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DESIGN AS A PLATFORM TO BUILD DEEP SUSTAINABILITY: REFLECTIONS AROUND AN IDEATION EXERCISE WITH PORTUGUESE SCHOOLS

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This design case describes an ideation process designed to be held with some of the schools of the Municipality of Torres Novas, Portugal, where the students were invited to imagine their school in relation to a future scenario. The initial objective of the exercise was to explore ways in which design could foster ecological literacy through participatory processes. The difficulties found along the way, however, have led me to reflect on the role of the designer as activator, integrator, and facilitator of design creative process in this context, using design as a platform to co-creatively construct ecological imaginaries and possible ways toward sustainability.

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INTRODUCTION

Many of the issues we are living today and that were addressed with this exercise in a public school context—including peak-oil, climate change, and resources depletion—are outside of the scope of peoples' general understanding. And when one cannot understand or consciously experience such ecological participation the result is that one cannot fully understand her affect on it or the consequences of one's basic and apparently trivial choices (Antonovsk, 1996; Bohm, 1980; Ferry, 2010, 2011). This encompasses all of the impacts generated by our human systems, including: food, transportation, housing, the generalised consumption of all the technology and gadgetry one aims to own, human work, building materials, energy and everything else that is part of modern living and their underlying intentions. It means that all these issues generated by the impacts of human living in the natural world may remain distant fictions to most people until it becomes an experiential reality.

Design can play an important social role here. In this sense, all the exercises that I will propose departs from the idea that it is necessary to resituate people and their doings and the ecological issues within the scope of their understanding.

Furthermore, if it is essentially through social participation that the human subject develops a self, creates symbols and opens up to the diversity of the world of others (Jovchelovitch, 2007), it certainly can be fomented and extended to the realm of our broader ecological participation (Capra, 2002; Maturana & Varela, 2001). So if we want to become committed to the building of a culture of deep ecological sustainability, it seems reasonable to claim that it is necessary to find ways in which we can experience our intrinsic participation on the dynamics of the social and ecological systems in order to fully understand it. As was suggested by David Orr (2002) we are to become ecologically literate citizens. In achieving that goal, participation promoted by design co-creative processes can play vital importance.

Similarly, if we assume that learning happens in the totality of the individual along her congruent interrelationships with others and place, it not only brings importance to our environments of living but also to the kind of relationships we nurture with the broader community of life when materializing it. This is especially relevant for design and educational settings that are in fact human systems, which simply reinforce practices and pathologies that cannot and should not be sustained over the long-term. In this respect, what I want to reveal with this particular case is that design doesn´t need to remain limited in the scope of turning green the objects and building environments surrounding educational contexts, but that designers themselves may become involved in education by becoming activists.

Recognized the dimension and limits of such an endeavour and for autonomous initiatives in these times where political and social institutions are not able to respond the increasingly globalized and complex issues, I propose that the invitation for a certain scholar community to think about their own future and to hold them accountable is a sort of design activism. In this sense, modest projects and initiatives if deployed *en masse* can create a network of experiences, alternatives, domains and territories that are more liveable and ecological.

THE EXERCISE WITH PUBLIC SCHOOLS

The exercise that I will describe in this paper was designed and implemented during the year 2012. It was created as part of a major PhD design research study that aims to situate design within an essentially ecological perspective. That research has as its backdrop the search for alternatives for the growing awareness that in face of human ecological impact all over the planet we are likely to enter a period of scarcity of the overall natural resources supporting industrial society. I will refer to this phenomenon as an energy-descending scenario—and it may significantly change much of what we take for granted about the future.

I went to the public schools of the municipality of Torres Novas, Portugal to invite the students and their teachers to ideate solutions in the face of this energy-descending scenario. As I have learned during the research I conducted, when dealing with such scenarios as peak-oil, climate change, resources depletion, and other emerging socio-ecological issues, participants may have negative impressions and emotions, including denial, which can prevent them from engaging in creative thinking about the future (Hopkins, 2008, 2011). Hence, in addition to the construction of a specific scenario for this ideation process, I have designed specific informative and generative tools to situate people, help them to surpass the potentially negative perspectives and unlock their creativity. Also, I have developed a final questionnaire to understand the effectiveness of the exercise and to obtain further information on the participant's ideas and understanding of the whole experience.

