The *Cheer Project* for India and the *Eco-Regional* for Mexico are both proposals for organisation that starts with biocomposite materials in similar contexts, trying to take advantage of residual biomass that causes big environmental problems if it is ignored, so that a community takes part to solve the problem, and in a way, it turns out to be a cultural and productive activity. As with these examples, there have been so many more in recent years. Developing countries that count on natural fibres that also represent an environmental problem are looking for commercial exploitation in some industries. At this moment, most of the biocomposites projected are limited to lab-scale investigations. It is important to consider the role of government legislation and technology development to escalate the lab work.

Water hyacinth for biocomposites

Eicchornia crassipes is a floating perennial plant with green leaves that has a spiky bloom violet and yellow in colour and has a fibrous root that extends up to three metres. It belongs to the Pontederiaceae family, whch is native to South America. It is the only species of the genus *eicchornia* that is floating. The petioles have intercellular spaces filled with air, and the blades are raised above the water level and act as sails, which allow it to float freely and quickly spread its distribution until it becomes a plague (INECOL, n.d.). It has been lying in bodies of water in Mexico for more than a century, spreading to cause major problems in its early years and to this day. It is suggested that it was brought during the government of Porfirio Diaz, given the policies that were implemented in the economic sector to increase the development of agricultural and fishing activities. Due to this, it is thought that it could have arrived as green manure in chinampera agriculture, as an element of fish farming technology or as an ornamental plant, according to Cervantes and Rojas (2000). It has a wet weight of 11–51 kg per square metre, corresponding to 0.62–2.87 kg per square metre in dry weight. The biomass has a variable doubling rate of between 7.4 and 46.5 days (Juárez, 2011). Its use for material creation was not raised until a few years ago. Micro-enterprises are dedicated to its transformation into paper and derivative handicrafts woven from the stems, and more recently it has been proposed as fibre for the manufacture of composites and parts for the automotive sector. Great interest has been shown in the last two decades for the creation of a wide variety of projects of this type, both research and marketed, for the sustainable use of waste and weeds mainly aimed at their transformation into industrial/handcrafted materials.

This plant has been proposed as raw material, for example, due to its absorbent quality, to retain contaminants resulting from spills. Vargas (2017) mentions a variety of existing and possible derivative products, such as compost, paper, handicrafts, toxin absorbers, construction materials, paint texturisers,

oven supplies, fodder, soil remediation, some produced as a biocomposite, with the addition of chemical or biological matrices. Ajithram (2020) evaluates its use in compounds with epoxy resin, showing characteristics very similar to those provided by synthetic fibres. This is oriented to industries such as the automotive industry. Non-woven textile production has been proposed by Bhuvaneshwari and Sangeetha (2017) through a defibration process and combined with another fibre (hemp) that has greater cohesion power.

Fiber	Cellulose (wt. %)	Lignin (wt. %)	Hemi cellulose (wt. %)	Pectin (wt. %)	Wax (wt. %)	Moisture (wt. %)
Jute	61–71.5	12–13	13.6–20.4	0.4	0.5	12.6
Hemp	70–74.4	3.7–5.7	17.4–22.7	0.9	0.8	10
Kenaf	31–39	15–19	21.5	–	–	–
Flax	71	2.2	18.6–20.6	2.3	1.7	10
Sisal	67–78	8–11	10–14.2	10	2	11
Coir	36–43	41–45	10–20	3–4	–	–
Banana	63–67	5	19	–	–	8.7
Water hyacinth	61.63	3.78	16.26	–	–	11.8

Table 1: Physical properties of water hyacinth fibre compared with others. (Ajithram et al., 2020).

Methodology

To implement an ecological production system for biocomposites in coherence with the context and the objective of comprehensive sustainability defined from the documentary review, a search was carried out for processes with the least impact on both environmental and human health, drifting towards simplified processes that are feasible to be carried out in vulnerable communities with a lack of services, reduced spaces and low investment level, using the most accessible tools and machinery in terms of use and costs, the least possible use of substances or additives both renewable and non-renewable, as well as an optimal use of energy and in the same way, the least possible, whether electricity or from fuel. In this way, a strategy of strategies emerged that occurred four stages before social entrepreneurship.

1) Theoretical foundation. Relevance of the proposal. 2) Strategy where the methods of preparation of the fibre and other inputs for the material creation were planned. 3) Strategy of experimentation in the creation of materials. 4) Proposal for the future for obtaining materials and the creation of design objects aimed at a social enterprise.

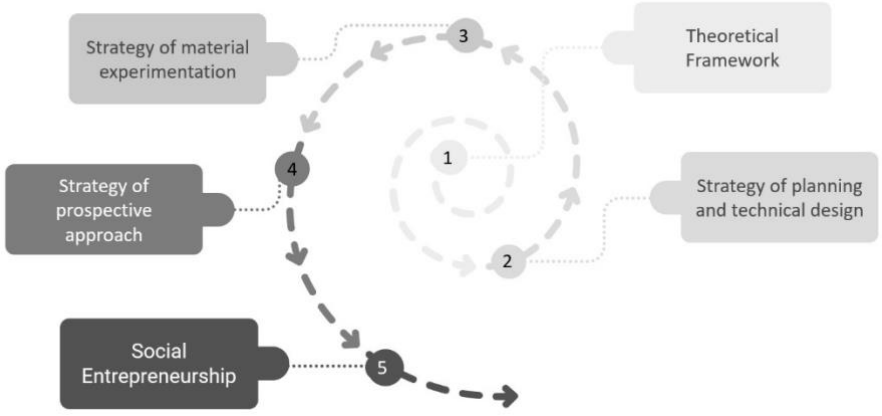

Image 2: Strategy phases of the proposed methodology for eco-development of biocomposites in San Gregorio.

The main contribution of this methodology is to find a way to make an impactful project in the San Gregorio region, going little by little, given the cultural characteristics of the communities. This work frames the first steps where a posture of eco-development is taken through the theoretical investigation and materials are obtained, so is possible to offer workshops with actors of the community to have an approach from the perspective of design and other fields like biology, architecture, chemistry, among others, with social entrepreneurship aimed at since the beginning. This is the first estimated bridge between the community and a group of work that will carry a whole project of sustainable restoration called *Master plan of sustainable development for San Gregorio Atlapulco*, in which professors, investigators and students from different disciplines like those mentioned before meet. With a complete map of stakeholders, we can formulate a complex strategy for the estimated project to the integral sustainable transformation of San Gregorio Atlapulco.

