

ECO DESIGN IN DESIGN PROCESS

PRALEA Jeni ¹, SOLTUZ Elena ²

¹ University of Arts George Enescu Iasi, Romania, Department of Design, Faculty of Visual Arts and Design, Postal address 189 Sarariei, 700451 Iasi, Romania, E-Mail: fapdd@arteiasi.ro

² University of Arts George Enescu Iasi, Romania, Department of Design, Faculty of Visual Arts and Design, Postal address 189 Sarariei, 700451 Iasi, Romania, E-Mail: fapdd@arteiasi.ro

Corresponding author: Elena, Soltuz, E-mail: soltuzelena@yahoo.com

Abstract: Eco-design is a new domain, required by the new trends and existing concerns worldwide, generated by the necessity of adopting new design principles. New design principles require the designer to provide a friendly relationship between concept created, environment and consume. This "friendly" relationship should be valid both at present and in the future, generating new opportunities for product, product components or materials from which it was made. Awareness, by the designer, the importance of this new trend, permits the establishment of concepts that have as their objective the protection of present values and ensuring the legacy of future generations. Ecodesig, by its principles, is involved in the design process, from early stage, the stage of product design. Priority objective of the designers will consist in reducing the negative effects on the environment through the entire life cycle and after it is taken out of use. The main aspects of the eco-design will consider extending product exploitation, make better use of materials, reduction of emission of waste. The design process in the "eco" domein must be started by selecting the function of the concept, materials and technological processes, causing the shape of macro and microgeometrics of the product through an analysis that involves optimizing and streamlining the product. This paper presents the design process of a cross-sports footwear concept, built on the basis of the principles of ecodesignului.

Key words: Biomimesis, design, ecodesign, eco-product, footwear.

1. INTRODUCTION

How an eco-concept answers to the ecological requirements cand make the difference between a winning or a losing product on the consumers market. Based on a set of technical capabilities, the eco-concept is focused on solving the problems that cand make the design process a succesful one. [1].

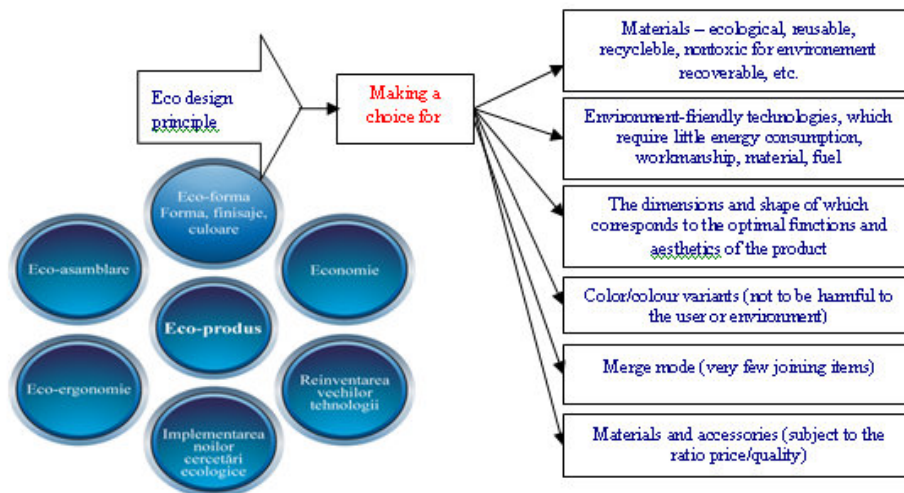


Fig.1 Eco design principle [3]

