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Life-Changing Design

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EDITORS:

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Building design agency through bodystorming

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When addressing urgent issues such as climate change and the social impacts this will have on our future living environments, as designers and design educators, we must critically ask ourselves if the mindsets, approaches, processes, methods, and tools we know are appropriate or need inquiry to evolve. This paper presents an experimental technique the authors have been applying in the past four years of teaching in an international design studio that aims to imagine products and services for future uncertain times. In planning the course the main challenge was to understand which would be the best method for designers to really engage with change, grasping the complexity of a near or far future we might be experiencing. The bodystorm challenge, intended to kick off the course, immediately plunges students into a real-life condition which forces them to look for alternative solutions for basic daily activities. Over the years, students have been asked to conduct a two-week challenge drastically reducing either their consumption of energy, water, digital use, waste, overall expenditure, or by radically changing food habits, and mobility. The students also kept an online diary, on the publishing platform Medium, building a shared journal which displayed a jumbled mix of pictures, narratives, and drawings. First experimentations show how upstream bodystorming increases student's agency by allowing them to deeply understand that they are fighting a major social battle against cultural beliefs, social practices, economic systems, existing artefacts and infrastructures and acting as a spark to more radical innovations.

Keywords: bodystorming; design agency; futures; product service system design

1 Introduction

In the quest for addressing global challenges, which deal with complex sociotechnical systems, several scholars have well described the urgency to rethink design education (Friedman, 2012; Norman & Stappers, 2015; Mayer & Norman, 2020; Pizzocaro, 2000). New approaches, processes, methods, techniques, skills and mindsets need to be experimented, evolved, discarded, prototyped and iterated in order to allow designers to become leaders of complex sociotechnical systems. Meyer & Norman (2020) argue that "designers are entrusted with increasingly complex and impactful challenges […]. However, the current system of design education does not always prepare students for these challenges". In revisiting design methods and processes to address contemporary challenges there is

also a need to "probe and question the histories and geographies of design's methods, to explore how they could contribute to expanding conceptual foundations and develop new ways of designing" (Göransdotter & Auricchio, 2021). This reflection on design methods also entails a parallel and perhaps deeper reflection on what is the role of design in transformational processes, reconnecting methods to philosophies, to final goals, and to researching the meaning in our work.

In this paper we intend to describe a method introduced and prototyped by the authors over the past four years of teaching in a class of international master design students coming from different design cultures, schools and bachelor backgrounds. At the beginning of the master's two year curriculum (Master Degree in Product Service System Design) Innovation Studio is the first practical experience in designing a product service system. The studio follows a methodology that integrates research, scenario building, concept development, prototyping, project development and implementation and culminates with a public exhibition. Students work in teams of 5-6, for a total of 16 groups per year. The groups mix both performance skills as they include different bachelor backgrounds, and contextual skills (Friedman 2012) as they are composed of designers from different cultural backgrounds. In the past four years the studio has evolved, both in processes and themes, to address urgent issues of climate change and the social impacts this will have on our future living environments. In particular the studio strives to engage students in designing for a future in which expectations of stability and growth have been substituted by uncertainty and unpredictability. The theme given for these past four years has therefore addressed future uncertain times, developing products and services able to positively support or adapt to the transitions we will need to face in the next decades.

Three main topics have been explored to date: the future of the home (academic years 2019-2020 and 2020-2021), the future of education (academic year 2021-2022), and the energy crisis and the future of energy access (academic year 2022-2023). Most of the products emerging from the course are transitional solutions and, in some cases, also speculative devices for critical reflection (see the official website collecting all student's work in the past four years: https://www.uncertaintimes.polimi.it/archive/).

The complexity of envisioning a future setting with new constraints and conditions, largely determined by the consequences of climate change, required devising a range of methods and techniques to allow students to imagine emerging new practices in transformed contexts (intended as contexts modified in multidimensional and unpredictable ways). These included secondary research on expected conditions of the context (region or city) they chose to design for, extensive research on emerging practices of people living in changed or extreme conditions, scenario building of possible futures (also dystopic in some cases), concept ideation and prototyping of product services systems that could inhabit our future living environments. However the main challenge was to identify methods that would allow students to situate themselves in these contexts and grasp the level of intervention they could address with their solutions. In particular the complexity of thinking of uncertain futures is that the main transformations will be infrastructural and that these will entail profound social and economic changes. This in turn requires a certain level of reflexivity on the current conditions in which daily practices are enacted such as nearly unlimited access to energy, water, systems of mobility, the mechanisms of distribution of goods, etc. It also requires a clear understanding of the limits of a designer's individual agency within these systems of provision. To address this complexity, there was a need for a more experiential way of comprehending the relation between individual intentions and

actions and the structural constraints in which these are embedded and how this would have a significant effect in the ideation phase of the design process (Meyer & Norman, 2020).

