

DESIGNING MULTIFUNCTIONAL TEXTILE FASHION PRODUCTS

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ABSTRACT

In our days we are watching an increasing demand for highly differentiated products with a significant added value, that simultaneously consider issues such as easy to use, comfort, flexibility in wearing and fashionable look. In this group of products are the multifunctional fashion clothing's. These products allow different uses in different scenarios, such as adaptation to diverse social situations, weather conditions, etc.

The present paper looks at the key elements in the development of multifunctional concepts, proposing their integration in a design methodology for the development of multifunctional textile fashion products. We also present a couple of academic projects that support the proposed methodology.

Key Words: Product design methods, fashion design, multifunctional products, inclusive design

1. INTRODUCTION

The research in design for the development of multifunctional fashion products must necessarily focus on specific market niches, aiming the anticipation of consumer needs and desires, thus developing concepts that meet those demands.

Therefore it's not enough to put together a traditional trend research and a simple market and consumer survey. In this approach to products differentiation by their multifunctional ability, the design research must also attend to the emerging materials and technologies that may contribute for the development of products truly multifunctional.

The comfort issue is another matter that must be deeply considered in the design research of multifunctional fashion concepts. Products, whatever they might be, are conceived to be used, handled and felt by the consumer. In this sense, it is important to consider the comfort in all its magnitude namely both psychological and esthetical comfort, as well as sensorial, thermophysiological and ergonomic. In light of these requisites, it is also of considerable importance a perfect understanding of what makes the consumer "to feel well" and how does this influence his psycho-esthetical comfort.

If in some cases the differentiation is the ultimate goal for the consumer, other cases occur exactly the opposite, where the inclusion and non-differentiation is the consumer main goal. In such cases for the design of multifunctional textile fashion products to be better design it must also address the issue of inclusive, or universal, design.

The fact that a product has been developed specifically for a particular market niche (as for instance handicaps, blind or elderly people) does not give it a guaranteed success. The truth is that these persons tend to dislike products that "stigmatize" them. In the case of this class of products it is necessary, after design concept development, to study ways to adapt these products in order to make them suitable for as many users as possible, searching towards an inclusive design product vision.

2. MULTIFUNCTIONAL FASHION PRODUCTS

Clothing's always had at least two main functions, particularly in the modern societies, the protective function and the social function. The main purpose of clothing's is to protect the human body against the environment, such as cold or heat. But not less important is the social function that clothing have in communicating ones social status. This has become even more important in the last century with the sprouting of the fashion. Nowadays the cloths we wear play an important role in the communication of our life style and cultural group assuming this aspect the lead in function importance.

In the last decade we have been watching to a significant increase of the demand for highly differentiated products with a significant added value and that at the same time consider issues such as ease of use, comfort, flexibility in wearing and fashionable look. In this group of products are the multifunctional fashion clothing/garments.

Multifunctional fashion garments can be defined has clothing or clothing systems that allow different uses in different scenarios, such as adaptation (dynamic or not) to diverse social situations or weather conditions, or just clothing that has different characteristics in different body areas in order to have different functional features, such as different permeability characteristics and different flexural properties in specific areas of the garment, among others.

3. DESIGN OF MULTIFUNCTIONAL FASHION CONCEPTS

When the topic of fashion design is addressed it is common to consider the traditional fashion design process [1] were the design research is centered in the analysis of fashion and market trends, consumer studies (life style, ambitions, worries, tastes, desires), brand concept (when there is one), in the observation, inspiration, innovation and finally on the research of innovative garment production methods and processes.

This more or less static design process has been evolving towards a continuous dynamic and interactive process, more centred in the "mind style" of individuals, responding with customised and multifunctional products/garments.

In order to develop multifunctional fashion products there is a considerable number of key elements that need to be considered in the design process, such as:

- The textile materials and technologies, particularly of the emerging materials and technologies that may contribute for the development of products truly multifunctional;
- The comfort in it's a sense of total comfort;
- The design research
- Concept test and evaluation
- The inclusive design approach

The total comfort is a "pleasant state of physiological, psychological and, physical harmony between a human being and the environment" [2], being a universal basic requirement for man, the clothing design in this field plays a great role. Many researchers have investigated comfort over the past years, but up to now, there has been no clear definition of comfort, since this subjective perception differs from person to person. Fourt and Hollies stated that physical comfort might be greatly influenced by tactile (Sensorial Comfort) and thermal sensations (Thermophysiological Comfort), arising from contact between skin and the immediate environment [3], but we cannot neglect the psycho-aesthetic aspect, as well as the ergonomic aspect of comfort.

Psycho-aesthetic comfort seems to bear little relation to the fabric's technical properties and is mainly related to the aesthetic appeal and the fashion trend prevailing in the society. It is the subjective perception of the clothing by the five senses, which contributes to the overall well-being of the wearer. Ergonomic comfort is related to the body movement comfort, the ability of a garment to allow freedom of movements, has to do with body shaping, clothing patterns making and sewing.