Case study

San Gregorio Atlapulco is chosen as a strategic site within the Xochimilco demarcation. It is made up of different zones: rural chinampera, wetlands (remnants of Lake Xochimilco) and urban and hilly. This area shares the typical characteristics of Xochimilco; it consists of an average altitude of 2,240 metres above sea level with an average 669 mm annual rainfall and temperature of 16.4°C (Torres-Lima & Conway., 2018). The lake system is made up of 277.8 km^2, where an estimated volume of 2622 cubic metres of water is contained in 160 ha. There is a channel network of 203 km in total length. The agroecological production area has decreased from 9,000 ha registered at the beginning of the 20th century to 1,200 ha. Torres-Lima and Conway also mention a series of problems that affect the sustainability of the San Gregorio Atlapulco wetlands (Table2):

Indicator	**Socio-environmental Impact**
Socioeconomic	Use of modified or transgenic seeds
	Use of chemical fertilisers and pesticides
	Replacing traditional chinampas techniques with greenhouses
	Construction of stables
	Construction of bridges between canals
	Introduction of a sanitary hydraulic network in chinampas
	Improvised rubbish tips
	Loss of trade with local markets
Environmental	Construction of locks and weirs
	Closure of canals and ditches
	Destruction of dykes
	Drainage of sewage into canals
	Deforestation of native ahuejotes trees (Salix Bomplandiana L.)
	Invasion of water hyacinth (*Eicchornia crassipes*)
	Removal of wild plants and animals
	Use of motorised aquatic vehicles
Regional	Abandonment of piers
	Transformation of chinampas into housing
	Conversion of canals into streets
	No intervention on the part of institutions and government officials

Table 2: Indicators and variables of socio-environmental impacts that negatively affect wetland sustainability in San Gregorio Atlapulco (Torres-Lima et al., 2018).

The aforementioned has motivated the generation of a proposal that articulates the use of the water hyacinth plague that shows an average yield of 120 tons per hectare yearly (D'Agua et al., 2014) and an approximate cost of 70,000 Mexican pesos per hectare to remove it from the waters (Juárez, 2011), causing an economic, environmental and social impacts that affect the water ecosystems and productive activities. With the strategy of utilisation as fibre, this can be profitable, through value-added products created by the community members in workshops.

Strategy of planning and technical design

The processes for the preparation of the water hyacinth as a raw material for the manufacture of biocomposites are established, starting from the theoretical basis of the treatment of fibres for their use as reinforcement in biobases. A general approach to the treatment of the plant is provided by Ajithram (2020) with a sequence of extraction, cutting of roots and leaves (which are discarded), drying and crushing. In addition, implements for these processes were designed and manufactured. Subsequently, experiments were carried out with the manufacture of biobases using starches, vegetable glue, pine resin and gelatin.

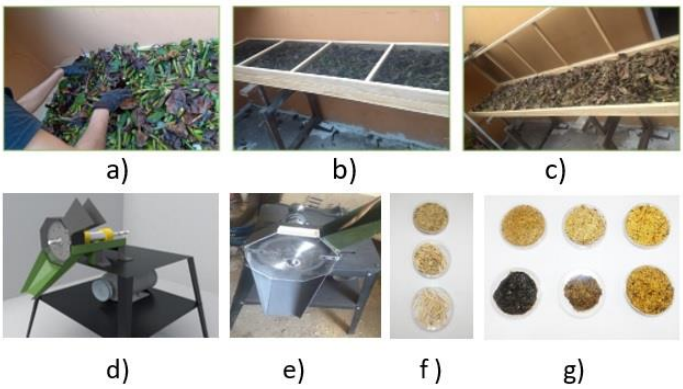

Image 3: Preparation of biomass for utilisation in biocomposites experimentation. a)–c): Drying process in net panels; d), e): designed low cost shredding machine; f) particle sizes obtained from shredding; g) experimental biobases of starch, gelatin, mucilague + fibre.

To obtain the optimal biobases for fibre binding, it was considered a design of experiments with mixtures proposed by Gutiérrez y De la Vara (2008). Guided by the geometric representation, the vertexes represent pure mixtures, the edges represent binary mixtures, the faces correspond to tertiary mixtures. and the interior points to quaternary mixtures.

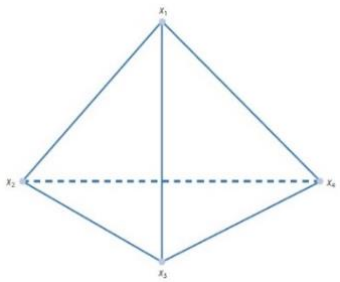

Image 4: Geometric representation of design of experiments with mixtures by Gutiérrez y De la Vara (2008).

Strategy of material experimentation

With the selected formulas, the material tests were carried out to obtain seven different presentations of fibre and combined biobases, using, as mentioned, simple processes, friendly for the user and the environment:

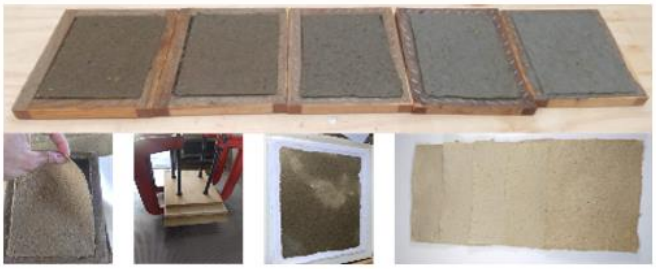

Image 5: Paper. A laminate from a mixture of 80% water hyacinth fibre and 20% recycled newspaper, both previously treated with water immersion of 7 days to soften the fibre.

Image 6: Agglomerate. Material made of 100% fibre, previously treated with water immersion of 7 days, only subjected to pressure in a mould to take form and expel most of the water. This presentation of bars was weak in its face, but very strong when it was resting on its edges.