Early in my initial attempts to engage with schools, I realised that a series of factors eventually came to influence the exercise and its final format. Portuguese schools are going through major structural transformations, including schedule and budgetary constraints and bureaucratic procedures that provoke a lack of autonomy and create difficulties in developing alternatives out of the scope of the regular curricula and annual programmed activities (Martins, 2013). Because of these reasons it was not possible to me to propose exercises involving the implementation of physical objects. That made it necessary for me to fit within these constraints and to build a concise exercise to generate ideas.

To overcome major bureaucratic constraints and to facilitate the acceptance of the exercise, I proposed it through the Municipal Library of the city of Torres Novas that is in charge of the network of local scholarly libraries and of promoting correlated cultural and extra-curricular activities for the local scholarly community. This relationship also allowed me to get in contact with other local people working with schools and to get valuable information to organize the exercise.

The final format was the facilitation of a 90-minute exercise, which was the timetable each school could dedicate to this kind of activity. Five different schools agreed to participate, involving a total of 141 individuals. I have visited three schools and facilitated the exercise at the municipal library twice. Each school made available a group or two of students ranging from 12 to 16 individuals each. There were two distinct groups of pupils, one ranging from 13 to 15 years old and another ranging from 17 to 20, each including the group's teachers.

For the sake of my research study, it was also necessary to try to implement at least one of the propositions developed by the students in one group to understand the dynamics involved. Hence a separate exercise was proposed to a local private school and accepted, which comprised a gardening activity with young children.

The Design of the Activity

The activity was structured around three leaflets used as generative tools for an ideation process. These were explained through conversation by asking questions and provoking reflections with support of a flipchart. I decided to use both the leaflets and flipchart to avoid the dependence on digital slide shows and the probable lack of the appropriate conditions in Portuguese public schools; for instance, poor light control and sometimes the absence of projection equipment. I also aimed to facilitate a more interactive approach based on conversations around the sketches on the flipchart (Figure 1).

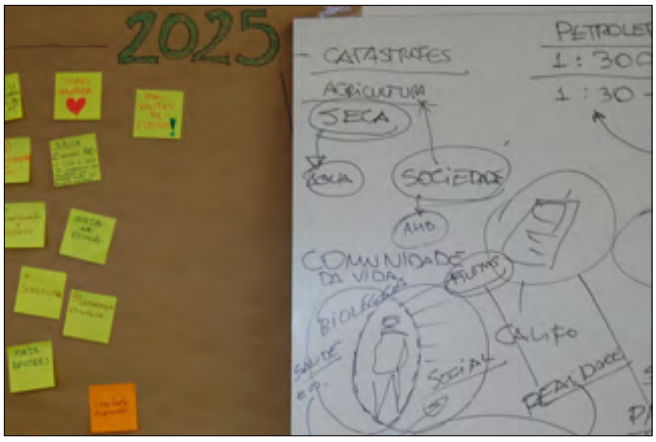

FIGURE 1. During the conversations with the students it was possible to draw on the flipchart to explain the concepts and to incite their reflection and participation.

The overall exercise was organized in two distinct phases. The first I have called an explanatory conversation, referring to the delivered information and explanations through question-based conversations and drawings, and with support of the leaflets. This was followed by a session of brainstorming. This was an ideation process involving their own school once they were exposed to the information in the first phase. The exercise concluded with the application of a questionnaire. In the following sections, I will describe the three graphical elements I have developed and their role in the process as a whole.

An Energy-Descending Scenario for 2025 and Beyond

I carried out deep research into concepts related to the energy-descending scenario, which may vary greatly due to the lost of biodiversity to ecosystems and natural resources depletion (Alier, 2004; Foster, 1999; Greer, 2008, 2009; Heinberg, 2011; Holmgren, 2009; Hopkins, 2008, 2011; Hulme, 2009; Jackson, 2009; Kunstler, 2006). This information was synthetized into the leaflet text as described below and used in the ideation process.

