DIRECT METHODS OF CREATIVE PATTERN CUTTING

pedagogy and experimentation

PhD THESIS CONCLUSIONS

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2016
FEBRUARY

DEPARTAMENTO DE IDEACIÓN GRÁFICA ARQUITECTÓNICA
ETSAM - ESCUELA TÉCNICA SUPERIOR DE ARQUITECTURA DE MADRID
UPM - UNIVERSIDAD POLITÉCNICA DE MADRID

This PhD thesis operates in the field of direct creative pattern cutting and its pedagogy. This type of pattern cutting implies innovation and originality, often questioning traditional ways of making patterns and looking for alternatives. Its main orientation is through direct contact with the material, applying intuitive processes that are easy to understand and execute and offer immediate solutions. The use of digital tools is not of primary importance. The dissemination of teaching proposals and results in relation to creative pattern cutting in general, not only direct pattern cutting, is a recent phenomenon appearing over the last decade (Rissanen, McQuillan 2016, 48, Lindqvist 2015, 80) and so far has not produced a systematisation leading to the definition of a pedagogic methodology.

The fundamental test bed for this thesis has been practical experimentation of the various methodologies in the classroom. The objective has been to move towards a teaching methodology aimed at achieving full creative freedom. In this way, both the existing methods and the one proposed by this thesis have been tested to see if they allow the students to carry out their volumetric projects without following specific prescribed instructions but rather by considering general principles. Control of volume, experimentation and research, as well as the constant exchange of different techniques and methods, are the keys to the pedagogical methodology that is submitted to critical analysis in this thesis.

The study of the pedagogical methodologies of other authors and teaching experience in the classroom has lead to the discovery that the application and practice of the methods of direct creative pattern cutting contribute to developing abstract and critical thinking. Abstract reasoning happens in two senses:

Anatomical fit> formal abstraction
Formal abstraction> original and innovative volumetric shape making, approaching the unknown

Students are worried excessively about human anatomy, which leads to the making of conventional garments. The elimination of this excessive worry makes it possible to confront the unknown. It is possible to resolve problems of volume and anatomical adjustment with forms and patterns in which the human volume can not be identified or associated. On the contrary, there is the possibility of the genesis of original and new volumes, without anatomical adjustment or with variable adjustment, through abstract forms. Sometimes detachment from the

human body enables something new and original to happen.

On the other hand, the intention is to contribute, through the finished study, to the development of a critical thinking capable of questioning that which already exists, which is able to detach itself and create mechanisms directed to particular project methodologies. This requires knowledge of that which already exists in order use it appropriately, and in addition, to seek original languages of resolution. In this thesis the validity of the use of a single method or system is questioned and the pedagogical approach is focused on methodological diversity.

Direct creative pattern cutting. Methodological approaches

The realisation of this thesis has distinguished two methodological approaches in the teaching of the direct creative pattern cutting:

- Techniques and methods orientated towards the search for a faster and more efficient solution in a proposed design, which is intuited or sketched in advance or outlined during the process. In this case the design would be joined and integrated into the making phase. Since the application of the technique is oriented towards a predictable result, there is the possibility for the student to know and identify the most appropriate technique or method and apply it for the desired purpose. This part of creative pattern cutting and its application in teaching is focused on having control over volume and form, for which there are different techniques and strategies, and involves following certain steps in order. Tomoko Nakamichi - Pattern Magic and Shingo Sato - TR Transformational Reconstruction are particularly salient authors.

- The second approach provides a surprising, unknown and uncertain result. The project and the obtaining of the pattern arise during a process of experimentation. In this case, control is less or variable depending on the method or phase of the process. In this methodological approach new variables can continually intervene and the method, that is, the order to do things, can be altered or a particular method can lead to an uncertain and unknown result. It´s possible to have a glimpse of some objective or challenge but it is necessary to work experimentally to achieve it. Creative freedom consists in opening up to different possibilities, investigation and experimentation. To design clothes with these methods, often the student has to be able to make patterns “from nothing” and not in response to a sketch. Pattern cutting becomes an integral part of the crea-

tion process. The phases of design and realisation are integrated and designer and pattern cutter are the same person. Pattern development becomes the key to design. This second category includes Julian Robert's Subtraction Cutting method, Rickard Lindqvist's Kinetic Garment Construction and the contemporary Zero Waste Pattern Cutting movement, promoted mainly by Timo Rissanen and Holly McQuillan as well as other sustainable approaches. This category is the framework for the method proposed by this thesis.

