

Package Design: graphic and glyphic modeling for environmental awareness

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Abstract This paper presents a teaching experience nowadays in use in the Package Design discipline, at UniRitter Design Course. The objective of that academic project was to identify contemporary problems in packaging and redefine the parameters guiding the design of more environment friendly solutions. One of the cases of study — milk package — is presented here. The questions raised in the Package Design discipline were: (i) how to reduce the environmental impact of the discarded milk package (ii) how to guide creative processes to ecologically sound design alternatives.

Key words: *industrial design teaching, package design; ecology.*

1. Environmental Design Awareness

Excessive consumption of goods and the resulting impact of their uncontrolled discarding require now an urgent redefinition of the industrial designers' role in society. Present reality calls for new pedagogic strategies demonstrating concern with the cost of mass consumption and pollution. The problem of over packaging is clearly perceived at the supermarkets, mainly in food sections. From the point of view of the general buyer, protection and presentation wrappings belong to the product; they are perceived as a component of the article itself. In countries dependent from designs developed abroad, very few industrial designers had had the opportunity to intervene in that scenario, and, then, it is not surprising that everyone quietly accepts that after the food consumption, its pack is thrown away. So, to which extent designers are to blame for that quantity of pollution and waste?

In Brazil, Package Design had acquired high status among the Industrial Design fields of professional expertise, and the Design Faculty at UniRitter is trying to contribute to the pedagogical principle that Industrial Design should have an ecological orientation. One of the disciplines that set into practice that philosophy combines ecology and technology in the academic projects.

The Package Design course is planned to have weekly meetings, arranged as follows: the three first weeks are meant to study ecological, psychological and technological factors in warming-up design exercises. The following references are employed: (i) planned creativity [1] and creative processes [2]; (ii) design practice mediated by ecological parameters [3]; (iii) specific packaging design logograms — a set of specifically designed signs used to support the creative process [4], [5].

By the fourth week some specific package design methodology are identified and chosen, and bibliography is presented from a set that ranges from the Brazilian classic Bergmiller *et al.* [6], includes Roth [7], Giavanetti [8] and Mestriner [9] [10]. That procedure supports the ideas for the beginning of the packaging design process, which will be developed throughout the remaining weeks of the academic schedule. It is proposed to the students in the very first week of the course that they collect and examine the packs put in their own domestic waste. The gathering and sorting activity takes one month. After that, a table chart is made to classify the garbage under the following aspects: types of material; ways of discarding; destination after disposal; kind of domestic product; quantity; and graphic-visual presentation. The decision about which particular item to design is made by the student after the activity undertaken. One case of study — milk package — will be presented here.

The whole design exercise is divided into two major moments: (i) glyphic — 3D design (volume, materials, transporting); (ii) graphic — 2D design (labeling, technical and nutritional information, appealing consumers' illustrations). By the eighteenth week a seminar related to the whole project is presented to final evaluation, never forgetting ecological, technological and geometrical (synthesis and formal coherence) emphasis.

2. Environmental awareness and creative motivation.

The Package Design course has a distinctive characteristic which is to encourage the students' sense of value. They are asked to face the consequences caused by package designers that do not consider the power of their project activity, and worst still, do not modify the processes of their creative movement. The beginning of the course is organized not only to demonstrate how far the packaging design activity is associated with distinct economic sectors of a country, but also to let students creatively motivated to develop more ecologically acceptable projects.

The students are reminded that industrial product design is more than manufacturing parameters and technological innovation improvements. The design of any product communicates, through the artifact formal, functional and informational features, the aesthetic standards and the ethical values of the product company and its design team. It is presented to the students a concept formulated by Brito [11], in which the criterion to evaluate the quality of an industrial products and technological innovation includes the transmitted values such as respect for the environment, fulfillment of basic human needs and the promised guarantees. Another very important topic highlighted during the initial lessons is the contextualization of creativity, whether oriented to illusion, to invention or to innovation, and strongly related to human mental capabilities (cognition, retention, evaluation and production).

In the course an important didactics aspect was developed to construct a industrial product taxonomy. It was established the taxonomy of this product relating it with ecological principles for academic study. The organization criteria were: the length in time that the consumer takes to discard the package and the amount of envelopes used. Maximum efficiency of a package means least enclosures and a longer time to be discarded. The development of that taxonomy resulted in significant complexity and has been substantially facilitated in parallel with the design of logograms [5] (Figure 1).

