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The Uovo di Colombo Lab: Designing against food waste

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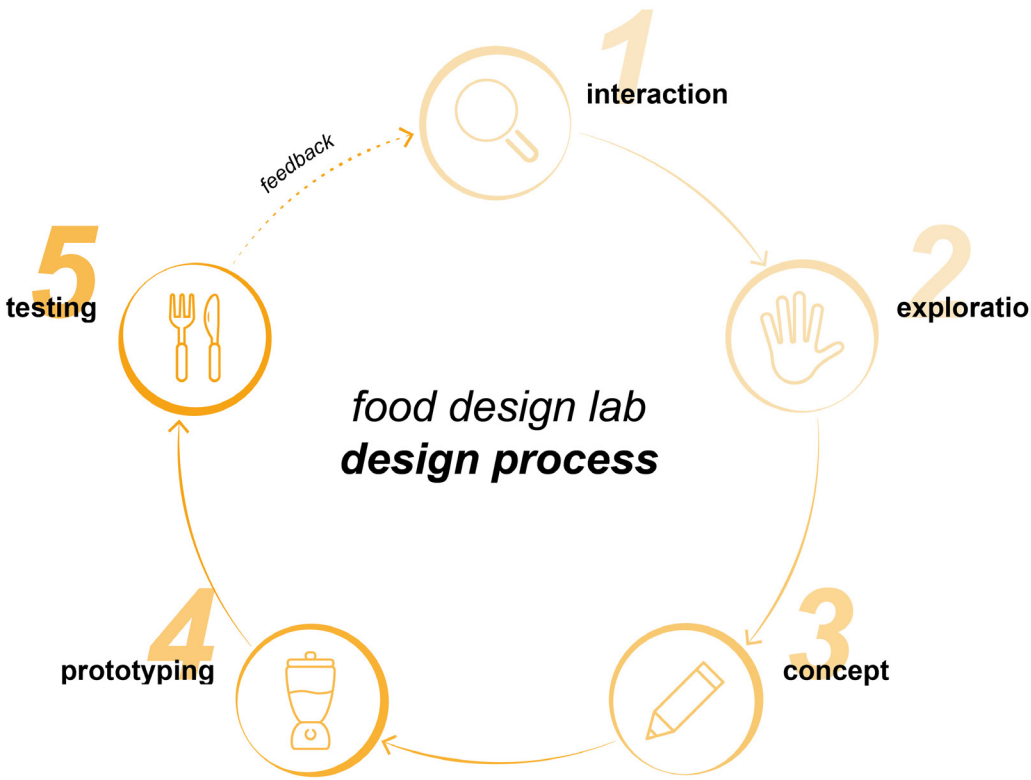

Figure 1. Design process. Source: Food Design Lab, 2019

THE UOVO DI COLOMBO LAB: DESIGNING AGAINST FOOD WASTE

Cristian Campagnaro
Raffaele Passaro
Barbara Stabellini

Food waste is an increasingly central issue in our daily lives. It is estimated that, every year, a third of food produced for human consumption is wasted. Considering this, the paper illustrates the experience of the "Uovo di Colombo Lab", a project offering training activities that address the issue of food waste along the entire food chain, with a particular focus on the phases of recovery, redistribution, processing, and consumption. A workshop organised into mobile kits and providing an assortment of low-tech professional equipment allows young students and members of the public to experience the food transformation processes. This is achieved by applying the circular economy principles in design, creative processes, and co-design methodologies.

educational project / food waste / food design / active engagement / territory

Figure 2. Students at work. Source: Food Design Lab, 2019

About one-third of food produced for human consumption worldwide is currently wasted (FAO 2011). The waste production occurs throughout the food chain—from "field" to table—caused by a set of different dynamics dealing with overproduction through agricultural stages, industrial processing, distribution, and final consumption. Food waste contributes significantly to environmental pollution, degradation and depletion of natural resources, threatening food safety (Foley et al. 2011). That is why its reduction is one of the goals of environmental policies globally. According to the Agenda 2030 and the Sustainable Development Goals defined by the United Nations in 2015—and, specifically, goal number 12 that is aimed at food loss reduction and responsible consumption of resources—the waste of food should be halved along the entire supply chain by 2030 (UN 2015). Thus the concept of Education for Sustainable Development (ESD) gains importance, providing individuals with the knowledge and skills they need to engage themselves as active citizens (UNESCO 2017; Holfelder 2019).