The use of bodystorming combined with a diary journal technique, as described in the following paragraphs, was intended to activate a personal embodied experience of transforming habits. It is to be considered a method that allows learning-by-interacting (Pizzoccaro, 2000), enabling designers to live the problem and to build an iterative conversation between understanding the context, imagining solutions and collecting information through secondary research. The need for the introduction of this method within the design process emerged by the desire to allow intuitions to stem from the first design research actions. By actively living a problem and understanding the complexities and constraints of a new (possible) future living condition, designers can envision project opportunities while identifying research areas to deepen their understanding of what they are experiencing. There are different ways to trigger intuitions, insights, and creative leaps. Next to the well known thinking by sketching and thinking by making methods (Meyer & Norman, 2020) the bodystorming suggests a thinking by living method: it entails immersing oneself in a future living scenario, adapting to its new conditions in order to reflect on the issues through an actionable understanding of the context (Pizzoccaro, 2000).

It is important to underline that the technique described below was not applied in year 2020-2021, i.e. during the pandemic, as the constraints and living conditions during the COVID lockdown in CITY specifically, in China (10% of the class is Chinese) and elsewhere (many students were not able to reach CITY that year and teaching was held in a hybrid modality with more than 50% of the class connecting on-line from all over the world with different time zones), were considered to be already challenging and there was no need to increase the disruption of student's daily lives. The lockdown and the online teaching were themselves the bodystorming activity. When the bodystorming exercise was reintroduced in 2021-2022, the two years of COVID that students had experienced had significantly changed their sense of agency: isolation and the redefinition of sense of risk had had an impact on the way they embraced the design challenge and on the projects they eventually produced. The concept of uncertainty and the sense that radical transformations lie ahead was more clearly integrated and needed fewer efforts of future thinking and scenario building.

2 Expanding the use of bodystorming

Bodystorming is a method that has emerged in product design practice and is more widely known as an ideation or prototyping method used for testing ideas, prototyping experiences and enacting situations, movements, and gestures users may find themselves performing (Buchenau & Suri, 2000; Curedale, 2013; IDEO, 2003; Rodgers & Milton, 2013; Simsarian, 2003). In service design studies, it has also been called "brainstorming for the body" as a physical ideation method to help understand, ideate, and show problems (Stickdorn et al., 2011, 2018). In some cases, bodystorming has also been combined with active roleplaying, which helps designers have an embodied experience of the context they will be designing for. In their work on "experience prototyping", Buchenau and Suri (2000) introduced the notion of "informance" (for informative performance) and "bodystorming" (for physically situated brainstorming) to describe how different methods merge to achieve an active engagement with prototypes. Bodystorming can also be applied as a generative method in the earlier phases of the design process with the aim to co-design with users and to build a higher awareness of

unknown scenarios (Burns et al., 1995; Schleicher et al., 2010). Schleicher et al. (2010) have distinguished “embodied storming” from other forms of “bodystorming” by describing an activity in which designers are invited “to act first, as physical actors in a situation, not as conceiving designers distanced from things” for a deeper experiential awareness. They describe this different approach to storming with the body sustaining that “by acting before understanding, we approach the possibility of learning in our bones the experience of another person as if we were the person experiencing the situation for which we are designing.” (Schleicher et al., 2010)

These approaches suggest that bodystorming might be used at an earlier stage of the design process. Building upon them, bodystorming was used as a kick-off tool to allow students to experience potential transformations of daily practices before the secondary research phase. Figure 1 depicts a diagram created by a group of students to illustrate the design process they followed over the 2022-23 academic year. The figure places the bodystorming phase at the beginning of the process, which provides great insight into the subsequent design work. Students were encouraged to experience and actively learn from some of the problems they might face when trying to modify the artefacts and services that are currently entrenched in our daily life. The aim was to make students aware of the constraints brought about by the built environment and by the economic and social infrastructures that structure and give form to their activities, and help them reflect on the behaviours and practices they have “naturalised” (Shove et al., 2012) and take for granted. The bodystorming technique consisted of a two week challenge in which each student was asked to carry out a challenge that reduced quite significantly the access to certain resources. The challenges have changed over time in accordance with the topic of the course: this year it was about living with far less energy than they usually consume; two years ago, students could choose to only consume 40 litres of water a day, grow their own food or adopt a vegan diet, reduce by 50% the time spent on digital devices, or go waste zero.