Within this approach, which encourages research and experimentation by joining the phases of design and making, it is possible to work following different criteria:

Sustainable criteria: In this case the design philosophy seeks solutions from sustainability and this conditions and determines the shape of the pattern. In this category concrete methods and projected design strategies coexist. While Zero Waste Pattern Cutting - ZWPC, which follows the criterion of no waste, is more theoretically defined, it is possible to detect other strategies related to reducing the number of seams in a garment, such as Minimal Seam Construction, transformability, social implications of users, as occurs in Make Use and Do It Yourself, repetition of a constructive element in all models of a collection, geometric versatility of a pattern, etc.

Functional and constructive criteria: The processes are experimentally determined to achieve a functional purpose, as Lindqvist proposes with his method Kinetic Garment Construction. In this case initial variables and concepts are intuited and an end is pursued but it is not perfectly clear how to achieve it. The solutions to the raised problems are found through the experimentation.

Formal and aesthetic criteria: In this case, investigation is focused on discovering new formal and expressive languages. The process constitutes a means of generating new and original volumes not existing in fashion before. Within this group are found methods such as Subtraction Cutting, some of the more abstract approaches of Zero Waste Pattern Cutting ZWPC like Geo Cut and Cut and Drape that, besides looking for sustainable solutions, generate other formal languages. The method proposed by this thesis fits into this category.

Accidental Cutting

The principal original contribution of this work is the theoretical foundation of a pattern cutting method which has been named Accidental Cutting. This method is located on the most experimental side of direct creative pattern cutting, where the introduction of chance, randomness and improvisation in the processes of building clothes can lead to the generation of volumetric form that can be applied in other fields, not only fashion. Accidental Cutting refers to the constructive and projectual method of obtaining complex volumetrics as well as pedagogical and research methodology. For the practice of this method previous knowledge or experience in the field of pattern cutting is not essential.

The method enables the generation of unknown formal results; is focused on finding, and not looking for, the nonexistent. Julian Roberts points out that with the techniques of creative pattern cutting there are as many new forms to discover as there are in all the history of fashion (Muir 2013). This method involves the generation of volumetric material that could not otherwise have been created (Figure 446). That is to say, the method is the generator of the project and determines it, but the result is surprising. This is precisely one of the biggest advantages of Accidental Cutting, the generation of results that are not predictable. This fact is in agreement with the opinion of Federico Soriano that a method is a project (Soriano 2013, 4). The truth is that on some occasions the use of a certain method limits and closes down the result from the beginning, but this is not the case here, since through the method the unknown is discovered. On the other hand, Accidental Cutting incorporates a series of concepts that are introduced in the language of the pedagogic methodology of creative pattern cutting: volumetric identification of a pattern, decontextualisation and formal abstraction of the pattern, geometric versatility of the pattern in the generation of different volumes, division of patterns into positive, negative, complementary, relative, subordinate and hierarchical, suppression and involuntary addition, apparent deformation of a pattern..[1]

The methodology of work involves open processes that branch out, since each solution leads to different ones and in turn those involve others, and so on. It is therefore a research methodology in continuous evolution, as new doors are constantly opened for those who practice it, resulting in surprising results. The methodology encourages unlimited investiga-

1 The term of positive and negative is used as well by other authors as Timo Rissanen, Holly McQuillan or Materialbyproduct but they utilise another assertion (Rissanen, McQuillan 2016, 88; Transparent Seams blog 2010; Townsted, Mills 2013, 106)

tion by its intrinsic characteristics and can be furthermore increased and multiplied by the different possibilities of application of the generated experiment, introducing scaled and quantitative variations, of localisation and distribution as well as variation in textile supports. Therefore, it can be said that the Accidental Cutting method of pattern cutting entails surprising and infinite results from elementary units of randomly generated patterns, which have at the beginning no recognisable associated pattern identity or volumes. The capacity of continuous multiplication of results is one of the characteristics of the method, which has not been detected in the other methods studied.

Fig.1. Prototype and pattern obtained with the Accidental Cutting method. Intervention in the pattern with positive pattern, negative with variation of scale, Eufemio Fernández López, third year ESDM 2014-15.