Since that I have assumed fundamental transformations in our view of the future as the starting point, this was the situation I chose to start with when facilitating an ideation process in the schools. The subjects leading to the proposed scenario were presented and discussed with the students. First, I delivered the information about the main issues we are facing, such as peak-oil, climate change and resources depletion and how these subjects are interconnected and mutually influence each other. It was my aim to help the students to understand that the proposed scenario was not a simple imaginary fact to exercise creativity, but a plausible one among the emerging issues. The conversation followed and was complemented by the other two elements that I have called the *constitution of the ecological being* and the *ecological lexicon*, explained later.

At the end of the conversation the leaflet with the scenario was used to set a clear context in which to situate the ideation process. It was a text I had constructed with support from the references I had researched. I asked one of the students to read for the others and then gave a moment for reflection:

> *A culture of sustainability emerges: The depletion and shortage of traditional sources of energy (oil and coal) and the climatic changes in transit become part of the European reality by 2025 and a culture of sustainability becomes urgent. This is accompanied by the adoption of drastic measures to cut and control the energy consumption in all societal levels, which causes profound shift in the way our social relationships take place as well as human relationship with the natural.*
>
> *The decreasing of energy abundance led to a drastic reduction on consumption and industrial activities. All followed by the necessity to relocate all available sources of renewable energy, food production, the economy and work. Hence it means the reduction of the complexity of the local systems of work, production, distribution and sharing. At same time the use of technology became restricted to the essential.*

FIGURE 2. The leaflet with the scenario and enticing pictures to illustrate it and to enact positive visioning.

FIGURE 3. I have used this Banksy graphic to illustrate the constitution of the ecological being both because it is very illustrative of the desired explanation and because of its appeal to youth.

> *Urgent necessity of valorisation of learning by doing, self-learning, reflection, and nurturing of social and environmental wellbeing emerges; and also revalorization of the interest in manual skills, community involvement, and sharing of the events and knowledge. New design rules and the management of biological and technological resources, the recovery of the woodlands ecosystems, and biodiversity became a source of wealth and wellbeing.*

When the participants discussed the subjects I had previously presented, they were able to make a picture of the future by themselves and it was one of perplexity and negativism, as described by Rob Hopkins (2008; 2011). Hence, I provided the other two tools that I had developed in order to help them to get past this negative state. The scenario presented to them was also created in order to offer a few tips they could explore as thought starters and also to prevent strong negativity. These two additional tools are described in more detail in the next two sections.

The Constitution of the Ecological Being

The constitution of the ecological being is a short explanation that is derived from Humberto Maturana's ideas about the biological constitution of culture and social identity to illustrate essential principles of human interconnectedness with the dynamics of ecological systems and thus to relate ourselves—human beings—as responsible for the emerging scenarios and also as the ones responsible and capable to counteract it (Antonovsk, 1996; Maturana, 2002; Maturana & Varela, 2001; Maturana & Verden-Zoller, 1996; Preece, 2011). It was also created to promote ecological principles and the understanding that the richness and diversity of other life forms have intrinsic values in themselves and that it contributes equally and mutually to the flourishing of human and non-human life on earth. These are deep ecological principles to nurture (Naess, 2008; Orr, 2002).

To explain the ecological being I have developed a graphical explanation that summarizes how we are what we are in the context of recurrent socio-ecological interactions. In Figure 3, the right wing represents the socio-cultural environment and the social network of culture and its general aspects that affect us all, such as our family, our communities, and institutions that will influence individuals' worldviews. The left wing represents our biophysical environment and our biological relationships. It expresses the significance of environmental relationships, and how they are important to our individual and collective health and the health of life-supporting ecosystems.