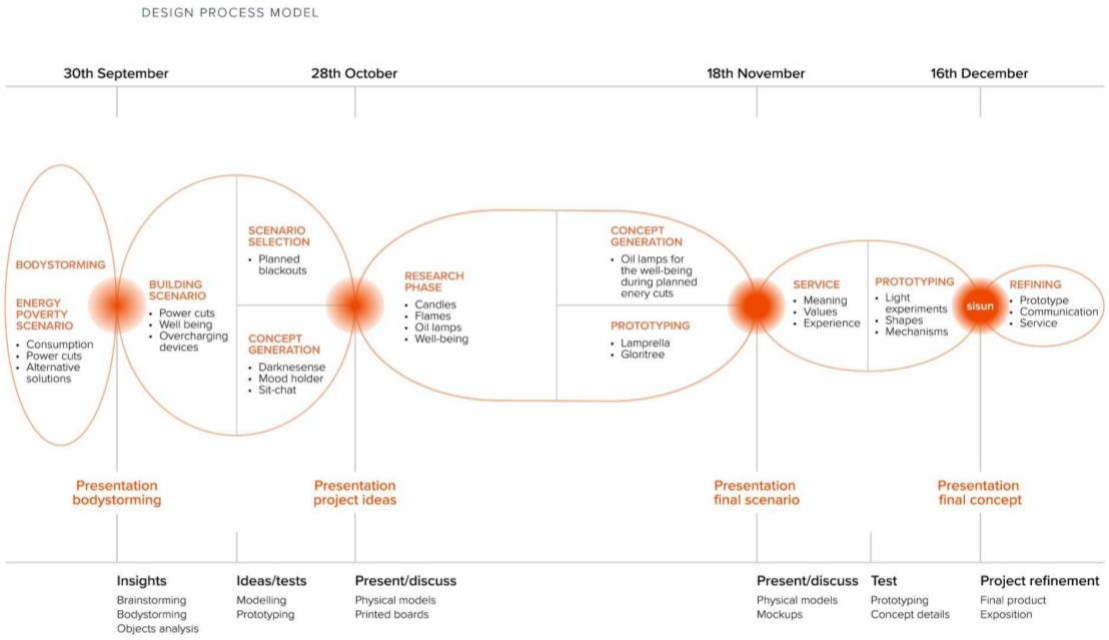

Figure 1. The design process followed by a group of students of the a.y. 2022-23. Bodystorming was used as a kick-off tool to the whole process (Dennis Galvan, Lia Garai, Alessia Hyka, Anna Macchietto Pinotto, Yifu Shao, Zuzanna Warminska).

3 A collective recording of the experience

The bodystorming challenge was an individual exercise where each student was asked to set a goal. Since the class is made of 100 students, we felt the need to find a way to share these experiences among the students but also give them a space to share the experience they were living, the intuitions that were emerging, the doubts, reflections, and human frustrations. Therefore, one of the novelties we introduced to the bodystorming approach, as it is usually practised by designers, was a collective written recording of the experience. The two-week challenge was accompanied by the production of a shared diary journal that was published on the online platform Medium. The Medium journals we have created for the course are called A diary of future lives - https://medium.com/a-diary-of-future-lives and Living with 4kWh a day - https://medium.com/living-with-4kwh-a-day (Figures 2 and 3), and contain the jumbled mix of posts of all the students and offers a view of 100 people struggling with new lifestyles, social incomprehension, infrastructural failures in short and funny accounts. The overall outcome is a sort of puzzle view of small daily battles with artefacts, shops, family and personal desires. Each student was, in fact, asked to publish at least 3 entries, over the two weeks, describing how the challenge was being tackled, the problems encountered and the solutions found. Most entries contained pictures but the texts can vary in length, depth of analysis and, more importantly, what was recounted. Sometimes a few nuggets of creativity emerged, when someone found a quick fix solution to flush with cooking water or save minutes of energy by dipping pasta in a plastic bag filled with tepid water for a few hours and putting it in the sun before boiling it for just a couple of minutes. Most posts express the small frustrations of running cold showers, giving up a certain type of food or having to change patterns of digital connection. The majority of final entries, however, express a sort of elation that comes with changing entrenched habits and a sense of greater mastery of devices or existing practices.