Image 7: Agglomerate with starch bioplastic. The optimal matrix was composed by a 4:1:1:1: 1/5 formula: water 30 g, starch 7.5 g, vinegar 7.5 g, glycerin 7.5 g, with 1.5 g of dried fibre. The difference between this material and the previous one is that this were not subjected to pressure to give form. It was just cast into the mould and left to dry. It takes around 4 days to be completely dry.

Image 8: Vinyl of gelatin and starch bioplastic with fibre. The optimal formula for the matrix was 10:3/4:2:1, which entails 100 g water, 7.5 g of gelatin, 20 g of glycerin and 10 g of vinegar for the mould used. The optimal amount of fibre added was 3 g dried or 20 g wet. It solidifies in 15 minutes, but to be completely dry takes approximately 96 hours.

Image 9: Bioplastic of pine resin. This material consists of three components: pine resin, beeswax and fibre. The wax is added to give fluency to the mixture. The optimal amount was 15 g resin, 15 g wax and 3 g dried fibre. The matrix is heated until it melts and then is cast in a mould with the fibre already inside it, stirred for a few seconds and left to dry.

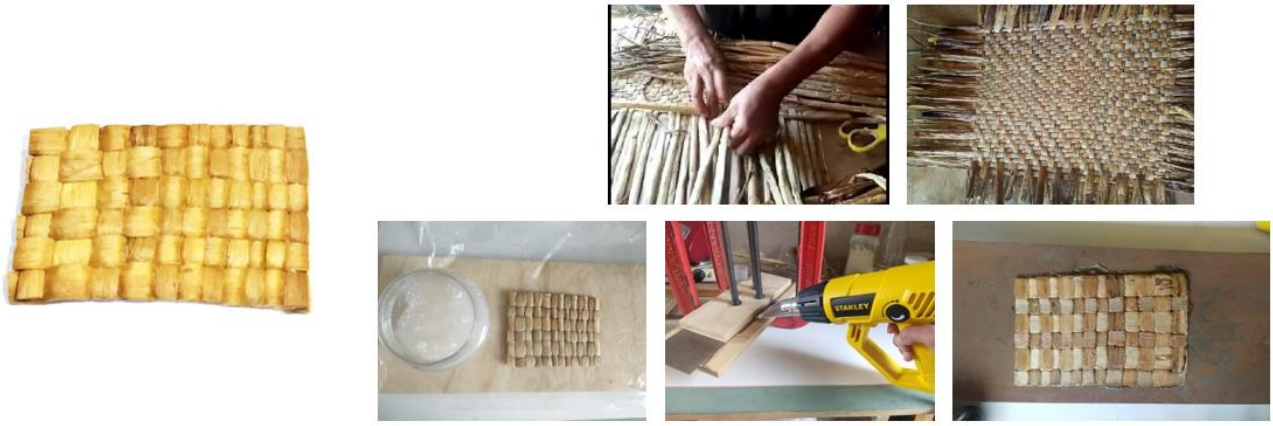

Image 10: Bio-laminated weave. This material consists of a piece of woven stems and a process of bio-laminate with starch bioplastic. First, the hyacinth stems are set in the sunlight for drying, then the air is removed by pressure with the hand. Once the stems are flat, the weaving starts. The bio-laminated weave consists of mechanical pressure applied to the piece of woven stems. Once it is flat, it is coated with layers of starch bioplastic, then is subjected to pressure again, with a source of heat supplying hot air to dry and harden the piece.

Image 11: Bio-panel. A combination of the last two materials: agglomerate + bio-laminated weave. The agglomerate is glued by the faces with starch bioplastic and subjected to pressure. Then, two pieces of laminate are set under and over the agglomerates and glued with starch bioplastic applying pressure too. The result is a light and hard piece of a sandwich of water hyacinth that supports large amounts of weight.

Strategy of prospective approach

This section proposes an application of the development of materials and the manufacture of design objects in a community environment that contributes to its integral sustainable development. It is intended that from this research a complex strategy arises, where the materials function as a means through which a community such as San Gregorio Atlapulco can provide solutions to the identified problems and solve needs, improving the current situation without causing further environmental deterioration, and alluding to environmental education and awareness.

How the project is planned to be carried out in the next stage is in a co-creation space where the community inhabitants interact with the material to explore design alternatives or applications for each material likely to be marketed to generate a social enterprise. This implies empowering the members of a community to achieve independence based on the self-production of materials, using simple transformation processes with local and circular inputs.

Image 12: Examples of applications for the developed materials in this work. 1) Biovinyl applications. 2) BioVinyl objects. 3) Paper for art. 4) Biovinyl lampshade. 5) Bio-laminated veneer on PDF. 6) Paper dog poop collector. 7 & 8) Bioplastic from hand-moulded starch.

The main contribution of this work is a extensive exploration of the material possibilities with water hyacinth, working with austerity, thinking about taking the processes to a rural environment, with the possibility to make a manual for developing this kind of biocomposite to use with groups in workshops. Another contribution is that when the work was showed to the public, mainly academic experts on the region of Xochimilco, it generated great interest as a project applying social innovation, whereby this project has been considered the more feasible way to approximate to the communities of San Gregorio, to carry then a greater project that covers another area and requires more actors.

In the context of developing the project proposal as social entrepreneurship, it is expected that there will be attention to each of situation that needs solutions, as follows:

Dimension	Development
Environmental	Water hyacinth control; inculcate ecological awareness; the barrier between the protected area and irregular settlements
Social	Improve quality of life; creation of new organisations; improve health
Economic	Improve navigation in channels; offer job opportunities
Bio-cultural	Heritage revaluation; landscape conservation; inculcate values and environmental care
Political	Agreements between stakeholders; support networks; proposal of new regulations and policies
Scientific-Technologic	Research and technological development (materials, processes); implementation of eco-technologies;
Educational	Form a socio-environmental criterion; educate for family planning
Fields of design	Sustainable alternatives of creation; aimed at socio-environmental benefit; investigation to and from design; create a regional product identity

Table 3: Developments for each dimension of integral sustainability.

