Design for Leftovers. From Food Waste to Social Responsibility

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Abstract: The paper deals with a didactics and research experience, in which actors from cultural (international no-profit Association enhancing food value), academic (University), commercial (packaging production Firm) and social fields (Foundation recovering and re-distributing food excess) converged on the exploration of post-consumption food waste in public spaces. The aim was to develop products for leftovers pack and transport, the so-called “doggy-bags”, increasing meaningfulness and value perception of food resources, raising public awareness on the food waste reduction importance in an environmental, ethical, social, cultural and economical context. The activity involved about 200 students, generated around 50 projects and proceeded with the realization and commercialization of one selected product. A campaign promoting this action and raising awareness about the global urgent phenomenon of post-consumption food waste was launched: the new food bags represent a smart and friendly tool enabling everyone to play their part in assuring food waste minimization and leftovers recover.

Keywords: Leftovers, Packaging, Food, Design, Conscious consumption, Food waste

1. Introduction

1.1 Food wastage in the food chain

Food wastage is an international problem, concerning spheres that range from the economy to ecology, culture, the social sector and to public health. On a global scale, it is estimated that about one third of all food produced annually for human consumption (approximately 1.3 billion tons) becomes waste during its “life”, meaning that it is not used (Gederberg, Gustavsson, Meybeck, Sonesson, & van Otterdijk, 2011). In Italy, about 146 kg of food is wasted per person every year (Buchner et al., 2012). The end consumer contributes to food wastage only during the final stages of the chain, particularly during distribution, preparation and actual consumption, whether the meal is made and eaten at home or in a public place (Segrè & Falasconi, 2011). Food wastage “post-consumption”, meaning food that has been served on the table, amounts to approximately 2,513.5 thousand tons a year in Italy (Who wastes and why, n.d.) and recent studies record how, at European level, one of the moments of greatest waste takes place with “ready-to-eat” meals, prepared by...
catering services or restaurants (Stenmarck, Jensen, Quested, & Moates, 2016). This is due mainly to organisational factors relating to the restaurant and to the consumer: difficulty in planning food purchases, the need to have more food than is actually required (buffets for example), the increasingly excessive size of portions (Young & Nestle, 2003) and courses. Of course we mustn’t underestimate socio-cultural factors and the lack of possibilities for clients to take their “leftovers” home. A recent survey presented at ExpoGate in Milan in 2014 (Segrè & Pessato, 2014) shows how, when people are asked whether they take home the remains of a meal that they haven’t finished at a restaurant, only 30% of participants said that they did, while the remaining 70% declared that they didn’t, for a whole variety of reasons (Figure 1): 18% found restaurants were unable to supply suitable containers, 28% were embarrassed to ask and 24% were not interested in taking their leftovers home with them (Segrè & Pessato, 2014).

![Figure 1. The current and potential attitudes of the food bag users (Segrè & Pessato, 2014).](image)

1.2 Actions in progress

Food wastage has been neglected for far too long. Only recently have new top-down actions, regulated by national or international policies and formally organised, and bottom-up actions, generated spontaneously by members of the public or non-profit associations and organisations, been recorded.

Specifically, at both national and international level, policies have been promoted for the recovery of food not just with a high but also with a low Degree of Recoverability (DoR), i.e.: an index created to quantify the impact of food wastage on the whole chain, using the Availability-Surplus-Recoverability-Waste (ASRW) model (Garrone, Melacini, & Perego, 2014). A European Parliament Proposal for Resolution on how to avoid food wastage, entitled “Avoiding food wastage: strategies to improve the efficiency of the food chain in the EU” was approved on the 19th of January 2012, (Caronna 2011/2175(INI), 2011). This document highlights certain possible policies to implement to tackle the problem and sets the aim of halving food wastage by 2025 (Caronna 2011/2175(INI), 2011). A few years after this Resolution, on the 19th of September 2016, the “waste-prevention law” (Law 166/2016, 2016) was passed in Italy, regulating the free donation of excess food to non-profit organisations operating on a charitable basis. This is an additional sign of just how important the topic is today, and of the new sensitivity of public opinion.