In this framework, universities, as public institutions, are seen as key players in tackling the challenges of contemporary development, thanks to their role as promoters and generators of innovation, knowledge, and skills. Within this context, through the "Uovo di Colombo Lab"—a project of the Department of Architecture and Design (DAD) of the Politecnico di Torino, and part of "Mirafiori Cultura in Cir-

Figure 3. Transformation process: from food waste to new edible products. Source: Food Design Lab, 2020

colo"[1]—the university reinforces its commitment to supporting innovative and design-led food waste prevention and education strategies with a focus on circular economy and social cohesion. The group of involved and interested actors goes beyond the student body to include the citizens, collaborating with local organisations sensitive to the question of sustainable development.

THE "UOVO DI COLOMBO LAB" PROJECT

Food has always been one of the areas of interest and analysis focused by the Design research team at the DAD of the Politecnico di Torino. Starting from a repertoire of projects promoted through the interaction with organisations of the business world, the third sector and the private social sector, the researchers' work has contributed to reflecting on the interrelation between design and food as well as between innovation and sustainability (Bistagnino 2011; Barbero, Tamborrini 2015; Campagnaro, Porcellana 2015; Gaiardo et al. 2016; Bozzola et al. 2017; Bozzola, Dal Palù 2018; Barbero, Bicocca 2013; Campagnaro et al. 2019; Fino et al. 2019). The body of knowledge developed over time, which combines through a multidimensional approach social and environmental aspects with processes able to involve users in innovation design, is proof of a constant interest in the subject of food

Figure 4. Some prototypes developed valorising products such as pomegranate, broccoli, red cabbage, and pistachios.
Source: Food Design Lab, 2019

and nutrition: a strategic area for orienting design towards the development of projects that are sensitive to the needs of society, paying particular attention to the social role—of inclusion and equalisation of rights and opportunities—of design. Based on this consistent collection of experiences, the project Fighting Food Waste Design Focus (FFWDF) emerged in 2017, along with its operative tool: the Polito Food Design Lab (Polito FDL). The project aims to bring students closer to the topics of food waste, food poverty, and sustainable design, with an emphasis on practical and theoretical tools and knowledge capable of fighting food waste with a view to social cohesion and the best possible use of raw materials.

The "Uovo di Colombo Lab" is organised into a series of educational workshops, characterised by a strong dimension of tangibility and practicality. The programme consists of training activities addressing food waste aspects during the recovery, redistribution, processing, and consumption phases. Specifically, young students and citizens are engaged in processes aimed at experimenting with sustainable practices by focusing on the circular economy principles.
As a tool of the Polito FDL within the project "Mirafiori Cultura in Circolo", the workshops have involved students of the high school "Primo Levi" and residents of Mirafiori district in Turin.

Figure 5. Heterogeneous teams. Source: Food Design Lab, 2020

The social identity of Mirafiori district reflects its industrial character and the transformations it has been undergoing since the FIAT plants opening from 1939 to the present day. Therefore, it is mainly expressed by the post-war migration phenomena and the consistent presence of workers, which define the area as a working-class neighbourhood. Nowadays the district still suffers from the effects of significant criticalities such as a decreasing population and ageing, an increasing unemployment rate (higher than the city average), and a low average level of schooling (Mirafiori Sud in numeri 2018). However, despite the current socio-economic disadvantages, Mirafiori includes a wide network of territorial subjects[2] whose organisations also operate through food in different areas of human life (health, personal care, education, work) (Atlante del Cibo di Torino Metropolitana 2019). This network, through public utility services, promotes initiatives based on strong cohesion, integration, and active citizenship, to tackling phenomena of poverty and exclusion.

Within this context, the workshop has been held at the education institute's premises ("Primo Levi"), which, by virtue of the project itself, has strengthened its role as an inclusive cultural hub in the territory. Twelve meetings have taken place since October 2019. Each meeting has lasted four hours, involving a total of over 150 peo-

ple with different skills, interests, characteristics, and backgrounds: high school and university students, homeless people, neighbourhood elderly dwellers, and community volunteers. The participants have reflected on the circular economy principles[3] (Ellen MacArthur Foundation 2015) through a practical experience of fighting food waste by working literally "getting their hands dirty" with pots, pans and food, cooking and tasting (Fig. 2). Great attention has been paid on how to obtain new edible products by transforming food surpluses, by applying circular strategies, the methodologies of collaborative design, and creative processes. In this way the workshop participants have been guided in the valorisation of resources still useful for human consumption, the reuse of food resources to fight food poverty and the rethinking of resource management to reduce the environmental impact of the food supply chain.