Final considerations: Limitations and scope

The objective is to create an eco-development strategy aimed at the production of materials in an environment of scarce resources and infrastructure. The methodology will entail an approach to a technical manual for the eco-development of biocomposites with water hyacinth. Aspects of feasibility will aim at a circular economy that contributes to community development through innovation and social entrepreneurship, which in turn, contributes to its control in the tributaries that are plagued by water hyacinth. Finally, due to the restrictions of the COVID-19 pandemic, the study of the community was carried out through document review and participation in seminars and talks with academics who have worked in the area.

Conclusions

A realistic scenario is proposed to carry out the eco-development strategy in the community of San Gregorio Atlapulco. Through a subsequent multidisciplinary, in-depth study with various actors (research community and authorities) and with a definitive structure, a pilot project with desirable scenarios will be developed.

The sustainability paradigm is perceived integrally, trying to contemplate the complexity, in this case, of the object of transformation, and thus responding with a proposal from complexity to provide solutions for social change. However, this approach is nothing more than a viable transition for the moment, towards a paradigm of deep ecology.

Future investigation will explore the optimisation of materials using other sustainable inputs – biobased or synthetic – and greater self-produced technological development. There will be execution of quantitative tests, such as mechanical, use and end of cycle like degradability and compostability. In addition, an impact matrix with social, cultural, economic and aesthetic indicators will be developed. Finally, a survey methodology will be implemented in the community on the receptivity of social entrepreneurship initiatives from design.

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Social impact measurement in Cyprus and other European countries

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Social impact measurement in Cyprus and other European countries

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Abstract

Although non-profit and other organisations related to social issues in Europe have increased, there is currently a gap when it comes to measuring their performance and social impact. This can cause mistrust and may have negative implications on their efficiency and sustainability. As part of the Erasmus+ project Social Impact Measurement for Civil Society Organizations (SIM4CSOs), which aims to create a common methodology and approach civil society organisations can apply to measure their social impact (in the form of a methodological manual and online resources), a survey and focus groups were conducted with representatives of civil organisations, corporate social responsibility departments and policymakers to identify existing skill gaps and training needs. The research took place in Croatia, Cyprus, Greece, Italy, Norway and Portugal. The results showed that social change practitioners, whether they work for non-profit organisations or the private sector, are keenly aware of the benefits of impact measurement. However, they expressed a need for buy-in and participation from organisational management, as well as identifying the main stakeholders who benefit from their activities. Additionally, many organisations indicated a lack of resources (financial and technical) to carry out a full-impact measurement process and evaluation. Finally, there was a clear need to consider the skill levels of practitioners, which varied. Therefore, most organisations suggested that the methodology developed should be practical, adaptable and non-time-consuming and that any platform used should be accessible and easy to use.

Keywords: Social impact measurement, Civil society organisations

Introduction

The Social Impact Measurement for Civil Society Organisations (SIM4CSOs) is an Erasmus+ funded programme which aims to empower non-profit and other civil society organisations by creating a set of tools and methodologies they can use to assess their social impact. The programme is led by Higher Incubator Giving Growth and Sustainability from Greece, a non-profit organisation that aims to reinforce non-profit organisations through educational and supportive programmes. The other consortium members are NOVA Institute, which is part of Oslo Metropolitan University in Norway, the Center for Social Innovation in Cyprus, ACT Group from Croatia, CESIE in Italy, INOVA+ in Portugal and MIDOT in Israel. All participating organisations have experience in social research and social science, and their collective knowledge and experience have been instrumental to the success of this project.

The aims of the SIM4CSOs project are:

> *"…to improve the effectiveness of the Third Sector, increase the fundraising possibilities of civil society organisations (CSOs), enhance the overall sector and the protection of the reputation of CSOs from bad practice cases, create synergies with organisations active in the social field and equip adult staff members with strategic planning of their professional development."*
> (SIM4CSOs Consortium, 2022)

As part of the project, several best practices concerning social impact measurement were collected from each partner country. Furthermore, to explore and assess the state of the art of social impact measurement of CSOs in each partner country, desk and field research was conducted, including a survey and focus groups. In this paper, the results of the research in Cyprus and the SIM4CSOs partner countries will be presented as well as contextual information about Cyprus and brief information about the other countries.

Current state of art in Cyprus

There are currently 6,300 registered associations, although most of them are inactive, which gives a false impression of the size of civil society in Cyprus, 330 registered non-profit organisations, more than 400 charity foundations (Office of the Commissioner for Volunteering and NGOs et al., 2019) and about 190 social enterprises (Isaias, 2019) which operate in a range of areas – from the environment, gender, education and culture to disabilities and health. Nevertheless, reports and studies indicate that organised civil society in Cyprus still has weak foundations for a variety of reasons, including limited participation.

In July 2017, progressive amendments to the Law on Associations, Foundations and Clubs to improve the regulation of CSOs in Cyprus were approved by the Parliament, but there are still obstacles to overcome. For example, the legislation does not have specific provisions for the legal sources of income or property for any type of NGO, nor does it set any prerequisites regulating their immediate involvement in financial operations, which hinders the need for transparency.

Based on the most recent assessment of civil society nationally (CIVICUS, 2011):

> *"Accountability and transparency rates of CSOs need to be encouraged and enhanced, particularly for the ones receiving public funding. This will help to create a culture of openness and transparency and will help to counter abuses and corruption in the long run*."

This highlights the importance of measuring social impact, which can enhance accountability and transparency of CSOs.

Current state of the art in other European countries

Based on the comprehensive report published by the SIM4CSOs consortium (2021), research conducted in partner countries, namely Greece, Portugal, Croatia, Norway, Italy and Poland, only a few had established policies or regulations in place regarding the definition of national standards for impact measurement. In Italy, social impact measurement became more relevant with the reform of the Third Sector (Law 106, 2016), in which social impact measurement was introduced and presented as a *"key element for the legal recognition of social enterprises"*.

Despite the lack of formal governmental guidance and official regulations regarding social impact measurement in most partner countries, it is evident that the situation has started changing, as CSOs, social enterprises and even private companies, including their corporate social responsibility (CSR) departments, from all partner countries have indicated that they realised the importance of social impact measurement and identified several external and internal drivers which further stress the crucial role social impact measurement plays in their sector.