These two dimensions are constitutive of the individuals' behaviour towards the world and the meanings we attribute to our surroundings, which involves sensations, emotions, mental dispositions, and also reason. This was intended to provoke the participants' reflection on the complexity and the multitude of factors influencing our attitudes and on the types of skills and abilities we should develop in face of the proposed scenario.

This image was not simply delivered to the students. I used drawing to present it to them while explaining it. This was also the context set to explain other short concepts that were all aimed to work as thought starters and that were arranged in form of what I have called the *ecological lexicon*.

The Ecological Lexicon

An ecological lexicon (EL) is a set of concepts, terms, and words that were conceived from the necessity to create something that could act as a thought starter; it

was intended both to surpass negativistic approaches to thinking, and to encourage creativity. This was also inspired by Maturana, and also by Wahl (2006) and Antonovsk (1996). The lexicon was intended to be explored as thought starters, and to become the subject of major idea articulation, engendering, and transformation, imparting a new sense of meaning during the exercise. The terms and concepts as I wrote them at the time were as following:

ECOLOGY The study of the living organisms and their relationships among each other, other species and theirs ecosystems.

PARTICIPATION FROM AN ECOLOGICAL PERSPECTIVE Life emerges and is sustained along the natural processes in which we are active participants. By living and doing things together in a range of different environments, we are in continuous interaction to form a web of social and ecological relationships. Our individual identity as well as human culture is the result of participation in this natural process. While biological beings and participants of natural dynamics, every human being affects and is affected by the wellbeing of other individuals, communities, ecosystems, and the biosphere as a whole.

ECOLOGICAL THINKING To live and act under an ecological perspective is to live aware of our own condition as participants in the natural processes within which all our biological and social processes take place. It necessarily implicates new ways of relating with the natural, with knowledge and subjectivity (self-knowledge), politics, ethics, science, and citizenship.

EMOTIONING The biology of love: All emotions behind human action are biological phenomena. This is the biological emotion of love that allows trust and mutual consensus and permeates all the socio-ecological relationships of proximity and intimacy along the living of each individual being.

TO LIVE IS TO KNOW There is no definitive knowledge. To live is the process through which we learn. Life is the school; knowledge and reality are a continuous and open process.

HEALTH Is a full state of physical and mental wellbeing of an individual or group of individuals. It entails all its social and environmental relationships and worldviews.

SALUTOGENESE It is the generation of health. The nurturing of salutogenese involves the understanding of the essential relationship among human and planetary health. It also involves the practice of coherence among thinking and action and emotioning and reasoning.

ECOLOGICAL DESIGN Is the expression of doing things together.

LEXICON TO BE EXPLORED Health food, edible gardens, symbiosis, cooperation, ecosystems, biodiversity, pollination, self-knowledge, outdoor activities, meditation, yoga, breeding, social network, sensations and emotions, reason, language, aesthetic values, ethics, flexibility, recognize and value different knowledges, and the ancient and situated knowledge.