METHODOLOGY AND EDUCATIONAL GOAL

In the "Uovo di Colombo Lab" learning by doing (Dewey 1938; Kolb 1984) plays a fundamental role for education and is constantly present in every phase of the activities, oriented by the following questions/topics: how and why food waste is generated in the local markets? How and where food waste can be transformed before becoming an inedible resource? Through which practices food waste can lose the connotation of a useless object? The activities have been carried out in three different but complementary ways to face food waste.

1. Observing food flows and dynamics of waste generation through visits to neighbourhood markets: to get in contact with local associations and actors involved in recovering unsold food;
2. Recovering and redistributing food surpluses by participating in the associations' activities: to discover the potentials of the territory as a source of resources in terms of existing skills and subjects to support social and economic development in the district.
3. Transforming and regenerating food surpluses into new edible products.

The third action has been especially focused. The practice of food processing, indeed, can benefit from the methodologies of design, its creative processes, and co-design methods, to make the best possible use of food waste. The designers of the Polito FDL have mentored participants in the design of new edible products based on the raw materials (fruit, bread, and vegetables) recovered from local markets[4], by addressing the following issues:

- the transformation and regeneration of food from the viewpoint of a creative and domestic economy: how a product that might not look and taste perfect can still be suitable for human consumption in terms of perceived quality—if treated properly;
- the reuse and exploitation of resources that are still valuable from a nutritional point of view but which, due to their aesthetic imperfections, discourage the consumer from eating them, changing status from food to food waste;
- the re-destination of food resources to contexts of food poverty where access to healthy and nutritious food confronts with socio-economics barriers. Thus imperfect food products become of value, as they are capable of alleviating the difficulties in accessing food.

This approach makes food a "design material" that offers textures, thicknesses, new ways of consumption and enjoyment (Allione et al. 2012; Lerma et al. 2012); a new material that the participants use to create edible products by combining creativity, technique and exploration (Germak 2008). The goal consists in designing with food (Zampollo 2016), gaining first-hand experience of tools, practical and theoretical knowledge and low-tech transformations, useful to transform products perceived as waste into new valuable and edible products by designing new forms, flavours and ways of use. (Fig. 3).

The design process took place within a four-hour time frame and included the set-up of small heterogeneous working groups made up of five to six participants spanning five consecutive phases (Fig. 1). These phases, aimed at developing one or more new eatable products, can be summarised as it follows.

1. Interaction with the raw material and identification of weaknesses and strengths through the use of a guidance sheet.
2. Exploration of the organoleptic and aesthetic characteristics of food through a sensory and mechanical analysis.
3. Definition of possible "design with food" concepts to enhance product qualities (e.g., texture, colour, taste, smell).
4. Creation of edible prototypes using only the instruments that were available at the laboratory (Fig. 4).
5. Testing the obtained solutions by sharing results with the other workshop's participants to get feedback.

In this way, problems that usually inhibit consumption (appearance, taste, shape, shelf-life) have been faced through design and a practical approach, combining creative thinking (Perrone, Fuster 2017) with collaborative attitude to work. Working side by side (Fig. 5), the laboratory groups have experienced new and unusual ways of transforming food focusing attention on how to "keeping the material in use" by approaching, often for the first time, ways to be easily replicated in the domestic environment. The ultimate goal of the project, indeed, is to shift the participants' attention towards a new creative and exploratory approach, especially to trigger a change of attitude among people; this is the only way to operate in an innovative and sustainable way (Tamborrini 2014).

CONCLUSIONS

In a context of non-expert learning, food proved to be a very accessible medium for participants to interact with the issues of circular economy. During the workshops, food products recovered from local markets have been easily managed in their processing. They have proved to be more manageable than other "second" raw materials such as wood and iron, whose transformation may require expert skills, prior knowledge and specific tools that could be a critical barrier in introducing the theoretical and social responsibility principles of a transition towards sustainable and inclusive economies.