Methodology

To explore and assess the state of the art of social impact measurement of CSOs in Cyprus, first, several best practices were collected from each partner country, which consisted of examples of organisations

or projects which successfully implemented social impact measurement. Second, a survey developed by the SIM4CSOs consortium and set up on Google forms was sent to over 160 non-governmental non-profit organisations, social enterprises and corporate responsibility departments in Cyprus in February 2021. A total of 32 organisations from Cyprus responded to the survey (215 responses came from the other consortium countries, 247 responses in total).

Finally, to further explore the topic of social impact measurement and the training needs related to it by civil society representatives, two focus groups were conducted in each partner country. The participants were recruited through email contact or had already expressed interest to take part in the focus groups via the survey. Twelve participants took part in the Cyprus focus groups, from a variety of non-governmental organisations in Cyprus, CSR departments and policymakers.

Cyprus research results

Demographics

Most survey respondents 78% (25) worked for non-profit organisations but participants from other types of organisations also took part, including a private company (1), higher education institutions (2), a public organisation dealing with social issues (1), a company limited by guarantee (1), a grassroots initiative (1) and an informal network (1).

The respondents worked in a variety of areas: youth development (7), arts, culture and humanities (5), environmental and animal (3), environmental, climate and social justice (1), educational institutions (3), health and human services (1), intercommunal communication (1), hospitals and care (1), community capacity (1), business incubator (1), gender issues and human rights research (1), gender and women's rights inequality (1), accounting (1), advocacy for civic space (1), business network (1), sustainable development goals (1), social care (1) and economics and public policy (1).

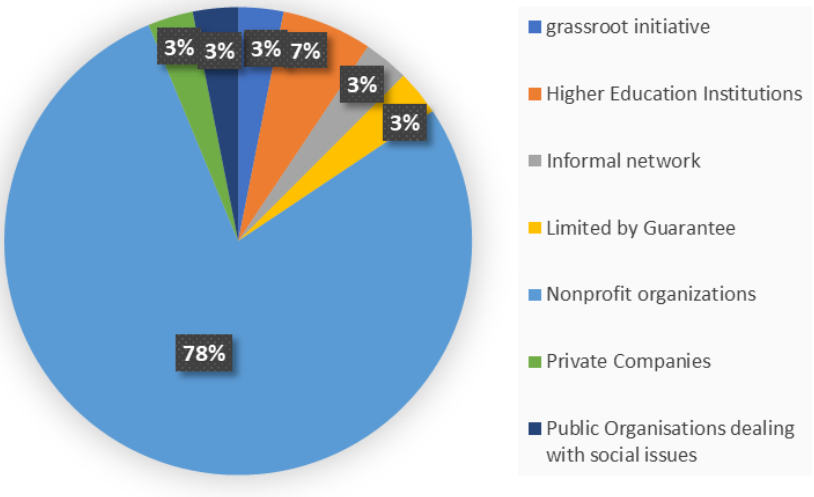


Figure 1: Type of organisation the respondents worked for.

In addition, most participants had more than three years of experience in the non-profit sector (22, 69%) and only one had less than one year of experience.

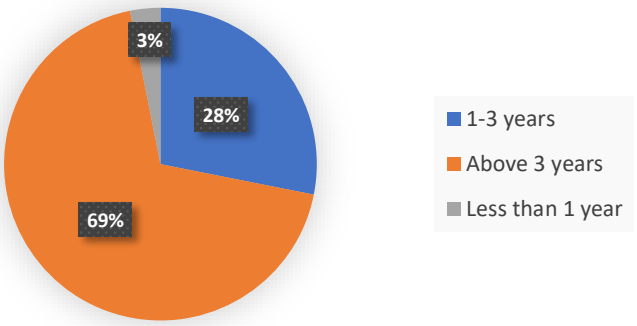


Figure 2: Years of experience in the non-profit sector.

The main funding channels for most of the organisations were EU funds (9), government grants (8), corporate donations (4) and individual donations (3). Other sources of funding reported were a combination of the ones mentioned (1), membership fees (1) and sales of products (1). Three (3) organisations reported they received no funding.

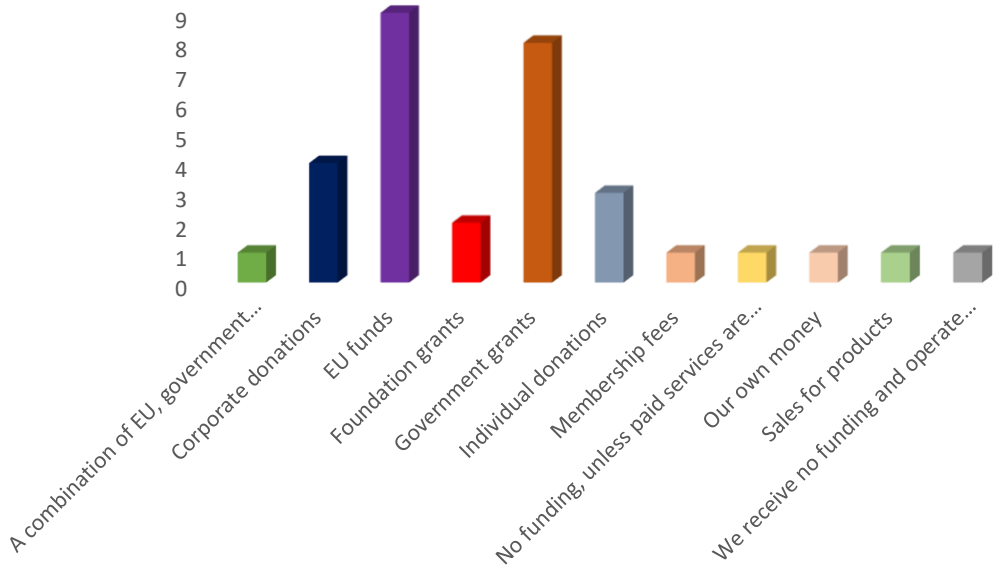


Figure 3: *Main funding channel of organisations.*

Regarding the focus groups, 12 representatives of NGOs, policymakers and CSR departments in Cyprus took part. Most participants were 40–50 years old (5) and had a Master's degree (9/12). The rest were 20–30 (3), 30–40 (2) and 50–60 (2) years old. Also, two participants had a BA and one had a PhD.