Actually Accidental Cutting is not a pattern cutting method oriented towards obtaining patterns, but towards generating volumes through the use of patterns. For this reason, the two-dimensional beauty of the patterns is not pursued. There are no pretty or ugly patterns that are large or small or with strange shapes, but rather volumes that are interesting or not. Holly McQuillan, for example, does look for a two-dimensional aesthetic factor in the pattern (McQuillan, Rissanen, Roberts, 2013, 47). In Accidental Cutting the oddest form is likely to become a volume with potential constructive and aesthetic interest. In the method several techniques and systems of construction are mixed within a process that involves following

very particular defined steps:

1 pattern > 2 formal research > 3 draping > 4 definitive pattern > 5 final design

1 The process is not based on a previous design, there is not even a personal visualisation of the project, nor is it known what is going to arise throughout the process. Neither the student nor the teacher knows, even if he is an expert in the method. This approach is in contradiction to the most traditional design processes involving patterns. This intrinsic characteristic is therefore contrary to the traditional construction of flat patterns and tailoring and also with the techniques of draping or modeling, although in this modality occasionally one can work without previous design, but most of the time a concrete result is sought from a previous visualised idea. Although not starting from a previous design is a significant fact, to this it is added that the pattern itself is anterior to the design. It is therefore a question of designing through the patterns and not of generating patterns for a design. This is also a characteristic feature of some other experimental methods like Subtraction Cutting and certain approaches of Zero Waste like Geo Cut and Cut and Drape. A determined result is not pursued, but arises through the process. The realisation is a determinant of the design itself and the separation between designer and the pattern cutter is not possible, as usually happens in the current industry and also usually in teaching. This is a characteristic of all the experimental methods discussed in this thesis.

In this initial phase the student can draw abstract, random, accidental forms (for example by throwing a cup of coffee and remaining with the shape of the stain) and this will be the starting point of the process. Any kind of form is valid and can be either an elementary or more complex geometric form. This form constitutes the primitive or primary pattern. These patterns can be classified into positive patterns, that is, the source forms of research, or negative, which are the patterns of the space format with the positive shape cropped into it. Other patterns can be classified as complementary, relative, subordinate or hierarchical, in reference to different relationships that can be established between them. The method contemplates not only the existence of surface elements but also different types of lines and points contained in a surface. All initial patterns are likely to generate volumes.

Julian Roberts, in his Subtraction Cutting method also uses empty spaces. His volumes are generated rather by the absence of the pattern, or superficial elimination of the cloth which is

discarded and not used. In Accidental Cutting the positive and negative patterns are used independently or at the same time. Julian Roberts also incorporates anatomical patterns, which does not occur in Accidental Cutting. The techniques of this method, Tunnel Technique, Ping Technique and Displacement Technique are not those of Accidental Cutting. Julian Roberts usually uses circles and forms derived from them although any other form could be used. In Accidental Cutting there is no predilection for one form more than another. On the other hand, the abstract and geometric cuts used in the Geo Cut and the Cut and Drape approach of Zero Waste Pattern Cutting have great similarity to the primary patterns used in Accidental Cutting but this method is not limited to sustainable patterns without textile waste. This first phase is very important, because randomness is decisive in the subsequent processes and in the final result. In this way the incorporation of pattern cutting into a design tool is highlighted. (Rissanen 2013, Rissanen, McQuillan 2016 and Roberts 2013).

2 Only in the following phases of the creative process is an analogy established between the elements of the initial investigation and certain volumes. These can be variable for each pattern, exploiting the geometric versatility of the forms and their possibilities of union. This phase is characterized by the exploration of the maximum number of possibilities of volume engendering offered by each initial pattern. At this stage the work is on a reduced scale, doing both paper and fabric mock-ups. This process can be as long as deemed appropriate. The final results are compared and only the most interesting volumes are chosen. It is therefore a reflexive phase in which conscious decisions have to be made, observed, reflected on and selected. It works in a way that is totally decontextualized from the human body. In this process, in which decisions of renunciation have to be made, the models with their corresponding patterns can be stored in a “Library of Volumes and Associated Patterns”, linking both physically, in order to be used at another time. In this way, it reinforces the idea of patterns as a working tool that can be stored in a library, as has been done by Timo Rissanen, when he stored patterns that he had studied and knew functioned well in “Shape Library” (Rissanen 2013, 91). This phase, although of maximum interest for the method, can be suppressed when there is an immediate need to complete the exercise.