In recent years, growing interest in these matters has been recorded, spontaneously generating a crop of organised activities. Examples are social actions, such as Giornata Nazionale della Colletta Alimentare (GNCA), which has been held for years now and is one of the most popular charitable events shared throughout Italy, during which hundreds of thousands of people voluntarily purchase food items to donate to those who are poorer. Other good practices are being implemented more and more frequently, such as making shopping lists, buying less more frequently, buying directly

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1 https://www.collettaalimentare.it/, retrieved on 16/11/2016.
from the producers, buying fewer processed foods, learning to make meals with leftovers and, last but not least, learning to take home any leftovers after eating out. This good practice is the subject of this research activity, carried out with the involvement of players from different sectors (academic, industrial, cultural, social) present in this field.

1.3 The Brief

The research, which we are going to analyse here, tackled the matter of reducing and recovering food leftovers, with the aim of developing products for packaging and transporting food, particularly leftovers from meals eaten in restaurants and places where we eat away from home. The research, developed within an agreement implemented by Politecnico di Torino with Cuki Cofresco, leader in the production of foil and cardboard containers for the preparation and storage of food, triggered an educational activity dedicated to Design 1 course, Concept Design laboratory (250 students), Bachelor’s Degree in Design and Visual Communication, Politecnico di Torino (a.y. 2014-15). The aim of the design exercise was the definition of a system of minimal, light and cheap containers, potentially supplied free to restaurants and available to diners, for the recovery and transport of leftovers, enabling everyone to play their part in recovering and minimising leftovers. A “doggy-bag” system to develop on the basis of market demand, the needs of the current and potential reference target the identity of the business partner in the operation and the technologies available.

In this scenario, the challenge was to seek product innovation in terms of functionality, sustainability, formal languages and active involvement of the user, developing projects capable of doing their job and communicating the good practice of recovering leftovers. In keeping with the simplicity of a gesture as minimal as it is effective, the decision was made to work with an approach capable of exploiting the techniques of origami and the paper industry, designing folding systems that required the participation of the end user or restaurant staff in the construction of the product.

2. Scenario

2.1 Take away, street food, “doggy bag”

For several decades, it has been possible to consume food in the place where it has been made or take it away. The term take away refers to a complete meal to eat off the premises, designed to take home, while street food indicates a snack to be eaten immediately, outside (Bozzola, 2016). Consequently, numerous systems have been developed over time for the storage and transportation of food, so that its qualities are not altered and making it easier to move the product from A to B. From ice cream cones, which act as container, grip and food all at the same time, to the cone-shaped wrapping for the Neapolitan “cuoppo” or for roast chestnuts in autumn, and pizza boxes, via polystyrene trays to preserve temperature, there are a whole range of technologies and solutions for transporting food (Camerer & Larcher, 2015; de Turckheim & Girard-lagorce, 2014).

From a typological point of view, the food bag, traditionally known as a “doggy bag”, due to the reference to consumption of leftovers by pets (which no longer happens) (Unwrapping the History of the Doggie Bag, 2011), belongs to take away systems, despite actually being a product with different and specific purposes for its sector (Figure 2). The food bag ennobles leftovers – not being a complete portion, but part thereof – restoring it to its original value as food and not waste. Besides being destined for solid food, it can be reinterpreted as a container for any leftover food, including bread and drinks. It can be used to collect leftovers from a meal eaten out (from breakfast to dinner),
or from an event (a reception, celebratory lunch, etc.). Moreover, its content can be consumed directly from the food bag or transferred to a plate and eaten alongside a main meal, kept for a few hours in the fridge and then heated up or consumed at room temperature, alone or in company.

Figure 2. Street food, take away, “doggy bag”: similarities and differences.

2.2 The target

The current target, according to the study presented at ExpoGate (Segrè & Pessato, 2014), is a segment of restaurant clients who still don’t implement the good practice of recovering leftovers. While in some countries – the United States for example – taking home leftovers is seen as an entitlement to something which has been purchased and simply not yet eaten, in others, like Italy (and elsewhere), this practice is still often seen as lacking in elegance, out of place in more refined circles or in the presence of people we don’t know very well (Shimmura & Takenaka, 2010). Consequently, to avoid looking greedy or even “poor”, people often prefer to leave their leftovers to be thrown out, declassing them to the status of waste.

The aims of the research are not only to reduce food wastage, considerable as a way of measuring the effectiveness of the completed intervention, but also to encourage this good practice through communication, informing the current target about the qualities of leftover food and inviting them to finish it, telling them how much they can save with an action that is as simple as it is important. In short, the aim of the operation is to enhance the value of leftovers, touching the chords of social responsibility and releasing the user from the embarrassment current felt when asking for a food bag and restoring the spontaneity of a legitimate gesture to this good practice – currently perceived as taboo. On this subject, the Project Brief reported the need for new food bags to be able to express themselves and break down the cultural barriers, generating new ways and new registers for overcoming the embarrassment of asking to take our leftovers home.