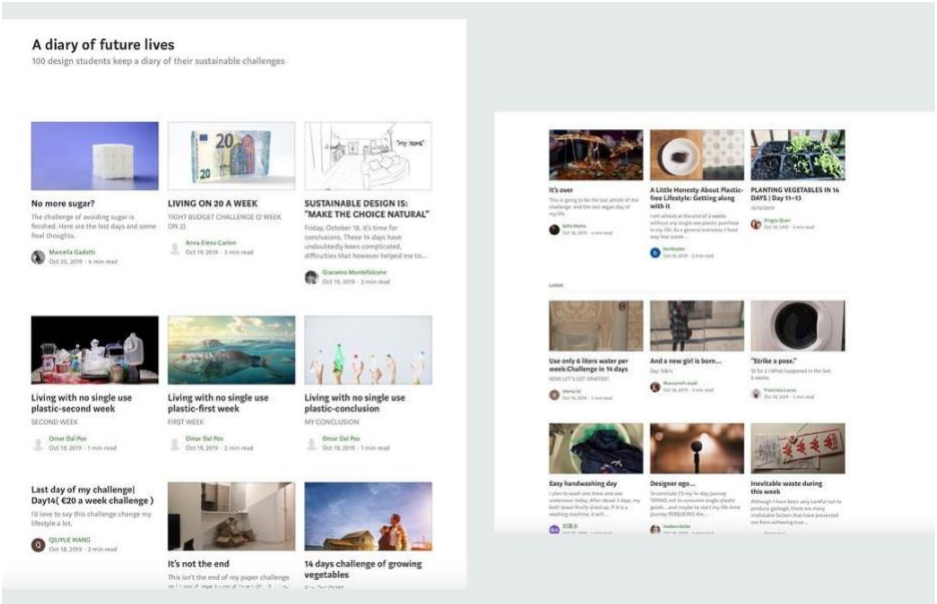

Figure 2. Medium journal 2019[1]

[1] https://medium.com/a-diary-of-future-lives

The challenge this year, which required a reduction of energy consumption to roughly 4 Kwh a day (where the daily average in Europe is 8Kwh), started with most students assessing for the first time in their life the energy demands of different household devices. Coming from all over the world, quite a few students have experienced at some point in their lives significant energy blackouts, cuts and limited hours of energy supply. Managing restrictions and timing consumption was therefore not a novelty. However, for almost everyone, measuring energy consumption systematically was new and rather complex. This step was encouraged in class because a better understanding of the energy demands of different appliances would have been useful in later phases of the course when they came to design new household artefacts. All the students therefore started with a careful analysis of all their appliances to estimate their energy consumption (they were asked to map their house and share the resulting energy maps with the class in Padlet - https://padlet.com/vanessamonna/energy-map-tx7ttkh7e32i2pki), they then attempted to calculate their daily use of each appliance to have an idea of how much energy they consumed in order to decide which practices should be changed and which appliances were most likely to offer a significant reduction of energy expenditure if turned off. A general finding was that although the fridge with its 2Kh a day is an energy-guzzling appliance, only two students decided to disconnect it. Other energy consuming devices such as the oven, hairdryer, or washing machine were also identified and their use either abandoned for two weeks or significantly reduced. In light of these calculations, some students attempted to change some entrenched habits to test new practices such as using public buildings for charging their digital devices, spending more time outside to reduce lighting, or living with candles rather than light bulbs. Other students simply restricted the hours of usage or started planning certain activities more systematically.