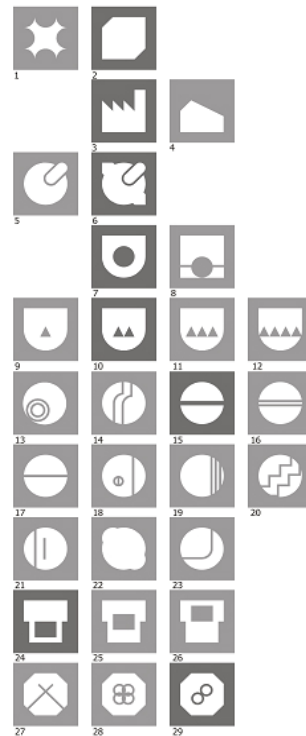


Figure 1. Logograms for ecologic purposes that complement taxonomy of packages

First level of the taxonomy is related to the origin of the packaging, which could be natural, i.e. found on and offered by Nature, not suffering human intervention, or artificial, i.e. produced and caused by human labor, manufacturing, and industry. The second level of the taxonomy indicates if the package belongs to the universe of craftsmanship or to the universe of industrial production. Third level is related to production, thus, the packages are categorized in manufactures, when produced manually on a small scale, or machinefactures, when produced on a large scale by machine tools. In fourth level, the packages are grouped according to their destination, their application or future use, which may be commercialization or sale, those that come into direct contact with the consumer and intimate contact with the product, and transport, which protects a range of packaging for consumer products and packaged in bulk. Fifth level deals with the presentation of the package, its external appearance or aspect. The package may also be elementary, when displays a single unit of product or contains the minimum unit of trading; accessory, when accompanies and protects the elementary pack, not

contacting the product; or joint, when contains elementary and accessory packages, protecting and consolidating this combination, with defined purpose. When the package also serves as stand or case, it is called exhibitor.

Level six of the taxonomy is related to the material used for the preparation and production of packaging, which may be of textiles, plastic, paper cards, cardboard, paper, wood, carton, metal, glass, molded pulp. Level seven deals with the ecologic relation, and categorizes the packages according to the time span of its disposal. It can be **Immediate Discard**, for example, when one package, usually the Accessory, is immediately thrown away in the trash, after purchasing the product and before starting the use of its content; **Late Discard** for example when the content of the package has to be completely consumed to discard the Elementary packaging, and **Postponed Discard**, for example, when the packaging is employed for another function after the use of its content, delaying the act of disposing it off.

At eighth level, the Postponed Discard is classified as **Re-cycle**, provided that the material can be, and in fact is, recycled; **Re-use** when the package can serve to other purpose, and **Non-use**, when the package is discarded, is not returnable, and is used in one single cycle of production/distribution. When designing a package as an industrial product, the student is oriented to use a technique called Textualization, which is an extensive and as complete as possible verbal description of the package to be designed or redesigned, including all models of composition. After that, the student is able to create his own Taxonomy, pointing out which package he will focuses in his project work.

3. The Creative Process of an alternative package for milk

The design methods employed for Packaging Design have, in recent decades, emphasized selling strategies and other issues arising from this, such as the use of appealing illustrations and graphics rather than the functional and perceptive aspects of the package. This approach can be associated to undesirable consequences for the environment. Based on Redig's [12] assumption, when an industrial designer is hired to design a package, most of the work tends to be directed to labels and graphics, and not the design of the containers. Like any industrial product, a package follows a cycle which, sooner or later, reaches the stage of discharge. Taking into account a rational and planned consumption, the excess of packaging has assumed serious proportions.

According to historian José Aparecido Gonçalves, technical coordinator of the Brazilian Association of Collectors of Paper, Cardboard and Recycled Material, most of this "is due to use and disposal of superfluous packaging." In Brazil about 125 to 135 tons of rubbish is produced each day, and a single person produces about 1kg of rubbish daily. Environmental issues have reached all sectors of society, especially the productive ones. The packaging industry is in charge now of adopting strategies to minimize environmental impacts in production, use and disposal of packaging. Significant changes are being made in the industry, with companies presenting more innovative actions in management and asking the collaboration of designers to lessen the environmental impact of products and production processes. This work then focuses a package design exercise driven by ecological parameters.

At the start of the identification stage of the design process, the student must define and delimit the problem. He then will start doing the creative work to design or redesign by a procedure named Textualization. Initiating the project, looking for a product that could be redesigned, with low cost and that could represent a gain for the environment, it was found that the example of package of milk, a bags of LDPE (low-density polyethylene).