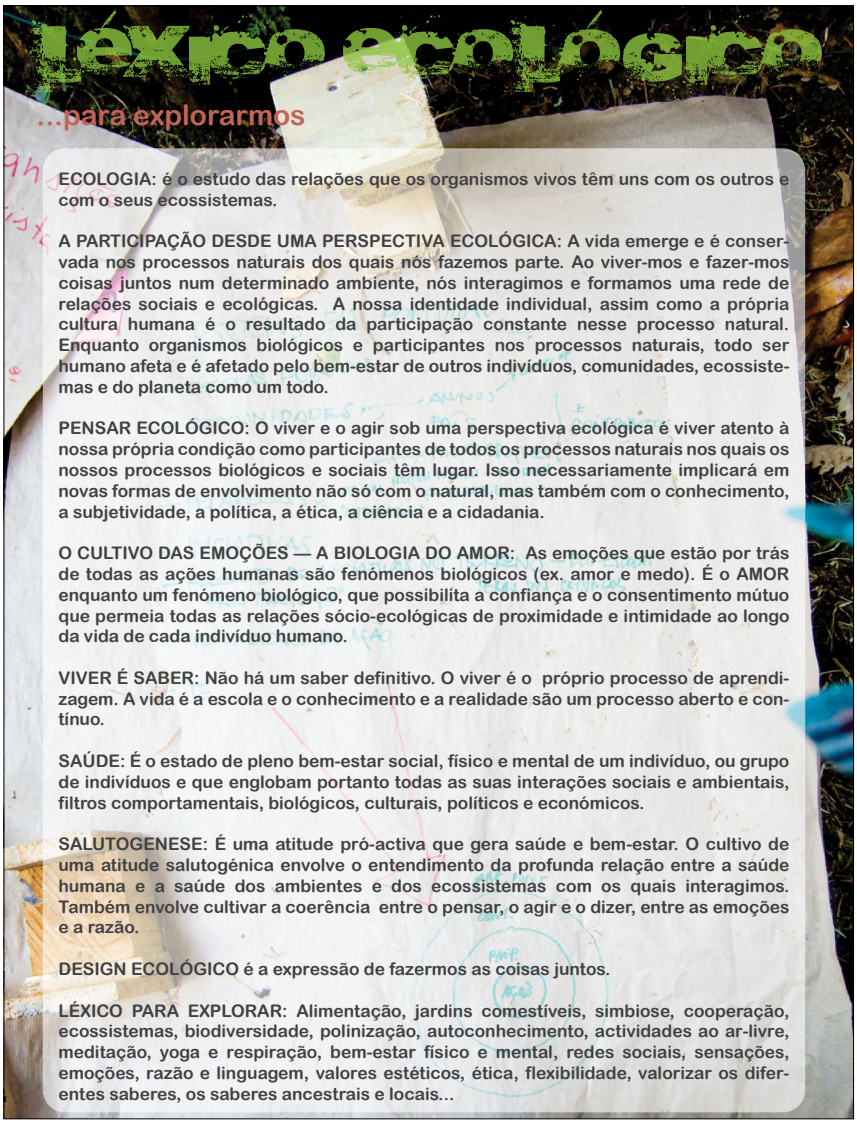

FIGURE 4. The ecological lexicon was a set of terms, concepts and words that the students were free to pick and to use along the exercise.

Many of these terms also formed part of the explanation regarding the constitution of the ecological being. The content of the EL was intentionally organized to emphasize values such as emotions, self-awareness, ecology, our interdependence and responsibility to the kind of world in which we live. I used this series of words that were up to the participants to select and explore during the ideation process (Figure 4).

The Ideation Process

As mentioned before, the three topics discussed above were presented, debated, explained, and interweaved through conversation with the participants. Following this, they were invited to form small groups of 4 to 5 persons for a short brainstorming session to come up with ideas for their schools. Before the session, the specific scenario I have presented above was proposed, in order to ensure they could respond and ideate from the same starting point. This was presented by reading in a loud voice after a brief exercise of silence and respiration.

Each group was given the three previously discussed leaflets to support their conversation and to allow them to get back to these issues whenever they wished. In addition, paper and markers were distributed to write up the emerging ideas. In the meantime, I circulated continuously group-by-group to encourage conversation or to refresh understanding of content where necessary. After the brainstorming session, each group was asked to present, explain, and stick up their ideas on a flipchart (Figures 5 and 6).

At the end I asked them to contemplate all the ideas presented on the flipchart, saying that they could keep working by themselves to implement the ideas they had co-created. Because of the previously described constraints in the time schedule I opted to ask them to fill up an individual questionnaire instead of leading a new round of collective reflection on their outcomes.

I was able to allow a moment of individual reflection after the exercise, to understand their perceptions of the issues discussed, their explanations, and the effectiveness of the exercise. Of the 90 total minutes over which the exercise was delivered, 5 minutes were used for introductions; 45 minutes to chat; 20 minutes for brainstorming; and 10 minutes to complete the questionnaire.

