Systemic Food Design.it
A website that narrates food supply chains from a systemic perspective

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Abstract: Systemic Food Design.it is a website that applies the guiding principles of Systemic Design to the food world: a production system in which every choice leads to consequences, effects and the creation of value relationships, with both the territory and the community. When we speak about food quality, we enter into a concept definition that is multi-faceted in its very nature. Systemic Food Design attempts to speak of the concept of the production and commercialisation of products and services in a practical way, throughout the supply chain, in order to teach new generations to recognise “system quality”.

The site aims to recognise the efforts of companies and small and medium producers towards a new concept of Good, Clean and Fair quality (Petrini C., 2005), where the importance of sustainability of content goes hand in hand with that of its container.

Keywords: Systemic, Food, Design, Quality, Packaging

1. Introduction

A trend, now several decades old, has led humanity towards a higher level of complexity in relationships and systems (Young O. et al., 2006). For the end consumer, it’s no longer enough for a business to merely produce. Instead, it needs to demonstrate that it is dealing with the problems of environmental protection, preservation of the landscape, conditions for workers, animal welfare, ethics, etc. by tackling them during its production processes (Peri C., 2005). This means that the company can no longer be merely an institution specialised in the production of goods and services that is guided by the principles of profitability, efficiency and effectiveness, but must also justify itself in terms of its impact on civil society as a whole (Golinelli G., 2009).

Quality is thus produced by movement, by a flow of information from the consumer to the production system and of materials in the opposite direction, subject to the influence of communication models, both from history and from the temporal reality of each system (Peri C., 2003).
It is a holistic and dynamic property that, through the use of models and methods of systemic thought, can be translated into the practice of producing and commercialising products and services, to meet the needs of modern organisational systems, continuously changing and in deconstruction (Fassio F., 2016).

The Systemic Food Design.it site was conceived as part of this conceptual framework. It is a supportive tool to help the end consumer to understand the complexity of food production throughout the supply chain, considering both the raw material and the packaging.

The work began with research carried out by Professor Franco Fassio at the University of Gastronomic Sciences and was aided in the generation of gastronomic content by students in the “Systemic Approach to Gastronomy” (A.A. 2012/2013) and “Systemic Food Design” (A.A.2015/2016) courses in the Masters Programme in Gastronomic and Tourism Heritage Promotion and Management. The applied research and the site’s development were financed early on by Comieco in 2012-2013 (National Consortium for the Recovery and Recycling of Cellulose-based Packaging) and then by Ricrea (National Consortium for the Recycling and Recovery of Steel Packaging) in 2015/2016. The goal was to spread the idea that a food product’s quality is based both on the sustainability of its raw materials as well as on the sustainability of the life cycle of its primary, secondary and tertiary packaging.

The site is full of the inseparable relationship between content and container quality, of a circular economy based on waste becoming a resource for other systems, of a system quality determined by environmental, economic and social sustainability together with sensory factors, of a consumer that must be more aware of the food system in order to make choices with information that covers the whole system as much as possible. It is proposed as an interactive tool for educational purposes.

2. How the Site Works

Putting ourselves in the shoes of a food industry businessperson, the website allows us to understand the main “cause and effect” connections that can be difficult to see: from production to packaging, from sale to consumption to the valorisation of generated outputs, in order to investigate and reflect on every aspect required for quality food and packaging, step by step. Systemic Food Design poses questions that allow users to build their own supply chains for 20 foods and beverages in daily use and, through the narration of the production system’s main phases, allows the user to look at the multidisciplinary world of Gastronomic Sciences.

The user can trace the life cycle of each product, considering the quality of the content (raw materials) as well as the quality of the container (packaging).

More specifically, ten supply chains deal with paper and cardboard packaging (marmalade, potato crisps, oil, chicken, beer, pasta, biscuits, ice cream, eggs, cheese), five with steel (tuna, chocolate, coffee, corn, peeled tomatoes) and five with wood (apples, small fruits, pallets, wine, whisky). Once a supply chain is chosen, the user enters and plays the part of a producer of the selected food.

The user finds a short introduction to the food system selected, described from a historical-geographical perspective. Once inside the interactive section of the site, through 15 questions, players can design their own products, learning to recognise their main features. Each choice is assessed for its positive and negative effects in four areas – environmental, economic, and social sustainability and sensory quality – giving a final approximate value and a percentage of “System Quality”, the value given by a multi-faceted definition of holistic and dynamic quality connected to ecosystems and their rhythms. Quality “meaning the sum of objective and subjective natural
(evolutionary) factors present in a set of variables that characterise the social, environmental, economic and sensory sustainability of a certain product or service that enable it to satisfy the expressed or implied needs of the local ecosystem” (Fassio F., 2016).