But while, on one hand, the current and potential target can be identified as restaurant clients, the restaurant itself is of interest too. If a client doesn’t ask for a food bag, the proactive restaurant owner will suggest this “good practice”, offering the chance to take any food left over from the
client’s meal. In this renewed virtuous circle, in which design is the promoter and vehicle of good practices in line with the missions of Design for Sustainable Behaviour (DfSB) (Bhamra, Lilley, & Tang, 2011), the value of the food-product, the quality of the ingredients used, the experience of the person who made the meal and the time dedicated to will all be acknowledged. In short, not only economic but also cultural values will also be reassigned to leftover food.

2.3 Significant case studies

A study of the latest food bag systems currently in use in Italy and abroad has highlighted certain consolidated design strategies. The case-study products taken into consideration and their macro-characteristics are shown in Figure 3.

The English food bags, “Too Good To Waste”\(^2\), and the French version, “Trop Bon Pour Gaspiller”\(^3\), both use a cardboard box-container, created especially for food. The Italian “Doggy Bag - Se avanzo mangiatiemi”\(^4\) projects is more articulate and was developed in partnership between Comieco (the National Consortium for the Recovery and Recycling of Cellulose-Based Packaging) and Slow Food for Expo 2015. It consists of a family of containers conceived not just for food, but also for other leftovers from our tables, such as wine and other beverages. Something different is the French “Gourmet Bag”\(^5\) and the Scottish “Good to Go”\(^6\) projects, which don’t necessarily use a standard container. The restaurant owner chooses the type of packaging considered most suitable (trays, boxes, bags, etc.), completing the food bag with a standardised sticker that promotes the initiative.

The strategies in question are just some of the possible lines of intervention outlined in this research operation, as you will see in the following paragraphs.

\(^2\) [http://www.toogoodtowaste.co.uk/](http://www.toogoodtowaste.co.uk/), retrieved on 26/11/2016.
\(^3\) [http://www.tropbonpourgaspiller.com/](http://www.tropbonpourgaspiller.com/), retrieved on 26/11/2016.
\(^4\) [http://www.comieco.org/doggy-bag-se-avanzo-mangiatiemi/](http://www.comieco.org/doggy-bag-se-avanzo-mangiatiemi/), retrieved on 26/11/2016.
\(^5\) [http://gourmetbag.fr/](http://gourmetbag.fr/), retrieved on 26/11/2016.
\(^6\) [http://www.zerowastescotland.org.uk/GoodToGo](http://www.zerowastescotland.org.uk/GoodToGo), retrieved on 26/11/2016.
3. Methodological framework and roles

3.1 Partners in the research

The research involved partners of national and international acclaim: Politecnico di Torino, Cuki Cofresco (which has been committed to supporting the Banco Alimentare activities of the “Save The Food” project dedicated to recovery uneaten meals for the social chain, for some time), the Banco Alimentare itself and, last but by no means least, Slow Food, the international non-profit association which works to restore value to food, respecting producers, the environment, the territories ad local traditions.

Each partner contributed to the research, bringing values, experiences, knowledge, contacts and opportunities to reflect on the matter of enhancing the value of leftovers, as well as promoting and distributing the Food Bag created and the good practices that it implements.

This is a virtuous circle that lies behind “win-win” operations, in which the winners are the individual partners but also, and most importantly, the social, productive and cultural system that they support and feed.

The university mission, “high” by definition, was to translate the values embodied by the different players into a single project, product and service development action. The “fresh” look at the project taken by the students involved (tomorrow’s aware professionals), informed by Cuki on the
production scenario, led in their cultural exploration by Slow Food and sensitised to the topics of social innovation with the case studies dedicated to the activities of the Banco Alimentare, developed into a real product innovation. By distributing the Food Bag, primarily through Slow Food restaurant channels, the research can be used to build up a “best-practice”.

3.2 Innovative approach to education

The design operation was organised into a first focus on Brief and Target (by the teaching team), then into the organisation of the scenario of productive, social, technological and cultural references, reaching the concept (hinged on product identity and the choice of materials and techniques that are most consistent with it) and then the concept development (based on the Politecnico di Torino’s Exigential System methodology), and then, lastly, for the design chosen by Cuki, prototyping and optimisation for production (Figure 4).