Lessons and Pictures Emerging from the Exercise With Public Schools

The reader may be questioning whether these students were able to cope with the kind of information I gave them, and this was also my concern before completing the exercises. My expectations were, however, surpassed during the process. When I assessed the participants' proposed ideas, I was able to form what I have decided to call an *ecological imaginary* for the schools of Torres Novas.

As I observed during each exercise, the initial explanations and conversations the students held remained limited by the mindset of technological efficiency and recycling—this I regard as due to the fact Portuguese schools remain limited in these subjects when approaching the issues of ecological sustainability. However, as I reviewed new explanations and elements, different perspectives and propositions began to appear and a whole new student mindset started to emerge that would attend to the needs of the proposed low-energy future and a more localized living.

The students began to entertain new ideas in a holistically manner, as their concern grew regarding the development of individual needs and abilities and the awareness on ecological principles of interconnectedness. It was for instance, expressed through propositions to develop hand skills such as carpentry, crafts, arts, gardening, food production, and

FIGURE 5. Students sticking their ideas on the wall after the brainstorming session.

FIGURE 6. The ideas arranged on the wall (left) and the sketches built during the chat with the students. (right) A flipchart turned out to be a simple and effective tool to draw and connect concepts during the chat with the students.

cooperation. According to the students, it was also necessary to adopt different pedagogies—more appropriate to different activities and individual needs—and to emphasize outdoor activities to get to know the geographical, historical, and social sensibilities of place, and the promotion of ecological values in a learning-by-doing manner. Values such as cooperation, concerns with self-awareness, sexuality, and immaterial wellbeing also came to be recognized. A few groups of students even proposed the dematerialization of the school, where all the learning would happen as part of living in the community where general tasks would be done via the Internet and only some specific activities like meetings, some work, and research would be located in a certain physical place. This, according to these students would reduce the need for dislocation, energy usage, and bigger and new buildings. The ideas of dematerialization were stronger in the groups involving older students.

On the questionnaire, I asked in a straightforward manner if the exercise had shifted their perspectives and why? They were also asked how they would like to participate in the shifts they identified as necessary? Would they like to become responsible for what and how they learn? Did the school have the necessary conditions to deal with the proposed challenges? Based on their answers and the ideas they developed during the activity, I derived the following understandings:

1. Most of the students declared that the activity promoted changes in the way they saw the challenges of sustainability—views that were previously limited to a technological imaginary regarding renewable energies and also around recycling.
2. To most of the students, what I presented and how I presented it was a broad new perspective that could change the way they see things. The holistic way in which the subjects were related and the type of information were declared a novelty both by students and professors.
3. The participatory nature of the activity and the informal environment generated by the exercise was greeted positively by the students.
4. On the questionnaire, the students declared an intention to participate and to become involved in the school's daily decision-making in the future. That included taking responsibility for what and how they learn.
5. The students considered it to be necessary to determine what and how is taught in school to fit the proposed paradigm. It included the general teaching pedagogy and students' participation on decision-making processes. School facilities were considered secondary to these issues.
6. In the face of the proposed scenario, the students thought that their schools were not ready for such challenges; however they emphasized that schools are essential to the effort of coping with the future.
7. Younger and older students and their professors declared themselves equally affected by the exercise. The differences between them involved the way they acknowledged how to get involved in thinking about and crafting solutions. Younger students were keener to explore the possibilities within school, while older ones declared themselves more concerned with the fact they were about to finish and leave the school, and the possible impacts of the proposed scenarios on post-school endeavours. The teachers differed in their mode of participation basically by playing equal in stature with the students, or by trying to command the group where they were participating.

I have identified as positive the capability of the participants to engage in such an ideation process, to understand the potential challenges and their proposed ideas, and their expressions to become part of the solution. On the other hand, such a short workshop may have clear limitations to promote effective change in the school as whole. Both students and professors may face impediments to creating major space for effective participation and transformation owing to the hierarchical nature of educational institutions. There are a series of immediate obstacles to overcome in public schools.