In detail, though still through a terse definition, the site assesses the user’s choices based on the following definitions:

- **environmental sustainability**: the ability, over time, to maintain physical and relational balance, quality and reproducibility of natural resources, to preserve biodiversity and to guarantee ecosystem integrity. The underlying principle of its subsistence is in the controlled use of natural resources: human activities must take advantage of resources without surpassing the ecosystem’s limits of reproducibility. The preservation of the identity of cultures and places depends on the quality of the relationship that is established between humans and the environment.

- **economic sustainability**: the ability to sustainably generate income and work, and to achieve eco-efficiency, meaning rational use of available resources and a decrease in the use of non-renewable resources. Sustainable economic development will have to consider the four existing forms of capital (economic, environmental, human and cultural) and work in a way that safeguards the intangible capital made up of free goods (which do not have a price on the market) and related assets.

- **social sustainability**: the ability to guarantee access to basic rights (safety, health, education) and to welfare conditions (access to information, recreation, tranquillity, sociability, human and animal welfare, etc.), equitably within the communities. Safeguarding of local cultures and traditions by creating the possibility of expression for indigenous peoples. Respect of social conditions of workers must be, above all, ethically acceptable.

- **sensory quality**: the ability to train the five senses to recognise more conscious and holistic “quality” in food, with tangible and intangible features. Values of aesthetics, nutrition, taste,
etc. become salient “ingredients” of food because a diet that is attentive to well-being and to the naturalness of products is a “sustainable pleasure”.

These definitions and content are based on the research of 67 people who, in various ways, participated in content creation for the site: specifically, in the drafting of 300 questions, 900 answers, 20 summary outlines for the supply chains, 250 glossary words, and about 100 curiosities that give the chains details and relationships with other systems. The whole thing is based on a bibliography and siteography of 157 references, divided into general sources and specific sources for each product, together with 96 websites.

Users take about ten minutes to answer the 15 questions, discovering what inputs and outputs make up the supply chain, step by step. The central aspect of this approach, emphasised by the graphics chosen, is to make the user think about the main concept of circular economy, where an input, a necessary resource for the production of a thing, very often leads to outputs after its processing, waste that can then become a resource for the same system or for different supply chains. Usually, for each product chosen, the first four questions are about raw materials, the next six are on various processes of transformation, while the last five are on packaging. The user goes from producer to processor, distributor, consumer and then to waste collector. Waste is often defined as a “secondary product” because it is valued for its generation of new materials and products.

A series of details then give the main phases and players of the production system, elements that are clearly shown in the final diagrams. These are concise representations of the product’s life cycle – the main phases can be read in bold, inputs are in white italics and outputs in black. Orange arrows trace the relationships connecting an input and a phase, while red triangles emphasise the importance of some aspects which innovation has yet to give an alternative for, or especially critical phases or

Figure 2. Supply chain selection page
items. Generally, the inputs/outputs are coloured, while the various phases and players stay in white and in outline.

Figure 3. Once a production chain is selected, the user is brought to a historical-geographic introduction to the system

In the last section of the site, users can download a summary graphic for the chosen system and share their results on social media, with the aim of encouraging others to be curious about what they eat and about the supply chain they are driving.

The final system quality is expressed in a percentage and is the arithmetic sum of the results obtained in environmental, social and economic sustainability and sensory quality, a concept of quality that goes back to the definition of Good, Clean and Fair (Petrini C., 2005).

The assessment takes different opinions within the scientific community into account, but produces a result that aims to be approximate only. It is also interesting to note that – intentionally – no user will ever obtain a final system quality percentage of 100% since, from a systems approach, expressing the boundaries of a system and therefore declaring, for example, that the system is “zero impact” from an environmental perspective, it is actually a definition that does not express all the impacts an action can have and is therefore misleading for a consumer wanting to be more aware.

3. Motivation for the Website

3.1 Prevention of waste production

Waste from packaging makes up about 7% of total waste (Conai, 2010) and food packaging materials make up 65-70% of the total packaging market, so waste produced is considered equivalent to the amount of the input for consumption (Conai, 2011).

In one year, the supply chain of food products uses 8.5 tonnes of packaging, 52% for food and 48% for beverages.
The cost of packaging disposal for the food sector is around 230-250 million euros per year. Every year, in fact, 3,000 kg of food comes into Italian households, of which 200 kg is the weight of the packaging alone (6.6%). Knowing that about 150 kg of food a year is wasted, we can say that each household throws 10 kg of packaging away (Eurostat, 2010).