During the research, the students (organised into groups of four, and tutored constantly), were able to benefit from specific communications issued by the partners in the research and use the original materials supplied by Cuki to shape the design solutions during the various stages of progress of the project and to have a direct feedback in relation to the validity of the proposals. The proposals were discussed and compared using the “Pechakucha” methods, analysing contents and technical feasibility during weekly reviews in the Concept Design laboratory, by the professors of Design 1 course and of the Course of the Technological Culture of Design.

Figure 4. The adopted methodology.
4. Results

4.1 Design approaches

The proposals developed during the course follow a common thread, with a view to making the most of leftover food with original and “simple” interventions (reducing materials, components and production techniques) to create products that are sustainable in terms of culture, expression and technology. In particular, the proposals can be organised into three lines of intervention, which respond to possible interpretative approaches:

- **DRESSING CUKI TRAYS OR BAGS**: new concepts developed from products already existing in the company’s catalogues (foil trays or plastic bags). The containers are “dressed” with special minimum elements, tabs, handles and cords that transform their identity, increasing the containing function and simplifying the recovery of leftovers, transport, storage and relative communications thanks to specific interventions.

- **REINTERPRETING THE DIRECT CONTAINER**: new concepts of single portion tray to directly contain food. In this case, starting with existing paper industry production methods, the proposals reinterpret certain archetypal systems for containing and transporting food (plate, basket, bundle, bread bag, etc.) or allude to semantically similar spheres (the home, chef’s hat, handkerchief, etc.), giving the containers transmissible meanings in addition to performance in terms of practical use, effectiveness and easy production.

- **ADAPTING THE FOOD BAG TO PARTICULAR CONTENTS**: new concepts for the recovery, transport and management of leftover food or drinks that have not been finished. A thread triggered by the observation of certain recurring dynamics in the consumption of meals at a restaurant, highlighting how certain types of food more than others are destined to be left on the table. The bottle of wine which is too much for just two, the piece of cakes when we are full at the end of a meal, the extra bread, etc., all become starting points for the development of specific systems for the recovery of these foods.

The restoration of 3-dimensionality starting from a 2D sheet using special pre-programmed folding systems, not only generates a new play-creative relationship between consumer and product, but also has determined interesting ad positive effects on the transport and storage chain (optimising space), with economic and environmental benefits.

4.2 Some significant projects

About fifty projects were created during the course and, as mentioned earlier, the individual proposals had different approaches and distinctive values: we find projects for which the communicative value lies not only in the graphic characterisation but especially in the meaning expressed by the product in its entirety and methods of use (Figure 5). With this in mind, we can mention “Take eat home” which, with its “house” shape, creates an immediate reference, indicating the container function and inviting people to take it home, where they can finish their meal. This is a system of different coloured and sized containers, designed for presentation inside the restaurant, in a micro-village layout.

“Chef à Porter” is a container in the shape of the classic chef’s hat, created by intricately folding white polythene-coated card, with an implicit message, ennobling the leftovers (not waste, but excellent quality food). A drawstring is used to close the container and carry it.
Its extreme simplicity and functional effectiveness make “RigustiAMO” worth mentioning. This proposal is a tray holder made up of two strips of corrugated card which can be slotted together to form a cross structure which contains and protects the trays. A double loop made of string creates the handle. “A portata di mano” is another food bag made with a cardboard strip that wraps around the tray so it can be carried. The “hook” form of the ends allows the fastening of the strip and the grip for transportation when it has been assembled. When it is still flat, it reminds us of the “do not disturb” signs found in hotel rooms, with the claim “do not waste”, and the strip can be hung on the restaurant door, publicising the waste prevention service offered.

Similarly, the “Gustami ancora” project makes simplicity its strong point, and this is one of the reasons it was selected for production. A small strip with two holes punched in it to hold the opposite corners of the foil tray which, when inserted diagonally, is blocked in three directions and can be carried using a punched handle: a simple and intuitive assembly operation that guarantees high value service with very little constructive effort at a cheap cost.

![Several projects developed during the course.](image)

4.3 Product selection and optimisation for production

Having chosen “Gustami ancora” as the most effective solution due to its communicative capacity, functional use (both for the end consumer and for the restaurant owner), production economies and overall sustainability, the product development phase was launched, with investigation of the optimisation margins to create a final design and go ahead with production. This activity meant that the students who created the design were able to work in close contact with the company experts and academic tutors to establish and perfect all the details of the projects: reducing the amount of material used, optimising production scrap, rationalising the slot-construction systems, selecting the idea card weight, as well as redefining the graphic project in line with the company’s coordinated image (Figure 6).