Inclusive design or design for all is, according to Clarkson *et al.* [4], an approach to design that aims to ensure that the majority of the products are accessible to the largest number of people. This means that inclusive design is better design, for instead of regarding older and disable people, or other vulnerable groups, as different people that need special design solutions, it seeks to integrate them through an inclusive approach to product design.

The growing consciousness around the inclusive design approach is due not only to the increase of life expectancy that results in a population ageing, but also in the increase of dissatisfaction related to the lack of integration of disable people into the majority of the society. This awareness brings new challenges to the fashion designers such as: how to design products so that they can meet the needs of the majority? The answer may lay on taking into consideration aspects as the comfort and multifunctional abilities in the development of fashion products, among others.

3.1 Methodology for the development of multifunctional concepts

Methodology is the organization or systematization of a set of actions or procedures that guide the product development process with the intent of solving problems. The solution of a problem begins with the development of a concept and develops with the intent to satisfy its user. In this sense every object or product must be understood as the result of a reflected development process, which course depends on several conditions, not just creative, and on several decisions, since in design each decision must be accounted for.

Since design is a problem-solving discipline, the design process begins once a problem has been identified, or a market opportunity has been detected (Figure 1). To achieve a good design solution, the design process begins with a comprehensive understanding of the problem to be solved. At this first stage of the design process a first level research must be made in order to develop the design brief. The design brief is, according to P.L.Phillips [5], a *written document that deals with the desired outcomes, the reasons for doing the project, the business objectives, and the audiences you are designing for. The design brief is a background tool to get core, highly creative, design concepts quickly.*

The Design Process

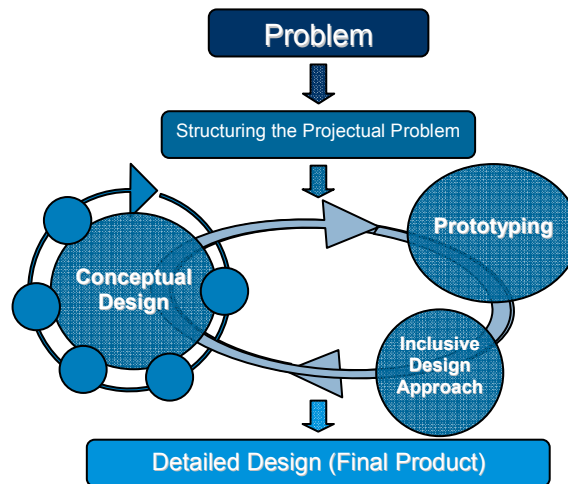


Figure 1. Diagram of the dynamic Design Process.

The first level research comprises the first two stages of the design process.

- **Problem Identification:** This stage consists of an evaluation of the detected need or business opportunity as well as of the project environment and restrictions.
- **Structuring the projectual problem:** This stage starts with a general formulation of the design problem, then a more detailed formulation takes place in order to fraction the design problem into partial design problems aiming at a comprehensive understanding of the design problem and at the development of the design brief. This stage also comprises the first stage of the design research defined by Dick Powell [6] *as research focused on clarifying the context for a new design that may influence its outcome. This might encompass user research, market research or trend research.*

Finally the design brief is written, stating a definition of objectives, outcomes, design strategies and of the project evaluation criteria.

The conceptual design stage of the design process aims to ensure a diversified search of possible solutions to the identified problem, and comprises the key elements in the development of multifunctional design concepts stated previously (Figure 2). It is an interactive stage in which the designer or design team must integrate all those key elements in the design concept that they are generating. These key elements compose the 2nd level research, which is the deeper research done during the design process and also the most time consuming.

- **Design research** is now done at a more deep level. It becomes extremely important understanding the user, the market and the fashion trends. Fashion elements are related to the aesthetical appeal of the product, in clothing products the fashion elements are decisive for the psychological and esthetical comfort, since they contribute to the emotional relation one has with cloths.
- **Understanding users specific needs**, how they will interact with the product and how they will relate to it, is of extreme importance when developing multifunctional design concepts for specific users and also for an inclusive design approach. This knowledge strongly influences the choice of materials and the comfort specifications of the new product.
- **Materials & technologies research** aims at the understanding of the particular characteristics of the textile materials that can be used in the design concept. It is particularly

important the continuous update in the emerging textile materials that may play a decisive role in the product differentiation. The design team must have a strong knowledge on textile materials in order to develop a design solution that meets all the specifications required in the design brief at the various levels, functional, form as well as aesthetical.

- Comfort, as already stated, is strongly related to the consumer needs and to the materials. It is important to understand which comfort factors have a more decisive role in the design concept, and the implications that this factors play in the definition of the materials to be used and in the shape of the clothing to be developed.
- Concept evaluation is a key activity in the conceptual design stage. In order to archive the optimum solution one has to test and evaluate all the ideas that are generated during the central creative phase of generating design concepts. Having a systematic approach to evaluation processes is the best way to achieve better results, avoiding common errors such as lack of creativity due to the choice of the first idea that comes up or lack of formal product planning and idea tests resulting in *last minute* changes.