It is therefore necessary to invest in prevention and innovation in order to build relationships of value and of transmission of knowledge between the players in the system: a fundamental mechanism for meeting both common and individual goals and for the development of a widespread culture that identifies as a socio-cultural system attentive to the sustainability of its production processes (Fassio F., 2016). Systemicfooddesign.it comes from the key awareness that the consumer must be informed in order to prevent waste, particularly after use, and to teach producers and distributors to adopt strategies that minimise the negative impact that production and distribution have on the environment and the community.

To move in this direction, we must first aim to use materials already in circulation, with a view to the circular economy and, when it’s necessary to use and produce new ones, diversify the resources they come from as much as possible, based on their intended use and on surrounding environmental conditions (availability of resources and possibility of disposal).

![Figure 4. Inputs and outputs of the tuna supply chain](image)

### 3.2 Educate users to become mindful consumers

The site develops this dialogue between parties, aiming to build cultural bridges that bring together different actors in the “organism” of human society, increasingly more eager to metabolise products sustainably. The constant need, never neutral, of seizing users’ attention through a semiotic shell full of symbols with generated meanings would thus contrast the development of holistic communication that describes the qualities within the entire food system (Fassio F., 2016).
The container becomes not only an instrument of persuasive seduction, but an identity card for the system involved, a way of understanding the articulated structure of the content and therefore a modal trigger point for a communicative (and perhaps multi-channel) connection between the system and the consumer. This reduces the informational asymmetry between producer and consumer, allowing the latter to distinguish the differences in quality between various products and to make, with reliability and speed, choices that are consistent with his own needs and expectations.

What emerges, obviously, is the need to simplify complexity without trivialising it (Einstein A., 1939) with the goal of making consumers aware, as co-producers (Petrini C., 2009), who make responsible and informed choices, who create direct links between the food they put on their plates and the people who produce it. In other words, to know how to recognise the intrinsic value of food, a value connected to its system quality, and to be prepared to pay the fair price to buy it.

To accomplish these goals, the site offers a simplification of 20 very complex supply chains, showing them in a final diagram that allows the user to understand how his purchase influences a broad system. Through this interpretation, it’s easy to understand the value of a food that is produced sustainably, a value that is made up of material and immaterial factors rather than the price alone (Petrini C., 2013).

In fact, while a commodity’s price is defined exclusively according to market logic, its value can give voice to many aspects that are related, more or less explicitly, to the production of the commodity (Fassio F., 2016). The current economic system puts food producers in the position of not being able to determine the price of their products because many quantitative constraints force them to accept any value imposed on them by the distributive system. Every year, this situation causes a halt of agricultural activity for hundreds of producers and makes it clear that, if we don’t guarantee the profitability of food with a value that is fair to human health and well-being of the ecosystems and the planet, we will find ourselves having to make do with food with increasingly lower quality in the future.

Figure 5. Summary diagram of the tuna production chain
3.3 The alliance between content and container

According to Leonardo da Vinci, thought to be the first holistic thinker (Capra F., 2009), human ingenuity will never find an invention more beautiful or easier than nature’s, because nothing is lacking and nothing is superfluous in its inventions. So, taking inspiration from how nature spontaneously protects its products and preserves their freshness, human beings, in the development of gastronomic tradition, have learned to take important lessons to “design” containers that are suited to preserve their culinary products in form and function.

Where necessary, then, we have used ingenuity to develop packaging that guarantees the preservation and protection of food. And not just that. These containers have often been credited for boosting the flavour of the content or providing indications of quality, in the same way as a communications interface (Fassio F., 2015). The specific conditions of use for the contents determined the main features of the “container”, while the type of environment, distribution and consumption determined the functions and durability it had to have, so that the preservation process would be supported rather than impaired by internal and external agents. The result is a dialectic and two-way relationship between content and container, a combination that has often become inseparable, and the awareness of where one ends and the other begins is lost.

This healthy and functional symbiosis, over time and with the requirements imposed by the large amounts and distances of the modern commercialisation of food products, however failed and was sacrificed in order to provide a support service for the product’s consumption, rather than the content itself. The primary packaging has lost sight of the simple principle of natural inspiration of the form connected to the function, saturating itself with symbols as a result of the need of a linear production model that is not very integrated with the territory and community (Bistagnino, 2013).

The result was a loss of identity for the content, often subservient to the needs of marketing, efficiency, and sustainability for the system, if we take, for example, the lifespan of packaging (very often too brief, especially when compared to the materials used) and the oversizing of packaging systems (Langella, 2009).