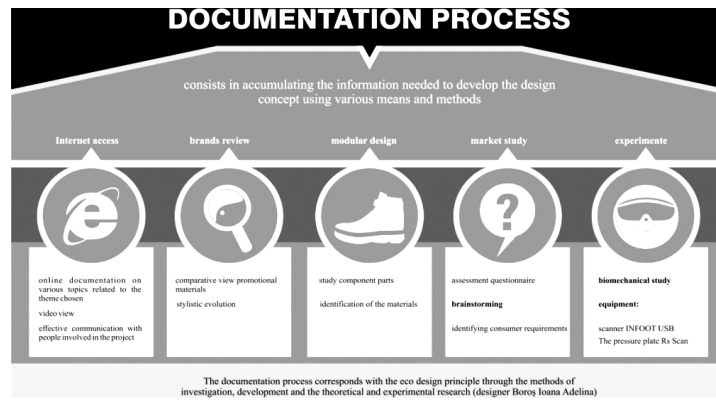


Fig.2: The documentation process applies the principle of eco-design through research methods, both theoretical and experimental

Eco-design involves designing and/or rethinking products in order to make them profitable and environmentally friendly. In accordance with the principles of eco-design is to consider including reviewing the functionality of products in relation to the analysis of the value. This factor allows the removal of those attributes of a product that are useless, or that can harm the environment, replacing them with useful functions.

2. GENERAL INFORMATION

The designer, having as main working principles the ecodesign tools, the value analysis and study on the evaluation of user needs, will make decisions that will lead to improvements in the product lifecycle, generating a concept of sustainable development. The designer must assume his the importance of his role in the conception and argumentation of eco-products. Starting from phase zero of the concept, which involves: documentation, competitive market analysis, and users needs, the conclusions that determines the new concept, sketches of ideas, experimental studies and tests instruments optimal solution choice, the designer will use IT assets (computers, software design, 3D printers, scanners) that meet the principles of eco-design (Fig.1) and that presents minimal risk to the environment. [2]

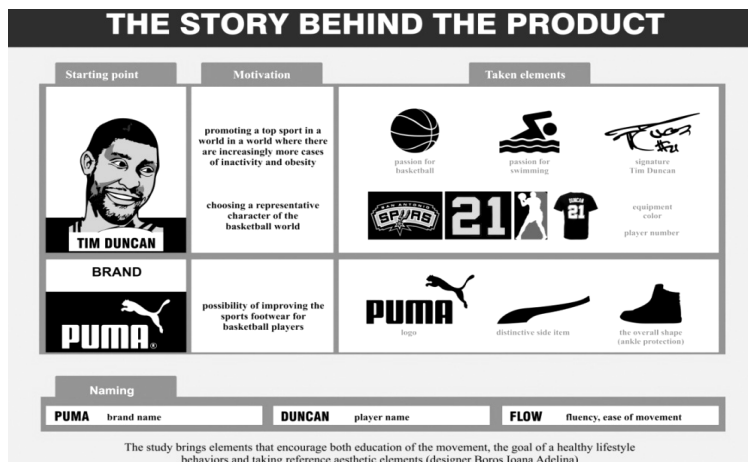
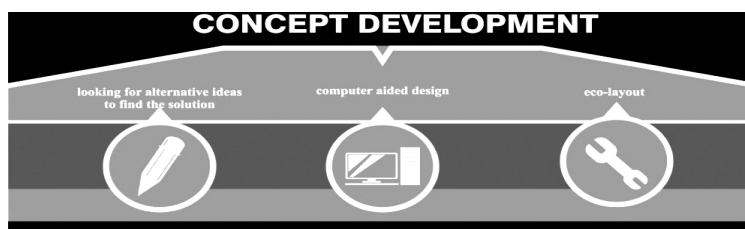


Fig.3: Documenting aesthetic elements of established benchmarks of the brand analyzed

Environmental parameter represents the main element of reference throughout the life cycle of the product. The objective of applying eco design methods and principles in design, initiates analysis regarding the optimization of the number of components, materials, items and time required for assembling or fixing the product; measurements or analysis of energy consumption (in use), the weight of the product, the calculation of human resource needed, the cost and benefits of organic improvements. The aesthetic value of the product which is the necessary requirement for success on the market will be based on the choice of the materials with low impact (nontoxic, natural, recyclable, or who have been totally or partially recycled, which implies a minimum energy consumption in their process of extraction, processing, use, recovery and recycling). Adoption the new requirements in the "ECO" domain causes the widening of the designers area of qualification. The designer must know the