The project of the educational agreement with local manufacturers falls within the consolidated practices of Politecnico di Torino Bachelor’s Degree in Design and Visual Communication. The interest in this specific case lies in the completeness of the professional simulation which, besides reaching the production and sale of the some of the projects chosen, sees the predisposition of a specific contractual arrangement between the company and designers of the proposal selected, in
the name of defending ad enhancing the intellectual work of the project and the creation of responsibility in the designer-students in relation to the development of a real product with tangible social effects.

The direct contact with the market (production in sale), and in particular with the tools that regulate the designer/manufacture relationship, are largely unprecedented aspects in the educational practice which often stops with the formulation of proposals acquired by the commissioning companies as research materials, possibly for development elsewhere.

5. Future development and conclusion

5.1 Promotion of the operation, dissemination of the results and sale of the product

As regards the promotion of the operation and dissemination of the results, a public presentation was held during “Terra Madre – Salone del Gusto” at the press conference on the 23rd of September, 2016, at Magazzini Oz (Turin), at which Maurizio Martina, Minister of Agricultural, Food and Forestry Policies, and Carlo Petrini, Chairman of Slow Food, were present, highlighting the cultural value that lies in this kind of operation, particularly in the potential to create general awareness towards an issue the ethics and sustainability of which hold important social weight. In specific terms, Petrini declared the intention to disseminate the product in the restaurants of the Slow Food network and so encourage the good practice of recovering leftover food, while Minister Martina highlighted how the new waste prevention law (Law 166/2016, 2016) recently passed represents an important provision for simplifying the collection and donation of farm produce and food, and reducing wastage in the restaurant sector. During the press conference, the exhibition “Save Bag – Progettare Antispreco” was launched. This exhibition documents the results of the operation, with the display of the design tables and study models created by the students of the Concept Design laboratory (Figure 7). The exhibition was open to visitors during the week of Terra Madre – Salone del Gusto (21-26/9/2016) and was subsequently re-proposed as part of the “Good Design Days” programme in the Sustainability Week held by Politecnico di Torino between 21 and 26/11/2016.

The promotion of the Save Bag as a tangible product for restaurants to use was launched during Terra Madre – Salone del Gusto during the presentation of the Slow Food Guide “Osterie d’Italia 2017”. The first three hundred kits were distributed free of charge to three hundred restaurants. The Food Bag will soon also be distributed to Eataly restaurants.
5.2 Future developments and effects on the socio-cultural context

The project envisions a system for the distribution of the Save Bag to a large sample of restaurants (currently in the start-up phase), accompanied by detailed communication on the value of the service, as well as the product. To this end, the kit received by the restaurants includes not only the containers for recovering leftovers, but also some communication materials to promote the use and value of the action. The other materials include a window sticker to put into the restaurant window to tell clients about the value of good, edible leftovers, and indicate the possibility to use the service (Figure 8). In this way, the taboo surrounding an action which “lacks elegance” can be exorcised and reinterpreted in the opposite sense. In order to optimize the project, a practical verification phase is envisaged for the next months, in order to collect feedbacks from consumers and restorateurs who already have used Save Bag, and point out criticalities to be improved.

In terms of effects, besides recovering most of the leftovers produced when eating out, and therefore reducing the environmental impact that this generates, and relative economies of scale, the project focuses, along with similar operations in progress at national and international level, on triggering virtuous processes of progressive change in the collective sensitivity towards environmental matters to make the most of and recover resources, including food. For this reason, the methods of this action can be scalable and repeatable to other contexts such as ceremonies, i.e. weddings, birthday parties, etc., as well as to other food waste typologies such as wasted bread or wine, in order to widespread the leftovers recovering best-practice. For this aim, new Food Bag customizations, designed to better fit those contexts, are hypothesized to be developed in next future.

Finally, since several initiatives similar to Save Bag are currently active abroad (i.e. those presented in this contribution), the creation of a room for exchanging and discussing on a national and international level about the different on-going actions could be set up through webinars and conferences, with the aim of generating a network for possible joint actions to face the global food waste issue. A matter of social habits, which is already potentially changing, but above all, a cultural issue to encourage and promote.
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