Measuring social impact

When asked how measuring social impact could help their organisations, 8 participants stated that it could help improve their current processes and their organisation in general (e.g. *"It is an important element of understanding the role and importance of our activities. This allows us to better understand how to improve*

our activities in a way that will hopefully achieve the desired impact"). In addition, 6 participants believed that measuring their social impact could assist in their planning and strategy (e.g. "*It will help with formulating future activities based on the impact, feedback and needs of our target group.")*

Other ways in which measuring social impact could help their organisations that were mentioned were assessing their efficiency (5 responses, e.g. *"It can help us make sure we are creating the change that the community needs"),* securing funding (4 responses, e.g. "*To secure more funding, more collaboration with other CSOs, better public awareness of our work*"), proving their effectiveness (2 responses, e.g. *"…People respond/understand better when you present your impact instead of anything else…"*) and raising awareness (2 responses, e.g. *"Promote the identity and values of the organisation. Raise brand awareness"*).

Furthermore, 41% (13) of the respondents reported that they measured their impact, with most measuring both qualitative and quantitative data (92%, 12) and one participant only measuring quantitative data.

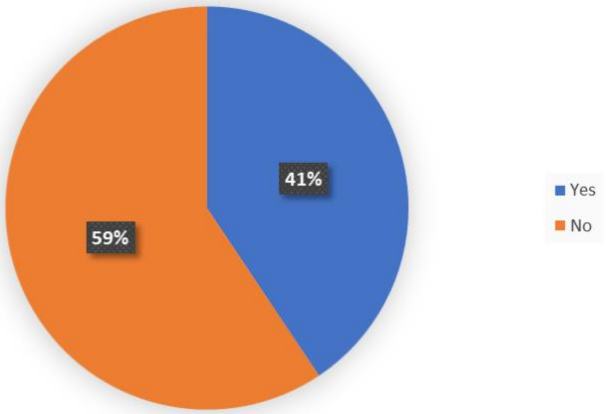


Figure 4: Percentage of organisations measuring their social impact.

The reasons the participants measured their impact were to improve the services they provide (10), due to internal process requirements (7), donor requirements (5) and to reach more people (1). Regarding the methods used to measure their impact, most used records/files (9), questionnaires (7) and interviews (6), followed by focus groups (4) and a combination of social media, emails and face-to-face conversations (1).

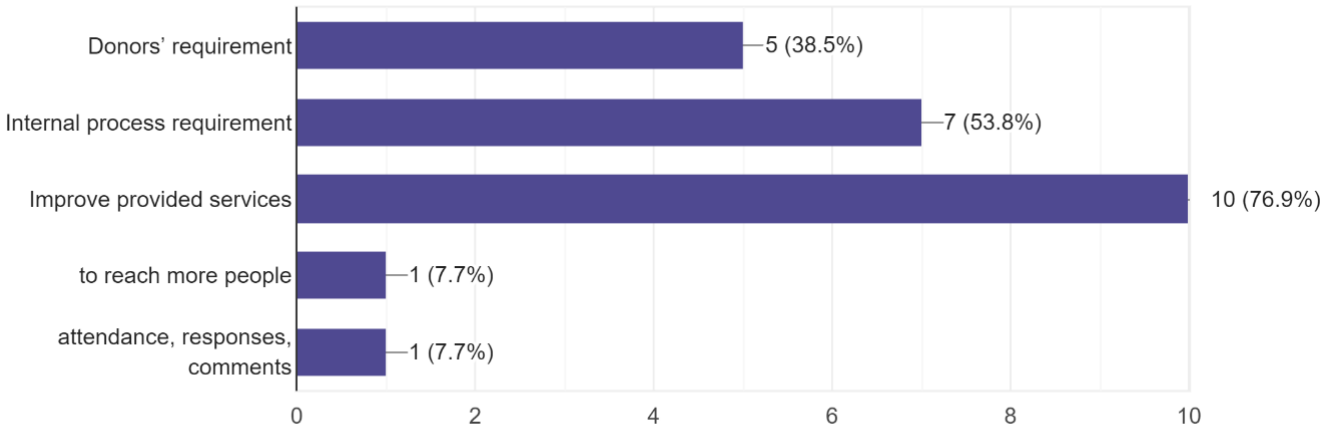


Figure 5: Reasons for measuring social impact.

Just over half (53%, 7) of the respondents used a logical model for these measures. The logical models used varied. Some of the models mentioned were based on the organisation's inputs, activities, outputs and outcomes, their goals (1), the organisation's rules (1) and according to European criteria (1). Of those who did not use a logical model, the main reason was lack of knowledge (1), lack of structured activities (1) and use of a theory (Theory of Change) similar to a logic model.

In addition, 10 of the 13 organisations that measure their social impact had defined success metrics. Some of those metrics were the satisfaction of employees and volunteers, financial income, quality of services-activities provided and/or implemented, participation in activities, an annual target set by their Council, the organisation's projects and day-to-day actions, annual improvement, achievement of goals of projects and specific targets set and measured by the organisation. Of those not using defined success metrics, the reason was lack of data.

Regarding the frequency of social impact reporting, most participants (5/13) report about it annually, every six months (2/13) or after each activity/project (2).

