

# Guidelines for Patternmaking Teaching and for Didactic Materials

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**Research supported by CAPES (Coordination of Improvement of Higher Education Personnel)**

### **Abstract:**

*The present study approaches historical analyses of the methodologies used for patternmaking teaching and proposes the development of guidelines for this teaching. Therefore, it conducts a historical survey on the several techniques and methods used since the 1960s, allowing a comparison between method and sociocultural period aiming to the pursuit of techniques that can make the learning process easier. The analysis of the main patternmaking techniques used over time and of the research with educators from the area will provide a broad vision of what can be used to optimize the learning process and what can be dropped for not favouring a quicker and with a better quality education.*

**Keywords:** *Teaching, Fashion Design, Patternmaking and Moulage.*

## **1. INTRODUCTION**

This study presents a set of guidelines for the patternmaking teaching, which can make easier the teaching/learning of the subjects involved. It is worth saying that these guidelines do not approach the way of making the patterns or even their structure, but a way of conveying the knowledge in a

broader and more effective way through the didactic material and the teacher's action, allowing an education of a more skilful professional for the garment branch.

The patternmaking study is of great importance in the productive process of clothing manufacturing, which comprehends several stages, such as research, creation, patternmaking, cutting, sewing and finishing (ARAUJO, 1996). In this process, very old in the history of humanity, patternmaking is one of the main techniques that aim to guarantee the quality of the final product.

It is in patternmaking that occurs the definition of turning a fabric as a two-dimensional artefact into a three-dimensional one, which will be, later, the manufactured garment. Thus it is the patterns produced in this process that determine the shapes of the parts that will be cut on the fabric to accommodate the saliences of the body such as, for instance, abdomen and thorax and the articulations like the knees and elbows, shoulders and hip.

Therefore considering this relevance, the education of a patternmaking professional requires specific training and great practise until this very professional is able to develop activities within the productive chain of textile manufacturing. Thus, the thesis that originated this study seeks to find a way of making this learning process more attractive, faster and more efficient, optimizing the learning curve.

For that reason, we will present a brief historical survey on techniques, methods and diverse works used as references for the teaching of cutting, sewing and patternmaking since the 1960s, in order to understand the relation between method/work and sociocultural period, aiming to the pursuit of techniques that can make the referred learning process easier.

The analysis of the main patternmaking techniques used over time provide a broad vision of what can be used to optimize the learning process, according to the current learning reality, and what can be dropped for not favouring a quicker and with a better quality formation. From those analyses, we carried out questionnaires with students, professionals and educators from the area to validate the information and add many others capable of collaborating for the development of the intended guidelines.

After the referred study and analysis, this work proposes a set of guidelines for the patternmaking teaching that favours the transformation of a student into a qualified professional for working in the patternmaking area, which has been applied in a workshop with Textile and Fashion/USP entering students for observation of its applicability.

## **2. FROM THE TAILOR'S CRAFT TO THE PATTERNMAKING TEACHING – BRIEF HISTORY OF THE WESTERN COSTUME**

The history of humanity is linked to the history of costume, the habits and culture of its people. Characterized as fashion, for most of the historians, from the 15th century on, the history of costume demonstrates the social, economic and cultural development of civilisations; as it can be confirmed by Villaça (1998, p.107) when he concludes that 'fashion produces itself as record and show window of being/seeming, suggesting other behaviours and attitudes, manufacturing performative selves through subtle recreations of the concepts of truth, good and beauty'.

"Currently, "Patternmaking, or flat patternmaking, is the link between design and productions, which turns a designer's sketch into a tree-dimensional functional garment." (ROSEN, 2004, p.02). Hence, patternmaking, in its different forms and approaches, has its importance highlighted in this branch, which leads to the reflection on the necessity of defining its details on the various existing techniques.

'A long tradition of tailoring and preceded the creation of drafting systems (...) A wide variety of changing economic, social, and technological factors determined the methods created at specific times, the manner of selling the systems, and the composition of the market for them.' (KIDWELL, 1979, p.02). The studies prepared during this long tradition contributed to the evolution of teaching methods used today. Therefore this work considers the production of didactic materials written from the 1960s on, together with the aspects related to the social issues and their impacts on the fashion teaching, presenting an overview of the costume and techniques evolution according to the sociocultural events.