At the Preparation stage of the design process the student becomes aware of the Linguistic and Designistic analysis, which are suitable for enhancing designer's vocabulary and graphic fluency. Using such techniques, the student is allowed to view his work in an organized and systematic way. We believe that the success of the stage of Preparation is the construction of a prior vocabulary that should now be presented. Denotative analysis is aimed to help the understanding of the terms of the project. Diachronic and Synchronic analysis are intended to a better assessment of the competitors and analogous products. Paradigmatic and Syntagmatic analysis are aimed to an understanding of the parts of the product and the relations among the parts. (Fig. 2).

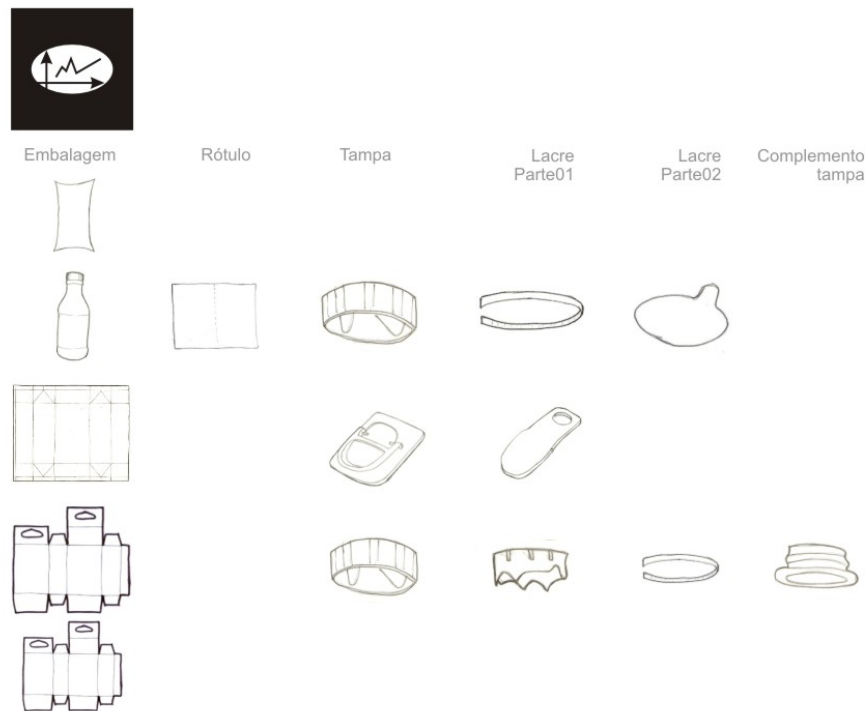


Figure 2. Syntagmatic analysis of the structure of the milk package.

Designistic analysis aims at describing the structure, function and morphology of the products previously explored by Linguistic analysis, preparing the work and clarifying the design problem through the graphical expression. According to Bonsiepe [13], the study of a product can be achieved by the investigation of its characteristics of use, structure and subsystems, and functions. In Structural analysis the student recognizes and understands the types and number of components, subsystems, principles of assembly, type of union and the embodiment of a product, types of printing, finishing, collages, cutting and bending; the elements contributing to

its graphic design, such as color, shape, brand, product representation, typography, photographs, illustrations, concepts, logos, symbols. In Functional analysis the student recognizes and understands the functions of individual components and subsystems of the product, examining contrast, visibility and legibility of elements. In Morphological analysis the student studies the product in relation to symmetry, harmony, balance and position of the elements that form its structure, recognizing and understanding the formal structure of a product, its composition, based on geometric features and transitions. It also includes information about color and finishing.

In order to meet the constraints of distribution and sale this package requires stronger materials. Handling obliges accessories to promote comfort and adequacy to the user. In addition, weight applied on the package when placed one over the other requires more care in their transportation not allowing an adequate exposure in supermarket shelves. From this analysis, we can conclude that the quality of the milk itself is undermined due to the various errors throughout the production process chain, from transport, storage, and display (Fig. 3).