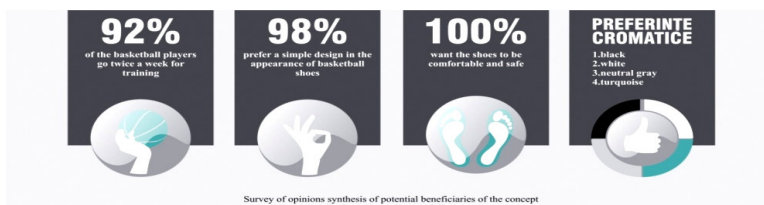
whole life cycle of the concept (manufacturing, mining, removing it from use) to give a creative solution for the moment the product is being taken out of use. (fig. 1).[4] Optimizing the life cycle concept aims: sustainability and product reliability, easy solutions for maintenance and repair, the concept of a modular product structures, sustainable design, increasing the quality of the product through new technologies, user satisfaction. Optimizing the end of products life relies on decisions concerning the possibility of re-using of the whole product or of certain parts of it, the possibility of remanufacturing, recovery or reuse, recyclability of materials, incineration. Ecodesig involves the designer in analysis regarding: dematerialization, shared use of the product and integrate additional functions, functional optimization of the product.

The designer is a member of a multidisciplinary project team. Studies on the factors of success of the eco-design process highlights the need for motivation and awareness of the work team and the management of the undertaking and the support of an expert in eco-design for advice, know-how and knowledge of the environment. Ecodesignul appeals and biomimesis, "Innovation Inspired by Nature", which represents a "new science that studies nature's models and then imitates or inspires from these models and processes to solve human problems". Benyus suggests looking in the nature of a "model", putting the emphasis on the sustainability as an objective of biomimesis.[5, 6, 7]



Eco design principle is found in all stages of the ecoconcept development (designer Boroș Ioana Adelina)

Fig.4: Eco-development concept based on the principle of eco-design



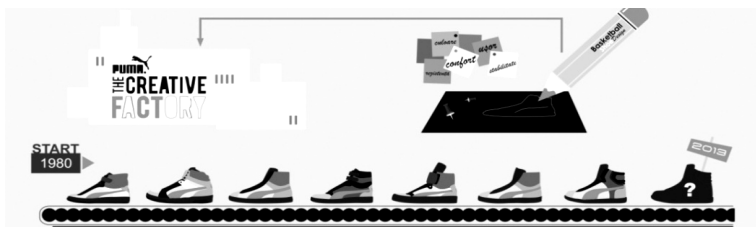
Survey of opinions synthesis of potential beneficiaries of the concept (designer Boroș Ioana Adelina)

Fig.5 Summary of the survey of views enable allows the development of new features (including aesthetic)

3. THE APPLICATION OF ECO-DESIGN IN DESIGN PROCESS

The design process defined by the following stages: documentation, sketches of ideas, the best solution, the 2D and/or 3D design (layout) is shown in Fig.2-Fig.8 (boards made by designer Boroș Ioana Adelina). Each stage contains elements of ecological design, demonstrating the designers concern for environment.

The elements of inspiration in the field of biomimesis can be found argued by shape, texture and finishes proposed by designer. The choice of modern materials (Bio Skin, SBS rubber, CFRP, knitwear, Vectran 3D threads, Carbon fiber, Natural rubber) correspond to the functions of the new product. The proposed materials ensure: increase the life time of the product, the novelty of form, the new function attributed to the product properties through innovative sneaker with airbags.