Transformations applied on food materials can be easily replicated in a domestic context, using everyday tools such as knives, pots, and pans. In this way, their effectiveness at generating new circular products is immediately apparent: if they are good, edible, and visually appealing, the process has been effective. Otherwise, we have to start again, but these transformations are also indicative of a regenerative approach to waste typical of the circular economy (Bistagnino 2011). Thanks to food and using a design with food approach, the students and the community members taking part in the workshops, were able to practise the circular economy consolidating the idea of food, including wasted food, as a means of improving people's quality of life. Many of them continued the experience beyond the workshop, changing perspective on food waste, and bringing home the concept that a material classified as waste often can still be used, in this case eaten, if creatively transformed.
Moreover, the students were asked to complete a questionnaire[5] that assessed their experience as a whole; it showed that the components of creativity, fun and innovation in the Polito FDL's activities were appreciated and conveyed the theo-

retical concept of "keeping the material in use" through the proposed practical and exploratory activities.
The collected results[6] open up for the workshop the possibility of being replicated and scaled to other educational contexts and places. More precisely, we are encouraged to promote the Uovo di Colombo Lab as an educational mechanism based on the "learning by doing approach". Thanks to the methodologies of Design (Cross 2006) and of food design (Stummerer, Hablesreiter 2010), we believe that it is possible to disseminate among primary and secondary educational agencies the principles and contents of both sustainability and creativity, which would otherwise be impossible to be experienced by students personally and directly. In this sense, the "Uovo di Colombo Lab" enriched life of participants providing them with social awareness and sensitivity to face the future as responsible citizens.

FOOTNOTES

1 The project "Mirafiori Cultura in Circolo" won the "Piano Cultura Futuro Urbano 2019 – Scuola Attiva la Cultura" programme of the Ministry for Cultural Heritage and Activities and Tourism (MiBACT). The Department of Architecture and Design of the Politecnico di Torino is a project partner with: Istituto di Istruzione Superiore Primo Levi di Torino (lead partner), Fondazione della Comunità di Mirafiori Onlus, Mercato Circolare, Off Grid Italia, Triciclo Impresa Sociale, Balletto Teatro di Torino. The project took place in the Mirafiori district, in the southern outskirts of Turin, where the IIS Primo Levi is located.

2 Fondazione della Comunità di Mirafiori Onlus was born in 2008, in order to not interrupt the positive transformation process of the district, begun between the 90s and early 2000s; this is a tool able to guarantee local and community development that goes beyond emergency or extraordinary interventions. Over the years, the foundation has started several collaborations, both with public and private sectors. It created a wide network of actors that moves on strategic axes to guarantee the continuous development of the neighbourhood, focusing on the following themes: community, social inclusion, culture, economic development, education, and territory. To know more about the work of the Foundation and its partners consult the following link: https://fondazionemirafiori.it/.

3 Workshops were focused specifically on the concept of "keeping products and materials in use". In a circular economy approach, economic activity builds and re-builds overall the system health. According to the Ellen MacArthur foundation, circular economy is based on three principles: (1) design out waste and pollution; (2) keep products and materials in use; (3) regenerate natural systems. The activities proposed by the Polito FDL, through a design-oriented approach, investigate how food materials considered waste can be reused to design new edible products, keeping them in use for human consumption.

4 The workshops' implementation was made possible thanks to the collaboration with the following associations and projects: Fondazione Mirafiori, Progetto Fa Bene, Progetto C.A.R.O.T.A., Progetto Mirafiori non spreca. Food used for the workshops was collected by the associations recovering products from local markets. Specifically, foods such as fruit and vegetables were recovered daily from the vendors in the neighbourhood local market (Onorato Vigliani Street); instead, the bakery products like bread and breadsticks were collected thanks to a partnership with a big supermarket player,

which has two stores in the district. All of these products (fruit, vegetables and bread) are indeed considered, to all intents and purposes, food waste, the result of an oversizing commercial offer, which presents problems related to shelf-life, aesthetic and sensory characteristics that lower the appeal to the consumer.

5 Twenty-four questionnaires were handed out to the IIS Primo Levi class III work experience students who took part in all the activities, both within the school-work experience and community programmes. One of the questions concerned the identification of three words to describe the workshop experience. The words emerging from this point were creativity, fun, and innovation.

6 The positive results of the activities can be traced out. On the participation side, (1) the number of people higher than expected (131 expected, 153 actual participants until the stop of the activities in March 2020 due to Covid-19); (2) the willingness expressed by some participants to attend other future activities proposed by the Polito FDL and (3) to work in mixed groups interacting with people they did not know before. On the organisation side, by (1) the ease in setting up the laboratory inside generic spaces, such as a school; (2) the willingness of the associations to collaborate with the Polito FDL supporting the phases of food waste collection and (3) promoting workshops to citizens in the neighbourhood.

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