The content’s subordination to the container has become emblematic of a development model in which we paradoxically go from extreme aesthetic quest for very short-life products, meant for immediate consumption, to the commercial need to extend the shelf life of long-life products as much as possible, in both cases running the risk of creating an excessive dissonance between the appearance of the product and the expectations of the consumer, which has made the content’s true character increasingly distant and imperceptible (Gallen, 2005).

Only recently would it seem that, alongside the awareness of making packaging less environmentally intrusive, the demand for food products of genuine, natural and family-produced content is increasing. At this point we return, completing the circle, to packaging that adapts to the form of the content and, in addition to being protective, takes on a new communicative function in an ethical way.

For these reasons, the claim of the systemicfooddesign.it site is “for quality of content and container”. The definition of quality for a food that is believed to be good cannot be separated from the sustainable features its packaging must have.
3.4 The circular economy and system quality

This is why design for sustainability (meant as environmental, economic, social and sensory) in the food sector is more effective if it becomes “systemic”, if in addition to relating to the components of individual products, it takes the entire system into consideration, supporting consumer comprehension of the value of content and container. This objective is supported by the function of the site that connects every user choice to the generation of inputs and outputs, shown in chronological and ascending order, as the production chain is completed. This leads the person, while thinking about his own production, to reflect on the circular economy, the current economic model, promoted by the European Union, which sets out measures to reduce and give value to every type of output (European Union, 2015).

Preserving and promoting natural capital by fostering the use of renewable resources, optimising the resource yield by circulating reusable materials in both technological and biological cycles, means planning for the regeneration, renewal and recycling of components and materials that circulate between various players along the chain. These characteristics, together with the search for more efficient systems, are the theoretical basis for the circular economy and are well argued on the site in various situations linked to several chains. So making a “zero waste” plan means thinking in cascade, in phases that slowly give value to the various secondary products generated until waste is reduced to zero. In this scenario, however, systemic thought becomes crucial – the ability to understand how the parties mutually influence each other (Von Bertalanffy L., 1968). We can attempt to break down the complexity into a set of sub-problems that are independent from one another by determining linear and competitive development models but, in the approximation of the model, we lose the transdisciplinarity (Piaget J., 1970) of the scientific and intellectual approach that aims for full comprehension of the complexity of the present world. The concept of system quality goes beyond that of the circular economy, simply because it emphasises the fact that, besides the “circular” reasoning explained above, we must realise that, in our social and production model and in nature, we find systems within systems that, in positive relation to one another, create something more than the static sum of their individual elements (Fassio F., 2011). Conversely, however, if an action is conducted poorly somewhere in the system, it creates a negative sum that disrupts the system, making it fragile. At that point, the more the system is resilient, that is, the more it reasons with complex systems that can adapt, it accumulates diversity (Benyus J., 1997) and restrains excesses from the inside by using the power of boundaries, the more it will be able to repair the damage and, in the best cases, even predict it.

A goal of the “Systemic Food Design. For Quality in Content and Container” website is to encourage people to think in systems, gradually gaining the knowledge that the relationship between observer and observed object leads to direct experience and a culture of pre-judgment, but the system involved when a purchase is made goes well beyond what is perceived with the senses.
4. Conclusions

Systemicfooddesign.it contains, behind its playful interface, cutting-edge reasoning and innovative logic. 22,062 people (data from December 2016), have played at becoming an entrepreneur. We don’t know the age of the average player but we know that, since the 2015 Expo, the site has been included in many programmes at Italian high schools and institutions, like the Ludovico Geymonat Institute in Tradate (Varese, www.itisgeymonat.va.it). It’s an atypical online game because, with the 10/15 minutes needed to play, is not comparable to other online games, which require an average of 5/7 minutes per game. This result, over three years (the site has been online since 2013), without any forethought to publicise it, confirms the trend that more and more people are interested in really understanding what they eat, as well as the system they subsidise by buying certain products. It’s clear that the average site user is interested in becoming an active supporter of a community of destiny that unites the whole human race in recognising the entire Earth as a “homeland” (Morin E., 2002). In this perspective, it becomes crucial to enact policies of cooperation, an economy of relationships for common welfare. So, what emerges is a vision that values relationship capital, meant as the ability to realise that we are all part of an infinite system connected in time and space. Systems Design applied to food, as can be seen by playing on the site, thus offers a new role to the designer: a designer of relationships that, if developed well, can be cultural bridges that unite the sensibilities, goals and ideals of producers and consumers.
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Siteography
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