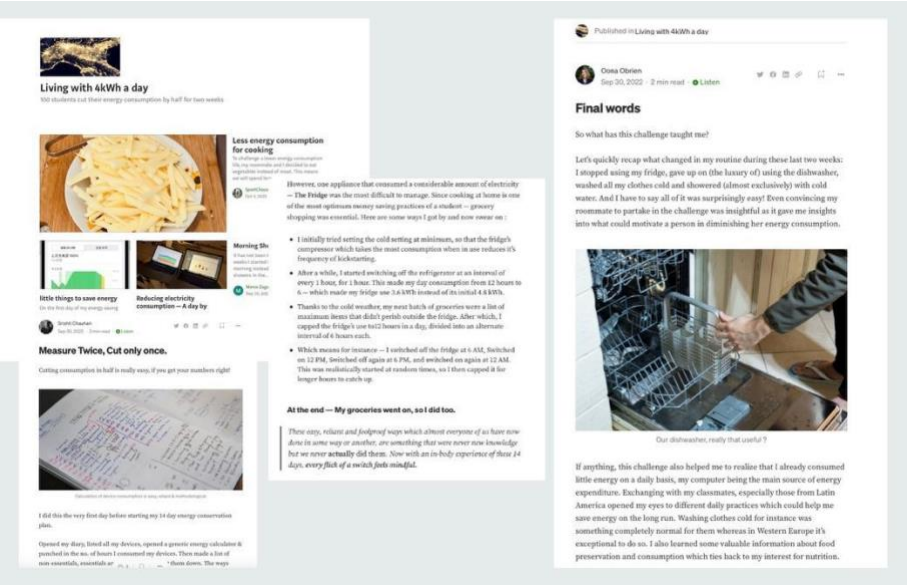

Figure 3. Medium journal 2022 examples: Srishti Chauhan, Jin Deng, Guoliang Li, Oona O'Brien, Marco Zagaria.

A similar variety of experiences were seen in previous years when the challenges were more varied and concerned water consumption, food practices or weekly budget reduction. There as well we saw some students embracing the idea of experimenting new practices and some instead opting to go without a certain resource. Some students for instance decided to systematically eat collectively to

reduce costs, while others just ate less. Some students invented systems to capture and reuse water (for instance from cooking or the shower) and others just flushed less or washed more sparingly. Both strategies however, started from an increased level of awareness and reflexivity on their habits and practices, suddenly and quite brutally making them aware of the interdependence of their daily activities with a range of infrastructural, economic and social resources. In some journal entries, students expressed their frustration with the impossibility to find food without plastic packaging, the high price of vegan food, the difficulty to control central heating or the amount of energy consumed by ovens and washing machines, and commented on how dependent they were from utilities, supermarkets or digital services.

4 The lack of Agency as a trigger for innovation

Overall, the Medium diaries show narratives, pictures and inventive new practices that are closer to a collective artistic performance than an academic endeavour. In the end, however, they offer a unique opportunity to discuss the concept of agency, willpower, awareness, infrastructures, social constraints and determinism. The struggles are meant to dispel the illusion that willpower, awareness and determination alone can allow people to change daily practices. If the artefacts don't afford the consumption of less water, energy or waste, if the commercial distribution does not offer cheaper products with no packaging, if the urban infrastructures do not permit to go off-grid, there is little that an enthusiastic and motivated individual can do. The discovery of their dependence and lack of agency is sometimes a shock to the students but offers the trigger, the spark for more radical innovations. A good example this year have been the cases in which students have analysed the appliances that consume the most energy and found them all in the kitchen: fridge, oven, cooker, and dishwasher. The impossibility of modifying the devices led them to switch them off or avoid them for the duration of the challenge. This in turn led to a radical transformation of their diet and purchasing patterns as they adopted a diet of raw food which needed to be bought fresh and daily given that the weather was still hot. The purchase of fresh food also changed the sources. Overall it provided a very rapid insight in the well known effect of the introduction of the fridge in the cycle of food distribution and production (Rinkinen et al. 2019). Other cases highlighted the dependence on centralised infrastructures of energy production and distribution. Some students wanted to explore alternative energy sources but were unable to find charging stations for their digital devices that were not linked to the national grid. In the debrief sessions following the bodystorming weeks, the constant theme of discussion was the limited range of possibilities they felt they had apart from reducing or abandoning some activities. The only choice they had was to stop doing something that involved energy consumption rather given the lack of alternatives. One of the constant issues that designers face is to evaluate the extent of agentic behaviours that their services will allow. It is in fact a critical element of many projects that attempt to envisage new future practices that could or should emerge in response to the numerous crises we are facing. These new developing habits, we would argue, are not simply individual behaviours but shared practices that will emerge from the interaction of people, artefacts, infrastructures, regulations, institutions and social interactions (Shove et al. 2014). In this way, students can be supported in the discovery that going zero waste, or reducing their energy consumption is not an individual virtuous effort but a social endeavour that requires better infrastructures, efficient devices, costing structures, transportation and logistic strategies, and much more. Every plastic packaging is the result of an industrial and logistic set of choices that the end