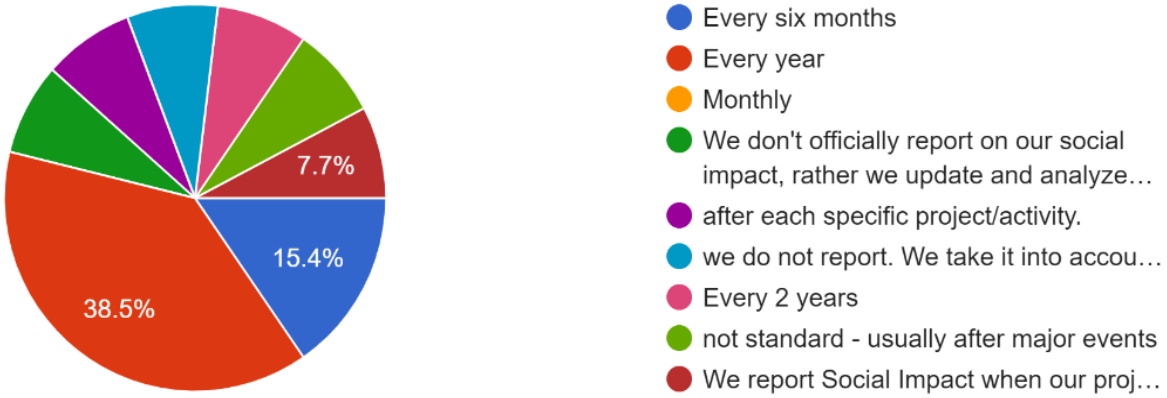


Figure 6. Frequency of social impact reporting.

The organisations that did not measure their impact reported that it was due to a lack of human resources (11/19), lack of financial resources (10/19), lack of time (10/19) and lack of knowledge (9/19).

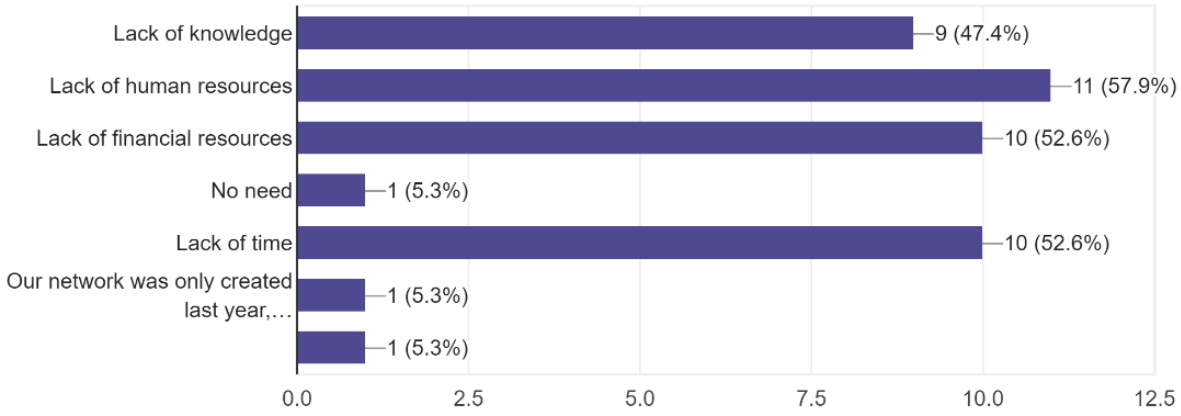


Figure 7: Reasons for not measuring social impact.

The most common reasons they reported they would like to start measuring their impact were to be able to improve their services (16, 84%) and due to internal process requirements (6, 32%) or donor requirements (2, 11%).

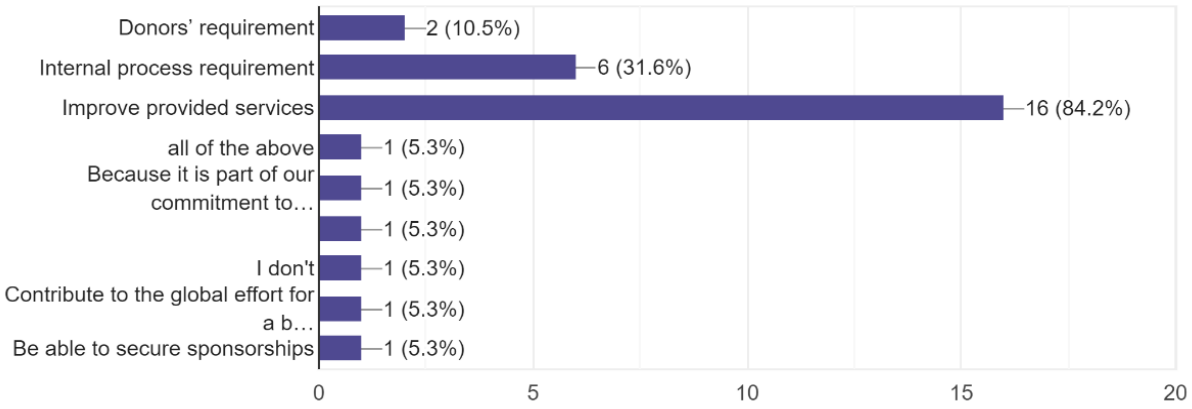
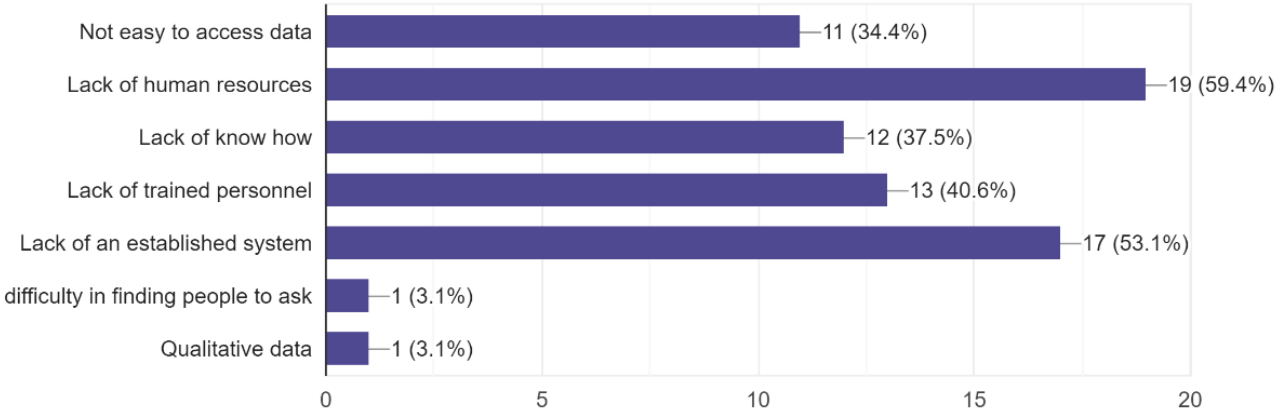


Figure 8: *Reasons organisations would like to start measuring their impact.*

Obstacles in measuring impact

The main obstacles to measuring impact that the participants responded with were lack of human resources (19, 59%), lack of an established system (17, 53%), lack of trained personnel (13, 41%), lack of know-how (12, 37%) and difficulty accessing data (11, 34%).