3 In this phase the confrontation with the human body is produced using mannequin modelling techniques. An approximation can be made on a small scale mannequin or 1/1. This is a phase of conscious decisions and action. There is a need to assign a scale to the “experiment” generated in the previous phase. It may be that the volumes of the previous

phase undergo considerable changes or even that they are completely transformed due to the change of scale. At this stage the student may discover new possibilities of the joining of edges and treatment of borders in the pattern. The phase does not consist only in the transfer of a model from the previous phase to the human body, but is still an active phase of creation. Apart from making decisions in relation to the scale, distribution and quantitative variables and possible uses of symmetries are introduced. At this stage, there is again a multiplication of results. Otherwise, it works according to the conventional dictates of draping, enabling the inclusion of new effects when confronted with the fabric and taking advantage of the possibilities of deformation. Phases 2 and 3 are characterised by a mixture of control and intuition. Therefore, it can be said that Accidental Cutting involves a way of building in 3D, since the original flat shapes lack recognisable associated volumes. This does not usually occur with patterns obtained by traditional techniques, in which equivalence or volumetric reading can be established in many cases. It is even characteristic of this method that not even in the final pattern is it known to which part of the body they correspond, or if they are placed up or down. For this reason it is necessary to have a rigorous technical description of the patterns, establishing clearly the points and lines of joining in the different pieces. The 3D construction is in line with all the other techniques and methods explored of direct creative pattern cutting that are presented in this work. In general special importance is attached to three-dimensionality. This factor is what really guarantees the ease of the constructions and the immediacy of obtaining the definitive pattern through the introduction of cuts. Both constructing in 3D and deconstructing the volume into flat planes later in does not usually generate problems for the students. In this phase it is possible to work directly on the mannequin or with overlapping patterns previously obtained by other pattern cutting methods.

4 This phase consists of flattening, through using cuts, the volume generated in 3D on the manikin in the previous phase. The original cuts of the primary forms may have undergone deformations and changes in the modeling process and in addition other cuts are introduced which are those of adaptation to the human body. Occasionally decorative cuts may be introduced which are not strictly necessary for volume lifting, to introduce chromatic variations of fabric or other optical effects..

5 This method demonstrates how even through simple or elementary geometric forms it's possible to arrive at results of high volumetric complexity. From the final volumetric form of the design, it is not possible to decipher the shape of the primary pattern from the begin-

ning of the process. It is not possible to read the process backwards. Neither is it possible to know the volumetric capacity of the primary patterns. The volumes emerge in the realisation phase. The incorporation of the realisation phase into the creative design process is a feature common to all experimental creative design methods explored in this work. This is a holistic or integral vision of the design where innovation has the opportunity to happen, as opposed to the conventional design vision and its creative processes, where students can lose creative opportunities since they tend to draw what they already know. That is to say, design drawing can often induce copies of what already exists, although this is not always a conscious process (Rissanen 2013, 151).

When analysing purely formal aspects, some of the garments involve constructions of a sometimes chaotic aspect while others draw attention for their apparently studied volumes. Establishing an apparent volumetric control is a characteristic of this method of accidental origin. There is the possibility of surprising the viewer, especially when using resources such as symmetry; then it can seem that the pattern follows a concrete law and that obtaining it has been complex and premeditated, although in reality it has been generated in a more or less random and almost immediate way. There is therefore no need to justify any error, since the viewer does not perceive that the model has been obtained accidentally but by a totally premeditated process, without suspecting that the pattern cutter may be inexperienced in the subject. On the other side, Subtraction Cutting fundamentally generates results that are unstructured, chaotic and in movement. In Accidental Cutting this does not occur, although asymmetry can also be explored. In general, Subtraction Cutting is characterised by bigger improvisation and spontaneity throughout the entire creative process, while in Accidental Cutting puts value on reflexive observation and the trial of different possibilities before making the final decisions in all the phases except the start of the process.

Although Accidental Cutting can operate completely independently, it is also compatible with all other techniques and methods of direct creative pattern cutting. There is the possibility of raising the volume with another method or technique and partially applying elements generated with Accidental Cutting. It is useful to use this method with students who do not yet have notions of pattern cutting so they lose fear of the subject. On the other hand, practicing the method with students of higher levels opens new paths and creative horizons.