Concerning the ways covered by teaching in a global way, in Brazil it is possible to observe that the lead changes on the teaching and didactics issues are obtained in the end of the military dictatorship, same period in which we can see the possibility of making fashion teaching academic and focused on the industry market. For in the 1980s, with the end of the dictatorship, there was a great interest in turning the didactics to a critical thought, capable of teaching the student to criticise the learnt knowledge and judge them among themselves, establishing connections among the different areas of teaching.

While during the 1960s and 1970S, amidst that repressive environment, a technician tendency was articulated, in which 'the new didactics philosophy should form a person capable of learning autonomously, but not of thinking and criticising' (Baradel, 2007, p.25).

It is considering this context of great social transformations post-1960s and the intention of a change in the teaching/learning in 1980 that the present study discusses the patternmaking techniques

relations with the learning, in order to observe the difficulties imposed by the current lifestyle and be able to propose changes that make the learning of these techniques easier.

After all, the cutting and sewing in the beginning of the 20<sup>th</sup> century has gone through transformations and today has three fronts of study: the manual flat-patternmaking, the computerized patternmaking and the three-dimensional patternmaking.

### 3. THE TEACHING/LEARNING OF PATTERNMAKING IN FASHION DESIGN

According to Araújo (*apud* SOUZA, 2010, p.02):

‘Fashion design can be defined as a team activity that seeks to develop the inspiration, the perception of the possible, and its interpretation in terms of products that can be manufactured and commercialized. Its efficient use can serve as source of new ideas helping in the reduction of mistakes and time of developing an industrial product.’

When analysing the needs imposed on the development of a garment by a designer, Saltzman (2004) and Souza (2006) emphasize the close relation existing between the suggested material and the intended silhouette. In this sense, we can note the importance of patternmaking comprehension for a fashion designer, after all, as Menezes and Spaine (2010) assert, ‘patternmaking consists of an activity focused on the flattening of the clothes in order to make the production in industrial scale feasible’. For Rosen, ‘patternmaking is a highly developed technical skill, requiring precision in the drafting and development process. It also necessitates an understanding of body proportions and their measurements’ (ROSEN, 2004, p.02).

In accordance with Diniz and Vasconcelos (2009, p.83), there are ‘many ways of obtaining a pattern and every technique uses different building methodologies, specially related to the measures of the human body’. Among the most used patternmaking techniques are the flat-patternmaking, the computerized patternmaking and the three-dimensional patternmaking or *moulage*.

As previously asserted, ‘the patternmaking of clothes in industrial scale can be performed, basically, through two geometric methods: the two-dimensional (...) and the three-dimensional technique’ (BORBAS; BRUSCAGIM, 2007, p.157). The industrial flat-patternmaking is subdivided into manual flat-patternmaking and graphic flat-patternmaking – CAD/CAM.

The manual flat-patternmaking is known to be the most common patternmaking, having being used since the beginning of what can be called fashion. It is, also, the main technique in industries and Brazilian educational institutions.

Graphic flat-patternmaking – CAD/CAM –, is the one which has the aid of computerized tools.

The three-dimensional technique is a totally manual one, for it is ‘made directly on the dress form<sup>1</sup> which has the shapes and anatomic measures of the human body’ (BORBAS; BRUSCAGIM, 2007, p.157).

#### 4. ANALYSIS OF METHODS AND WORKS

One of the objectives of this study is to make a comparison between the patternmaking methods, the published works and the sociocultural period in Brazil. Therefore, we analysed fifteen national and international works (referred to in Annex), published between 1970 and 2010, eleven of them being on the flat technique and the other four on the three-dimensional technique, which form the basis of the didactic material used by institutions and patternmaking teachers for teaching the patternmaking subject in the Fashion graduation courses in Brazil.