When asked how many hours a month they could allocate to measuring social impact, most participants stated that they could dedicate up to 5 hours (14, 44%), followed by up to 10 hours (8, 25%) and up to 20 hours (3, 9%). In terms of the amount of money they could give, most stated that they could spend up to 100 euros (10, 31%), followed by up to 500 euros (5, 16%) and up to 1000 euros (2, 6%). Seven participants said they had no funds available to allocate for measuring their social impact.

Eighteen respondents claimed that they would also like to measure other aspects of their work, e.g. indirect impact on society in general (3 respondents), not just the immediate target group, people's opinions/general public opinions (3 participants), comparing their impact with their stakeholders versus people who do not take part in the organisation's programmes, the impact of scientific and cultural events and the impact of CSR actions.

Most respondents (27) agreed (agree and mostly agree combined) that social impact measurement influences donors' decisions. They also agreed (25) that social impact measurement is an advantage for large-scale organisations and that in the long term these can lead to better, more informed decisions and become a management tool for the organisation (29). Most participants also agreed that (29) social impact is more than numbers and that it has a long-term impact on the organisation (22).

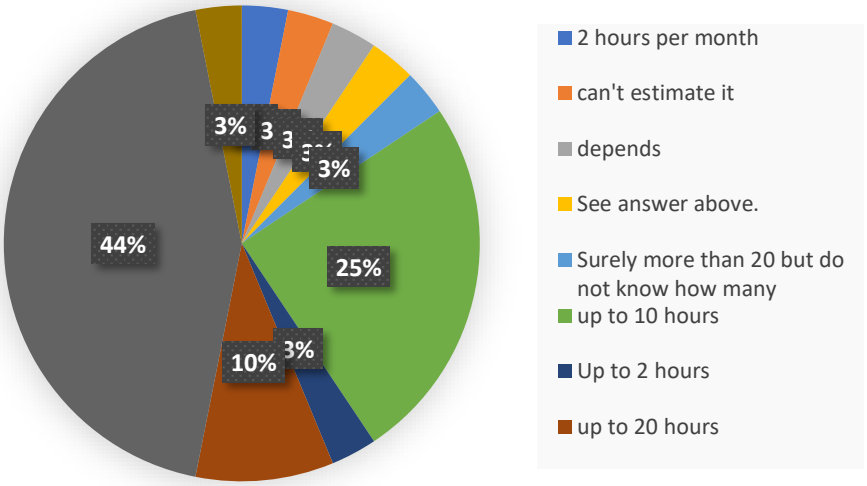


Figure 10: *The number of hours organisations could allocate to social impact measurement.*

Skills analysis

Most participants (combined scores of 3 and 4) felt confident in their ability to apply questionnaire research techniques to a target audience (23), present the results on the monitoring plan (22), compile a report with the results of the monitoring plan (21) and successfully research target audiences (20), but felt less confident in their ability to set/define key performance indicators (KPIs) (17), measure those indicators (16), apply focus group and interview techniques (16), design a monitoring plan (14), and apply social return on investment (SROI) methodology (5).

Finally, in terms of their training needs, most respondents reported that they need training in applying SROI methodology (26), applying focus groups research techniques (24), interview research techniques (23), questionnaire research techniques for a target audience (20), successfully reaching target audiences (24), setting/defining KPIs (23), measuring those KPIs (24), designing a monitoring plan to measure KPIs (26), compiling a report on the monitoring plan (23) and presenting the results of that monitoring plan (21).

Focus groups

The groups were asked about their experience in social impact measurement (if any), its importance for them, challenges they might face in implementing such methodology, what a good methodological tool would look like and what training or other needs they may have related to this area.

All the participants agreed that measuring social impact was of high importance for them, but most participants either did not measure social impact or measured it occasionally with no specific methodology. The CSR representatives and the Commissioner of Volunteering in Cyprus emphasised how vital it is for NGOs to be transparent and be able to measure and report their social impact, as funders will trust them more and will be more willing to donate.

In terms of the main difficulties faced in measuring social impact, most respondents replied, similarly to the survey, that lack of time, money and professional staff were the main reasons. Furthermore, for a tool to work for them, it must be easy to use, user-friendly, with minimal resources needed and should be adaptable to their organisational needs. All the participants agreed that some form of training will be necessary for them to be able to use such a methodological tool.

Results in other European countries

The results of the research conducted in the other partner countries were strikingly like the Cyprus results for both the survey and the focus groups.

Conclusions

Social change practitioners in Cyprus and the other consortium countries are aware of the benefits of impact measurement, the fact that it provides organisational infrastructure and is a way to attract and communicate with funders etc., but they also recognise the lack of impact measurement and the need for a more methodological approach.

It is also obvious that buy-in and participation from organisational management are crucial to the implementation of social impact measurement. However, there was some ambiguity about how the organisations should measure social impact. There was also a strong desire for professional support concerning the methods and skills necessary to conduct impact measurement. Considering basic skills levels and limited resources, most, if not all, organisations suggested that the methods developed should be practical, adaptable, not time-consuming and that any platform should be accessible and easy to use.

Next steps

The next stage of the project is the development of a methodological manual and an online platform that will supply information and resources to CSOs about impact measurement.

Based on the conclusions above:

> *"…this tool would be developed to help practitioners of all skill levels achieve a common baseline. Specifically, it would provide guidance on how to create a logic model, identify impact KPIs, and develop a logic-driven measurement plan which includes clear steps and phases. More advanced content might include links to measurement tools specific to certain target groups and intervention types. It might also link up with national and regional indicators and longitudinal data and would help organizations understand how to incorporate country or region-level data into their impact assessments*" (SIM4CSOs consortium, 2022)

Find out more about this project and the tool that will soon be developed on our website www.measuringimpact.eu

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