consumer has considerable effort to challenge. Every KWh consumed by an appliance finds its origin also in the manufacturing processes and the organisation of energy grids. This more holistic approach to design is in stark opposition with some of the behavioural economics models and nudging models that have increasingly permeated the theories of change that designers have adopted (Sunstein, 2014). In these approaches, the agency is completely in the hands of the individuals who engage in certain practices and therefore designers can nudge users towards certain behaviours by creating affordances (be they material or organisational) to support certain behaviours. The idea however, that much greater forces are at play that limit significantly the choices of individual users, is more difficult to model (Broadbent et al., 2018).

The bodystorming exercise is set in an educational process that leads up to the design of a prototype, and while the reflective experience on their practices is not the only source of inspiration, there are numerous projects that have embedded some of the issues raised by the challenge since the beginning of their project path, hence showing how first intuitions can and do spark from experiencing a problem at the start. In relation to finding some solution to the excessive energy demand in cooking and cooling food, three projects stood out this year. A project for a terracotta cooling system for fresh food, a passive cooking bag to continue the heating process while commuting (also defined as Slow Cooking systems) and a sand-based cooking platform that maintains the heat to a high temperature sufficient for cooking. Each of these projects was an attempt to address at the same time the growing phenomenon of energy poverty but also potential future energy interruptions or low availability. All three of them reinterpret some traditional techniques and materials: the cooling potential of terracotta, passive cooking potential of a well insulated environment, and the heat conservation of sand. In the presentation of the three projects, there is the intention to reduce the dependency on energy sources and increase a certain autonomy while maintaining the practices of mobility or food preparation. Interestingly, the three prototypes also take a wider, more systemic view of the artefact: the terracotta cooler encourages a plant-based diet as it cannot keep meat sufficiently cool, the sand in the cooking tray is made from waste material that is particularly good at temperature conservation, and the bag is thought for cycling and walking. The reflection from the bodystorming experience, kickstarted, in our view, a wider reflection on the dependencies in daily practices.

In the following table the projects described in the text are illustrated through the words of the students to give a better understanding of the concepts and themes behind them.

Table 1. Three projects developed by the students of the Master class in 2022-2023

	Project name: Cacto Students: Margherita Brun, Massimo Caon, Lorenzo Giampietri, Sunit Joseph, Guoliang Li, Corrado Vitali Description: Cacto is a new food-storage product that exploits the natural process of evaporation to create the ideal environment for preserving fruit and vegetables. Cacto promotes a healthier diet aimed at respecting seasonality through the emancipation of food needs from the use of electricity. The product is intended for the rural populations of the Mediterranean basin in 2030 when, due to the rise in temperatures and more widespread dryness, energy poverty will become a primary issue.

Project name: Obo
Students: Chenxin Gao, Irene Giorgetti, Hiromi Kimoto, Riccardo Manzati, Chiara Tralci, Ece Yükselen
Description: Large cities are growing exponentially, and the phenomenon of gentrification is pushing some citizens into areas increasingly distant from their workplaces. Obo is a service that aims to spread passive slow-cooking by providing knowledge, events and a specific product. Conceived primarily for daily commuters, obo-bag converts everyday commuting time into passive energy to cook. The insulation provided by the materials enables pre-heated food items to cook passively in longer amounts of time.

Project name: Savour
Students: Federica Formicola, Greta Mellaro, Hanako Hirata Mercedes Maria Vitali, Haokun Xin, Zhao Wu
Description: Traditional gas stoves are currently one of the largest sources of energy consumption within the household. From the modernization of a traditional cooking technique, Savour takes advantage of the insulating property of sand to keep the cooktop warm longer. Savour creates a deep connection around food, offering an engaging and conscious cooking experience: energy saving is not a loss, but an added value.