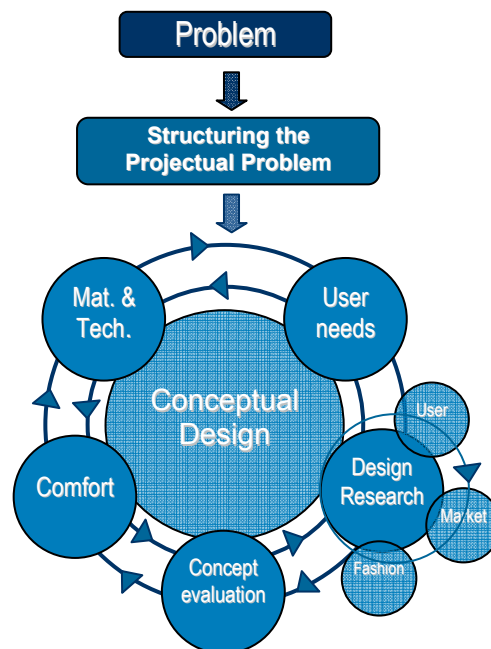


Figure 2. Diagram of the Conceptual Design stage and the key elements involved

When a design concept is finally reached it is then necessary to develop prototypes and to study ways of making the concept more suitable for as many users as possible. User trails may be used during this stage. When the solution is finally approved the design process enters its last phase where the formal detailed design takes place. A final document containing all the design specifications is compiled and the first industrial prototypes are produced. After consumer trials final adjustments are made if necessary.

4. ACADEMIC PROJECTS OF MULTIFUNCTIONAL FASHION CONCEPTS

During the past three years we have been developing a few academic projects based on the dynamic design process for the development of multifunctional fashion design concepts. One of these projects refers to a study made for the development of a multifunctional fashion garment adapted to the demands of the modern cosmopolitan women. The problem identified was the need for garments that could be adapted to different uses by women with an active life that need to travel a lot and pack light. As a response to this problem a garment was

designed that allows to be used either as a skirt, or as a dress, or as trouser or even as a cape (Figure 3).



Figure 3. Multifunctional female garment

Other case was the development of fashion garments adapted to the demands of people with physical impairments that use prosthetics in the inferior limbs. From this project a set of 4 garments resulted. Although developed for a specific group of physical impaired persons, these cloths were developed considering inclusive design, resulting in items that can also be used by an ordinary person. In figure 4A a skirt/trouser is presented were apart from having a wider waistband to give a better fit, it also has covered inner seams to avoid skin injury by contact. In figure 4B an inclusive multifunctional sweater, with multi skills to be used by people with deficiencies in the inferior members that walk with aid of crutches is presented. The sweater uses materials with differentiated thermal and mechanical features in specifics places. This product, due to its comfort specifications can also be appropriated to be used in the practice of sport either by people with several limitations on their physical capacity or not (for example for racing bikers).

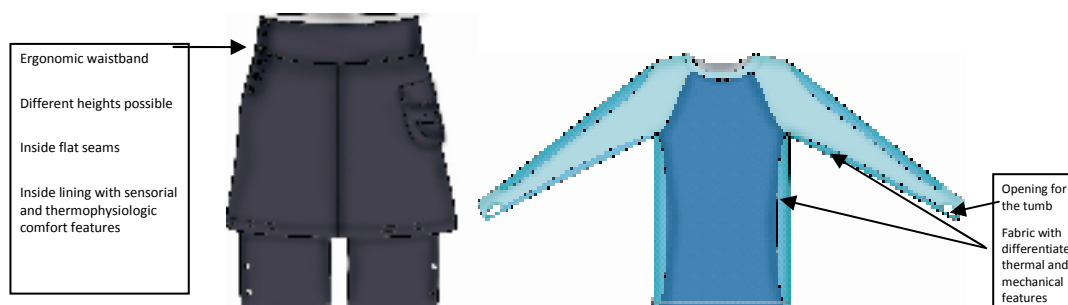


Figure 4. Multifunctional garments for people with physical impairments (a) skirt/trouser (b) sweater

5. CONCLUSIONS

In the present paper, we approach a design methodology applied with the clotting fashion design principles, in order to create highly differentiated products. In this way it was developed a dress that can be used in multiple ways, such as skirt or trousers, as it pleases the user. We presented also some studies of inclusive apparel designs for people with several limitations of physical capacity, but that can also be used by any other user.

The resource to a more dynamic design process enables generating more creative and innovative new products. It also enables the construction of a much solid knowledge on the user, on the materials, on the product itself and its construction, making more viable the development of this sort of products.

6. REFERENCES

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