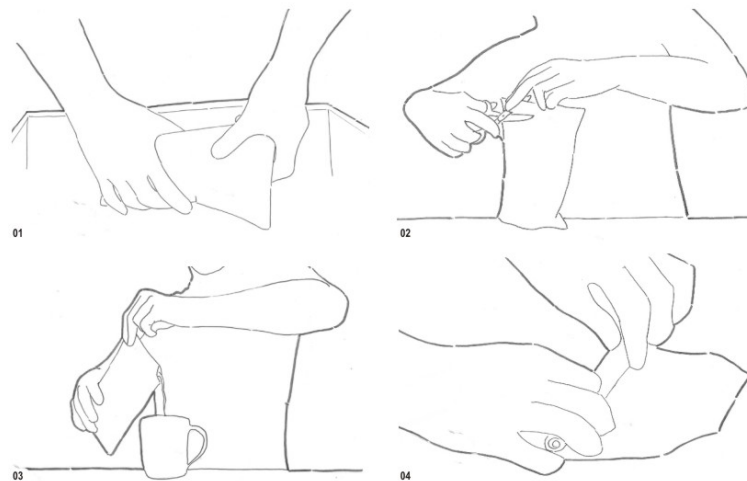


Figure 3. Analysis of Use; Functional Analysis

3.1 Warming-up stage, psychomotor exercises

At this point of the project the students are said that some actions have to be taken to facilitate the creative process. To deal with the Warming-up stage it is necessary to write and draw a lot. This may be the secret of success: the quantity and quality of expression, increasing the sensitivity and perception of things and phenomena. With this, the student will ensure greater psychomotor skills to represent their thoughts, and have his ideas more easily illuminated. This is the moment to return to the problem, but in a graphic and visual way.

The exercises begin by writing a List of Requirements [14], where all basic requisites of the new product are set in a graphic-verbal way. The quantitative and qualitative requirements consist in aspects that a solution must meet, for example those established by legal regulations, or the aesthetic, formal, logic, informational conditions that have to be fulfilled.

3.2 The insights and the elaboration of solutions

Insight is the moment when the student “suddenly” becomes aware of the solution to the problem. However, this discovery is not dependent solely on intuition, but on careful evaluation. The students are recommended to analyze their alternative solutions according to the main design factors — Anthropology, Ecology, Economy, Ergonomy, Philosophy, Geometry, Marketing, Psychology, Technology — to determine to which extent the proposal meets the goals. The students then start doing preliminary drawing showing size and materials, and making mockups (Fig. 6, 7 and 8).