Although the method of Accidental Cutting has the advantages described above, it has some drawbacks:

- Since it is a methodology that encourages unlimited research, students may feel that they are "missing something" if they do not make or apply the results of all their research to garments.
- Although a designer can generate all his clothing and collections exclusively with this method, there is no way that he will be able to obtain with it the patterns of any garment previously designed, without the knowledge of the general fundamentals of pattern cutting, as happens with Subtraction Cutting . Therefore, in order to achieve full creative freedom, it is convenient and necessary to know the fundamental principles of volumetric generation, other methods and systems of pattern cutting as well as understanding the human body as a relational system in movement

Educational proposal

It is recognised that changes are arriving in the teaching of pattern cutting, which question the pedagogic methodologies dominant today. Firstly, that direct methods of creative pattern cutting should be part of the academic training of fashion designers because of their ease of execution and the immediacy of obtaining results that involve creativity and innovation. This thesis contributes to this view in which pattern cutting does not have to be complicated and difficult to learn.

Secondly, methods and techniques of creative pattern cutting, not just direct ones, should be part of the education in the matter of pattern cutting in higher education centres of fashion design, not as independent or optional subjects but as core subjects, to develop new formal expressive languages and acquire awareness of sustainability related to the pattern cutting matter as well as to investigate functional issues, questioning the current systems and pattern cutting methods.

The introduction of both direct and indirect methods and techniques of creative pattern cutting in academic teaching can generate an ideological change in the current direction of fashion, which is usually based on copying styles and models. This methodological change affects both the regular pattern cutting and sewing subjects and project subjects. In the creative pattern cutting methods, especially the experimental ones, it is not possible to separate

the figure of the designer from the pattern cutter and these must be the same person, and the application of this type of pattern cutting in teaching implies a contradiction with the present curricula, where this separation occurs by isolating the project subjects from those of pattern cutting and sewing.

According to this perspective, the need for innovation in the field of pattern cutting in teaching and ultimately in fashion, requires that, at least, the subjects of projects and design should be partially joined and taught by the same teacher who has the will to explore methods and experimental pattern cutting techniques. This union in the academic field should question the entire system of fashion today, because the fashion industry is banned as well.

Research, experimentation and teaching can contribute to making fashion design more sustainable, more functional and also generate new aesthetics, contributing to modifying the current course of fashion.

Future research

In future research, it is proposed to approach the study of indirect methods and techniques of creative pattern cutting, mainly those using computer tools common in fashion design and also related to the field of architecture, design or mathematics. It is also considered that transformability in relation to fashion projects and pattern cutting, constitutes a vast field of experimentation. It would be interesting to identify and systematise all the possible strategies of application in a pedagogical approach that would be oriented towards a sustainable fashion project, although not necessarily without fabric wastage. There is the intention to propose research into an alternative theory to the one formulated by Rickard Lindqvist in Kinetic Garment Construction, as enunciated in the latest courses at the ESDM

Finally, as Timo Rissanen does at the end of his PhD thesis (Rissanen 2013, 162), other designers – pattern cutters, researchers and teachers, are invited to contribute to the discussion and amplification of what is presented in this PhD thesis, bringing both, professional and teaching experiences, to expand the spectrum of methods of creative pattern cutting and its teaching.

LINDQVIST, Rickard. 2015. *Kinetic garment construction. Remarks on the foundations of pattern cutting*. Ph.D. thesis, Borås: University of Borås

McQUILLAN, Holly; RISSANEN, Timo; ROBERTS, Julian. 2013. "The Cutting Circle: How Make Challenges Design". *RJTA* Vol. 17 No. 1, pp. 39-49

MUIR, Lucie. 2013 march 3. "The fashion designers who are changing the way garments are made". Finantial Times. http://www.ft.com/cms/s/2/6720cafa-80fd-11e2-9908-00144feab-dc0.html#axzz2N2x7XPGA/ acces july 2015

RISSANEN, Timo. 2013. *Zero Waste fashion Design: a Study at the Intersection of Cloth, Fashion Design and Pattern Cutting*. Ph.D. thesis, Sidney: University of Technology in Sidney

RISSANEN, Timo. McQUILLAN Holly. 2016. *Zero Waste fashion Design*. London, New York:. Bloomsbury Publishing

ROBERTS, Julian. 2013. *Free Cutting*. http://www.julianand.com/ acces april 2015

SORIANO PELÁEZ, Federico. 2013. "Un método es un proyecto". *Colaboratorio 3. Arquitecturas Colaborativas: M30* - Almudena Ribot, Ignacio Borrego, Diego García-Setién. Madrid: Mairea Libros, pp. 4-6