THE EXERCISE WITH A PRIVATE SCHOOL

Following the workshop I decided it was necessary to attempt to implement at least one of ideas generated during the exercise to further understand the role I was playing as a designer. Hence I decided to approach a private school in which I was the parent of one of the pupils and where the school was open to external propositions intended to enrich the students' experience. A group of children ranging from 4 to 6 years old were invited to build a small bed for planting seeds. This was a single activity, where the objective was to get at one of the ideas emerging from the workshops and to implement it as way to understand its dynamics and potential within the school.

Why an edible garden? I made my selection based on arguments from various authors. First, because gardening has been posited as a powerful and straightforward way to connect with ecological dynamics (Maser & Maser, 2005), and it touches on aspects of our food and its ecological impacts. The planning, design, implementation, and running of a garden and its possible uses are a pedagogical activity in essence for all ages, where different aspects can be explored (Legan, 2009). Its importance also relies on the fact that children are becoming progressively alienated from or deprived of nature and the very skills and experiences they

FIGURE 7. For some of the children this was the first time ever with their hands on dirt. This picture represents well the atmosphere and the dynamics around gardening.

need to become ecologically literate persons (Louv, 2005; Wood, Baxter, & Bruce, 2009).

In this activity these children participated in all the stages of preparation, digging, placing layers of compost, manure and straw for planting, seeding, and watering (Figure 7). Every stage was explained. They were shown how to touch and sense the dirt and to handle with care new plantlets in a bed. To complement the project, I chose plants that were regularly used to prepare the students' meals in the school.

Back in the classroom, these children were asked by their educators to sketch the activity. Drawing is a way children not familiar with writing can express much of their understandings, feelings and also their place and participation in the activity, or even in social life. This came to be part of the activity by happenstance: their educator came to me to say that I should take a look at their drawings. The drawings were surprising, as most of the expressions varied from representation of activity to detailed expressions of the experience of doing and of their understanding. Children this age can perfectly comprehend the activity, confer different senses of its meaning, and turn to incorporate it into their imaginations. Another important aspect regarding the whole activity, including my previous exercise in the public schools, emerged when I looked at these drawings, and retrospectively to the pictures of the activities and my notes: It was the importance children and youth gave to participation and how they were naturally keen to creatively participate when they were given a role. This is what happened when I asked students to imagine their schools in face of certain issues. It was similarly the case with these children when I invited them to set a small planting bed. Take a look for instance at the interactions of the children in Figure 7 and the drawings in Figure 8 and 9, created by five year old children.

Since completing this simple exercise in a private school, I have come to believe that the "doing things together" aspect that participation brings is essential to support learning within the activities proposed by the students during the exercise with public schools. This exercise seems to promote new connections and values, and a sense of meaning followed by real behavioral shifts. Without that practical component, no theoretical or conceptual understanding would be able, on its own, to become part of a public school imagination where ecological principles are the norm.

REFLECTIONS ON FURTHER ITERATIONS OF THE DESIGN

The implementation of the ideas proposed by the students could become subject of further exploration by designers. In fact this is necessary to give continuity to the process I started. Still I would face challenges, mainly because of being an outsider to the education system and also because of the Portuguese public schools limitations that make it difficult to promote, or to make, effective bottom-up changes in curricula to accommodate such proposals. However, I have identified possible ways to pursue this design (Table 1). First, it would be necessary to create more space for this kind of creative activity and involve teachers of different disciplines in a trans-disciplinary way. Second, create activities outside the domains of school in order to connect the students with the community. For instance, this could be accomplished through a common garden for all the schools of the municipality in a public place, or perhaps by promoting a series of outdoor activities to get to know the city's cultural and ecological aspects. In these cases it would be possible to witness designers not only facilitating the process, but also producing the objects and creating the necessary spaces for such endeavours in a participative manner. A third option would be to invest in informing teachers. This could be undertaken via specially designed workshops and courses or via the engagement in outdoor activities that would facilitate their process of becoming ecologically literate.

FIGURE 8. An expression of the experience of doing: The child has represented her arm in the making of the activity. On the back is the watering can and the different layers composing the plant bed.