When analysing them, we can reason that the works registered until the 1970s have similarities deriving from the period, in which the preponderant element for the patternmaking learning or ‘cut-and-sew’ at the time focused on the need of housewives or domestic seamstresses to improve their skills.

With that objective, works until that decade point common topics on manual finishings, amount of fabric needed to make a garment and types of seams of each item.

From the 1980s on, we can see a change on the focus of those works, for the industrial need is taken into consideration and the patternmaking methods need to adapt to ready-to-wear. This way, it is in this moment that we can notice the importance of a table of measurements and the making of prototypes to test the models.

However, only in the 1990s the works start to give the necessary focus to the ‘industrial making’, presenting theoretical content and ways of thinking about the patternmaking diagrams in a more logic way when it comes to industrial production, considering aspects such as tables of measurements, fibres and fabrics used at the time, as well as the processes of industrial products.

From the turn of the century to today, the needs go beyond aspects regarding the patternmaking in production, but it presents as its focus the junction of aptitudes, the need of embody other levels of knowledge.

The patternmaker nowadays must know about ergonomics to provide comfort to the customer, about anthropometry to be able to fit cuts and create new patterns that respect the body, without having it as an obstacle to creation. Besides, there is the necessity of adapting patternmaking to the branches

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<sup>1</sup> Dress form or sewing mannequin corresponds to the structure used for the elaboration of the three-dimensional patternmaking, being a representation of the human body itself.

of design and manufacturing, which need mastery of theoretical content such as geometry, anthropometry and history of fashion to a better interpretation of the product and communication within the companies.

Nowadays students seek to understand and criticise what is given to them, which is why the way of teaching and didactics evolved, having the possibility of discussing what is convenient, while in the decades before to the 1980s all that was wanted was that they copied what was given, so that the patternmaking student should reproduce the steps, not being allowed changes in the process.

A more critical vision of knowledge is also present in the job market, where they search for professionals that can change what exists, that dare to criticise, that have understood how to make a garment and not only how to reproduce it. Professionals that comprehend the reasons why each item is described in a diagram and, if so wanted, they can develop their own way of shaping them.

Considering these aspects, the research here presented has observed the facilitator aspects of the methods and works analysed and has connected them to published works on the topic in order to raise data on what could help in the didactics material elaboration, as well as in the patternmaking teaching method in the classroom, only then to assess the aspects from questionnaires developed with students, teachers and professionals in the patternmaking area and then to have a foundation to formulate the guidelines for patternmaking teaching.

## **5. GUIDELINES FOR PATTERNMAKING TEACHING**

As previously stated, for the formulation of guidelines for patternmaking teaching we have compiled data that were important for the teaching during the patternmaking classes as in the University of São Paulo as in other universities where the authors have been present as teachers, as well as of the relevant aspects compiled during the analysis of methods and works mentioned. These data have been described and questions have been formulated to validate them before professionals, students and teachers from the area.

Thus, there has been a critical analysis of the the teaching/learning process based on experiences, bibliographies and questionnaires carried out with students, teachers and professionals from the patternmaking area, being a total of three different questionnaires, all with the same essence.

Until the present moment, 67 people have answered the questionnaires and with their tabulation, it was possible to undertake the following analysis:

The first question assessed the importance of the previous contact to the patternmaking practise, in order to facilitate the practical learning and it has been placed in the beginning for it is a topic already considered necessary by Spaine in 2010, and also because it is one of the points mentioned

as positive when it comes to the didactic methods previously analysed. In this question, over 90% of the participants affirmed the learning would be easier this way, and half of those who answered affirmatively believe this regardless the used material, while the other part thinks it depends on the material. This way it is clear that the involved in the process of teaching/learning understand the importance of studying theoretical content that provide the basis to the patternmaking studies.

The second question approached which theoretical contents could be more relevant for the teaching and most of the respondents described the necessity of studies regarding ergonomics, followed by anthropometry and geometry. In this question, it was also shown the participants do not consider history of fashion a relevant content to the patternmaking teaching, helping this way in the indication of the three theoretical aspects approached on the guidelines.