5 Using lived experiences to design for uncertainty

While body storming is certainly not an anthropological or ethnographic method, it does embed an approach to positionality and reflexivity that are central concepts of anthropological research. Reflexivity is an essential part of all fieldwork as it requires ethnographers to examine critically their assumptions and points of reference when observing others. “The process of a continual internal dialogue and critical self-evaluation of the researcher’s positionality as well as active acknowledgement and explicit recognition that this position may affect the research process and outcome” (Berger 2022) is crucial for ensuring that personal experience does not obfuscate observation. Relevant researcher’s positioning include personal characteristics, such as gender, race, affiliation, age, sexual orientation, beliefs, biases, preferences, theoretical, political and ideological stances, but also, we would argue, the relation to resources such as energy, water or food. In general, the expectations of how institutions, utilities and services provide resources for daily life are an integral part of researchers’ and designers’ positioning in the world. A positioning that can significantly influence the worldview of the researcher or designer, affecting the way in which they construct their understanding of society, ask questions, view daily practices and identify the issues that are relevant to others. The unlimited availability of energy or water, the reliance on centralised utilities to obtain them, the dependency on external providers and the economic relation that this centralisation entails, are all aspects that can inform how a researcher views a present or future in which for instance, food cannot be stored or energy has to be self produced, or lack of water modifies daily schedules.

Some anthropologists have suggested that a reflexive praxis is embodied as well as cognitive and that the emotional component should be integrated as an experience in anthropological education (Singleton et al., 2022). The positioning stance becomes particularly poignant when experienced as social embarrassment, or when the experience of others is experienced by the body. These authors propose the concept of *uncomfortable knowledge*, which occurs in relational and social situations in which there is an encounter of worldviews that can create discomfort, for instance. They describe the social embarrassment of saying something out of place that reveals the preconceptions or different worldviews of the researcher to the participants of the study. Similarly, researchers can be uncomfortably hot or tired in certain situations that represent the lived experiences of their informants.

In the bodystorming challenge we propose to the students, the discomfort tends to be in the interaction with artefacts, services or built environments, which resist the intentions of the users and do not afford the realisation of their tasks and goals. These moments, which are well recorded in the Medium journals, are reflexive insights inasmuch they reveal to the students their embeddedness in sociotechnical systems which they tend to naturalise and which structure their actions with little awareness of the extent of their expectations. The bodystorming weeks in fact offer an embodied experience of self-awareness that allows students to examine, at least momentarily, alternative practices and potential scenarios of interaction. The benefit of this reflexive moment can be recognised in the capacity to ideate innovative solutions that do not presume for instance an illimited access to some resources.

6 Conclusion

From a design methods perspective, the bodystorming technique that has been introduced and experimented cannot be considered a new method, but rather an adaptation of existing methods to a new set of project challenges that are focused on a future that may have a different access to resources such as energy, water, food or mobility. By bringing together embodied storming, reflexivity and diary techniques, we are attempting to help designers envision daily practices reliant on potentially different socio-technical systems (Baxter et al. 2011). Further experimentation needs to be done to better understand the implications of such methods in the ideation phases, but some conclusions can be reported. The experience of doing a challenge for two weeks does not have the same effect on all students. Some students rather than innovating their tools and practices prefer to give up on certain activities, opting for renunciation in face of resource reduction or even a short term decentralisation. Other students embrace the possibility of innovating the access, storage or usage of some resources, leading them to change their practices. In both cases, thanks to the writing exercise, which invites them to report and share publicly their experiences, there is a certain level of reflexivity and analysis that can be found in their expectations of what the users of their services can realistically do independently of their social and infrastructural context. The bodystorming experience does bring to the forefront of observation not only personal entrenched habits, but more importantly the dependencies and assemblages of which these activities are a part. It has built a deeper awareness on our reliance on centralised utilities, on distribution systems, on the constant availability of invisible labour to transform and dispose of materials and goods. This realisation informs the projects and solutions that are proposed at the end of the course, and is reflected by solutions that avoid putting all the burden of change on individuals. In the systemic approach to service design that the discipline

has built as a hallmark, the possibility of questioning and reconceptualising the organisational framework of some fundamental resources, must be supported systematically and inventively in our educational programmes.

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