FIGURE 9. This pupil has carefully represented himself in the activity of watering and had represented step-by-step all activities involving the planting bed like the multiple layers of manure, straw and water we added to it.

Table 1 summarizes the pros and the obstacles of each possibility based on conversations with local authorities, the synergy of the students and their professors, conversation with some professors and principals, and from my observation of local political disputes. All these possibilities could be reflected in the arrangement of future activities within the municipality and may be valuable to other designers in different scholarly domains.

IMPLICATIONS FOR THE PROPOSED DESIGN

What I have realized when reviewing the exercise with the schools of Torres Novas, is that design may contribute by offering its creative process: design thinking is shareable. This is the building up of ideas and inspirational approaches, evocativeness, experimentation, ambiguity, and surprise that can bring different perspectives to the learning process from which I can enlist holistic/systemic thinking and action competence to promote the necessary connections among compartmentalized disciplines, school, and place. This also emphasizes autonomy—the living experience and the joy of the learning process. Everything that was proposed in this paper is an agenda adopted to connect with people and to create networks within the municipality that are intended to improve or to create transitional structures with people co-creating, promoting awareness on the need for change, and gradually exerting influence over political decision-making. The process does not end here, as this case is essentially the report of my ongoing experience and agenda. In this process, I have used design thinking as a platform to create ecological imaginaries. And designers, in this case, can come as activators, integrators, and facilitators of such platforms.

What I have exposed in this paper approximates design to its immaterial domains of practice in a way it is possible for the individual designer to question its locus, intentions, aspirations and worldviews permeating and coming through it when materializing a world. It can promote a shift from the idea of designing and producing to people, by the idea of designing and producing with people. In this case, the locus of design activity moves from an expert-driven mindset to a co-creative one. This is a whole new dimension for design

	PROS	OBSTACLES
[1] To create more space for this kind of activity within education	It would gradually sensitize individuals and small groups of people to the need for action from within Possible to locally implement some of the students' ideas Possibility of getting together a wide range of students with different ages and professors from different knowledge domains	Possible lack of continuity of the activities Harder to go through the school procedures as an outsider Lack of resources and financial autonomy to buy or implement physical structures Lack of autonomy to decide curricular alterations, or broader objectives Implementation of the students' ideas in every single school Dependent on the will of individual teachers to host the workshops It is necessary to motivate the decision-makers to then motivate the whole chain of participants
[2] To create activities outside the school settings	It would allow the individuals to contact and interact with local social and ecological realities There is a local municipal library that manages the network of school libraries, which has certain managerial autonomy and is already promoting specific activities to the education community that could facilitate further activities by incorporating designers and other facilitators The municipal library did support this series of workshops and aims to keep up the collaboration The students' ideas could be implemented in a collective and cooperative manner in public spaces It is exposed to the general public	It is necessary to be connected to schools' regular schedule of activities It is necessary to deal with restrictions and permissions to the students to engage in outdoor activities It is necessary to organize the responsibilities and intricacies among governmental and local authorities It is always necessary to deal with local political disputes
[3] To inform the teachers	It would sensitize teachers to be themselves the facilitators of shifts within school There are schools for educators in the Municipality, which could be associated with the process There are a growing number of activities related to ecological living in Portugal	It would depend on individuals' will to participate Teachers are stuck among bureaucratic procedures, mandatory top down training activities and classroom duties, which do not leave enough room for other activities

TABLE 1. Issues that are necessary to consider when planning further steps.

practice; one where the processes that constitute broader relational domains, and where people can engage with others, creating a project through which one can possibly imagine, endeavour, and craft ecological ways of living.

To explore creative, desirable and potentially viable futures is design thinking in its essence—design led ideation processes thus emerge as major tool for collective dreaming. When I was involving the students to understand an emerging scenario, depicting it in order to build a new one in which they were protagonists, I was helping people—and their communities—to situate themselves within a certain background. This process provided awareness, margins, and guidance to allow major shifts in worldviews and social structures that the suggested post-carbon economy will demand. These are also possible skills to be introduced within designers' educational domains.

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