The analysis of the stylistic evolution is based on the specific means of eco design (designer Boroș Ioana Adelina)

Fig.6: Analysis of stylistic evolution is based on specific eco-design means

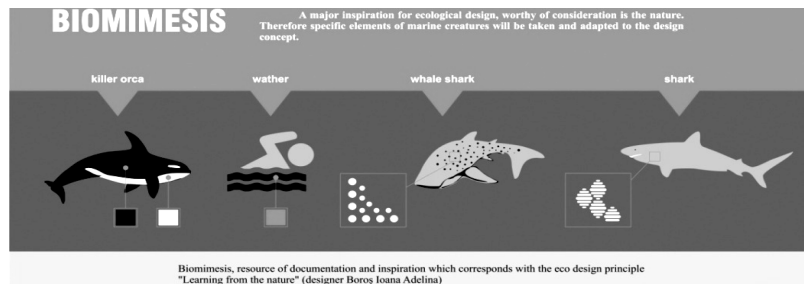


Fig.7: Biomimicis, source of inspiration for: form, texture of surfaces, finishes (were influenced by orca, shark, swimming style)

4. CONCLUSIONS

Design concept stages, supported by the principles of eco-design, demonstrates the importance of the designer's role: in the creation of eco-products; of biomimicis as a source of inspiration (items relating to the shape, structure, texture, finish are take over as inspiration); virtual design instruments, layout and prospecting, communication used in order to achieve the economy of conventional supplies, labor, time, energy (specific activity of design and marketing). The choice of materials and modern technologies supports new functions of product (shoe with an air bag), which extends the life of product form a moral and physical point of view. Eco-concept stages (from the documentation until the issue of removal from use) apply the principles of eco-design (methods, techniques, technologies, ways to streamline the entire process from the ecological point of view).

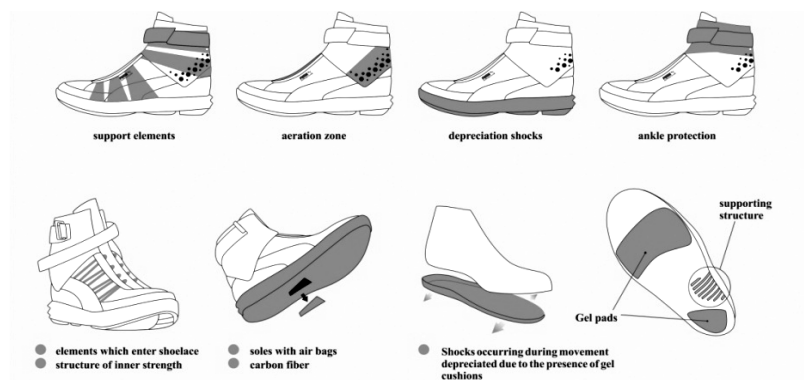


Fig.8: The final concept, the result of eco-design principles

REFERENCES

[1] S.C. ICTCM, “Implementarea eco-conceptiei in intreprinderi - imperativ al protectiei mediului inconjurator si al capitalului natural”, Available: http://www.ictcm.ro/DSTEM_Gentoiu%20858_5%20Cuprins.htm

[2] J. Pralea, M. Pop, M. Sficlea, “Conceptual routes in the design process intended for the ecological product.”, Proceeding of 13-th International Conference, Modern Technologies, Quality and Inovation, New Face of TMCR, ISSN: 2066-3919, Iasi-Chisinau,2009, pag. 523-527

[3] J. Pralea, M. Sficlea, M. E. Pop, E. Soltuz, S. Buraga, „ECO Design”, ARTES, ISBN 978-606-547-011-8, 2010, pag.157

[4] Eurocodes Expert, Available: <http://www.eurocodes.co.uk/>

[5] Merrill, Connie Lange (1982). *Biomimicry of the Dioxygen Active Site in the Copper Proteins Hemocyanin and Cytochrome Oxidase*. Rice University.

[6] Benyus, Janine (1997). *Biomimicry: Innovation Inspired by Nature*. New York, USA:William Morrow & Company. ISBN 978-0-688-16099-9.

[7] S. Byggeth, E. Hochschorner,(2005). *Biomimicry: Handling trade-offs in Ecodesign tools for sustainable product development and procurement*, Journal of Cleaner Production 14 (2006) 1420-1430, Sweden, Available: <http://www.aciencedirect.com>