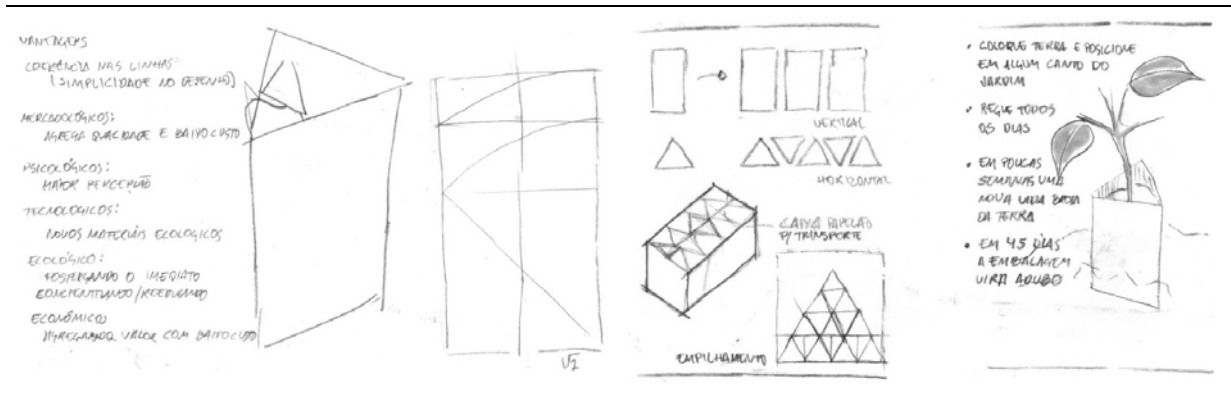


Figure 6 - Examples of first sketches

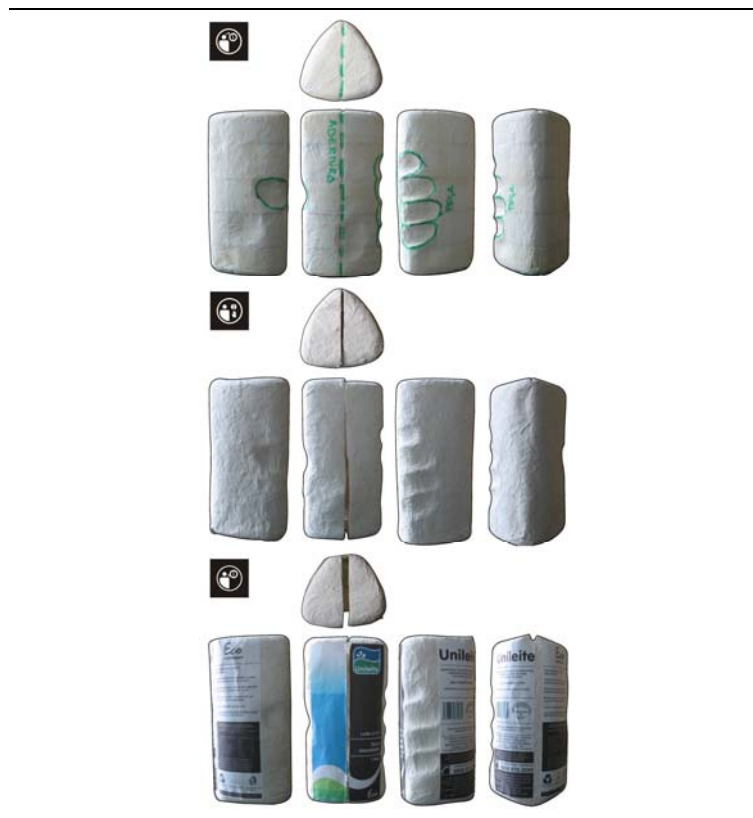


Figure 7. Mockups for the proposed packaging

The use of structural, philosophic and diagram grids helps the process of completing real size drawings with all measures and information necessary for making three types of models: mockups to help thinking, carved in Styrofoam; mockups to help testing which give a result very close to the type of final packaging, and, after refining the form the mockup for presentation purpose. At the final stage of the academic project the student shows his ideas to teachers' evaluation.

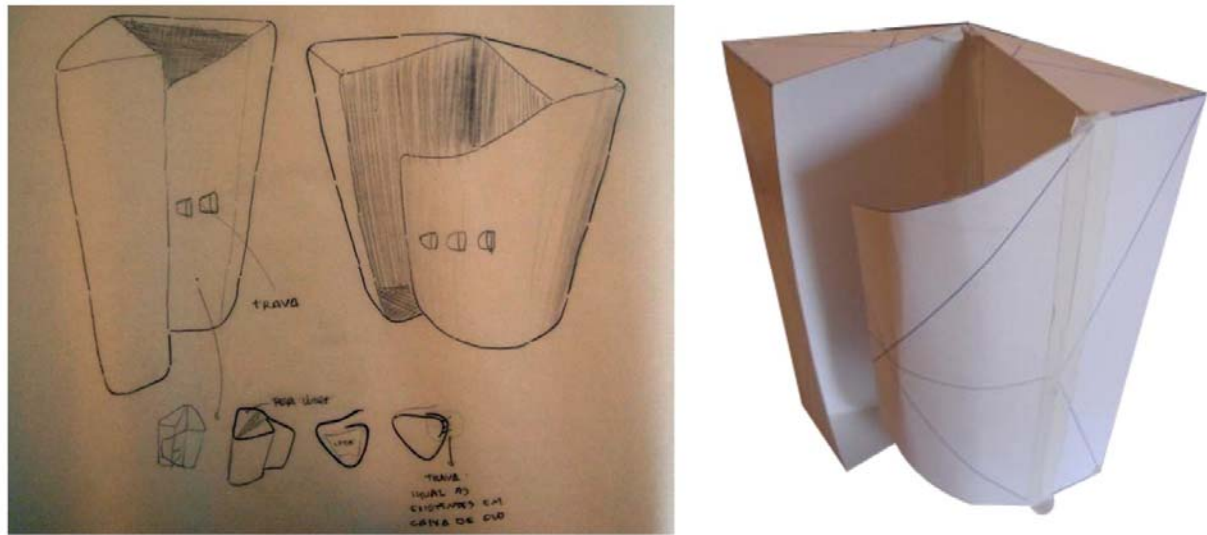


Figure 8. Studies of form

4. Final Considerations

This paper presented an academic project driven by ecologic motivation. According to this student's design for milk package, the form would be adapted to the equipment possibly used for the outer packaging, molded into fleshy tissue, the same used for eggs. The example also permitted that a teaching method based on stages of the creative process was exposed. It is believed that creativity can be amplified by mental and manual skills and the designer can make use of various techniques. It was explained also that it is not difficult to encourage young students to design environment friendly solutions. They easily understand that the volume of waste produced grew more than global population over the last decades. A number of alternative solutions for this appear in the design classrooms at the end of an academic year however very few indeed are explored as sources of improvement of goods. Despite the fact that we have nowadays a lot of information technology and computer aid design software available, the old fashion way of teaching design is still valid. It is necessary to balance the contemporary media with the modernist one, in order to develop students' awareness about the fragility of the environment and the power of the graphicacy to generate appropriate solutions for new products. In that course the exploration of form for its own sake would not give the students full opportunities to reflect on the consequences of their designs. The amount of material produced in the package design course indicates that, in the end, to review design teaching methods is still worthy.

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