On the third question we can notice that the patterns are rarely conveyed without having the necessity of further information, ergo the teachers' explanations are essential and occur in many different ways, most of them during all the processes of pattern elaboration.

The fourth question demonstrates that most of the courses have a broad patternmaking grading concerning as the flat-patternmaking as the three-dimensional one, regardless being integrated or not. However, there are still graduation courses that emphasize flat-patternmaking the most. Only a few courses teach the computerized patternmaking, which can be due to the material cost or for its use is considerably recent.

Besides, the fifth question shows that among the courses that apply flat and three-dimensional patternmaking methods there is a parallel among the ones that teach it in an integrated way and the ones that do not do it.

The sixth question approaches the possible difficulties reached in the flat-patternmaking learning, in which close to 60% of the students affirm having some difficulty; most of them concerning the comprehension of how that flat form will be on the body, in other words, the integrated teaching of three-dimensional patternmaking could help in this process.

The seventh question validates the initial results of this survey, which indicated the necessity of including flat and three-dimensional patternmaking so that they be integrated in the moment of teaching in order to provide a more complete learning, for 98% of the students and over half the professionals and teachers believe this action would help in the learning.

On the eighth question, which intended to observe what were the negative aspects of isolated three-dimensional patternmaking teaching, most of the students and teachers who answered think three-dimensional patternmaking might cause technical problems, as among them most of the people find generic difficulties when it comes to assembling and manufacturing the patterned piece.

Regarding the most relevant aspects in the three-dimensional patternmaking, the last question demonstrates most of the interviewed consider more than one item as essential, giving more emphasis to formal innovation and three-dimensional visualization, once again confirming the necessity for integration of both subjects for a better teaching/learning.

In this sense, we have the following guidelines:

- Integrate teaching between flat and three-dimensional patternmaking, providing the contents to complement one another and help in the total comprehension.

- Insertion of the following theoretical aspects: ergonomics, anthropometry and geometry, as in the beginning of the didactic material providing a broader notion of these components, as during the presentation of texts and diagrams in the form of information boxes.

These guidelines have been applied in a didactic material and in a workshop held in March 2013 at the University of São Paulo, as presented in Figure 1.

During the workshop developed on these guidelines, it was possible to identify, by observation and analysis of the students about the course, that the integrate teaching of flat and three-dimensional patternmaking when developing the first basis pattern of the skirt facilitated the comprehension of how the item would be on the body when finished.

It was also possible to comprehend that, for graduation students, the icons that related the theoretical subjects with the patternmaking practise were more important when linked to the ergonomics and anthropometry, as people with a more limited knowledge on Maths better used the aspects related to geometry, however, they yet helped the comprehension of the didactic material.

This way, the guidelines shown by the survey obtain a first validation, confirming the relevance of its applicability on the patternmaking subject from graduation courses.

## **6. FINAL CONSIDERATIONS**

When developing a deeper analysis of the most used patternmaking techniques from the mentioned aspects in this study, we can notice which characteristics favour or make difficult the students' performance during their formation, whether in the academic range or in the industrial one. This perception is even clearer for the authors in their patternmaking teaching activities in important educational institutions for the past years and especially after bibliographical analysis and questionnaires applied to students, teachers and patternmaking professionals.

We also analysed the difficulties and eases the students present when using each of the techniques, verifying the need for guidelines for patternmaking teaching in the Fashion graduation courses that can comprehend the qualities of the various techniques in order to correspond to a more complete

and efficient teaching.

It was possible to identify that the two-dimensional and three-dimensional techniques complement one another and if combined in their positive aspects can provide a more efficient teaching, minimising the gaps of each method by enabling the student to comprehend the origin of what is studied, integrating flat-patternmaking mathematics to the visibility provided by the three-dimensional one.

Other aspects that are able to optimize the learning correspond to the presentation of theoretical contents – ergonomics, anthropometry and geometry – previously and during the patternmaking teaching, so that it is clearer the reason and intention of every pattern line, as well as to elucidate the existing connections among the subjects from the Fashion graduation courses.

### Saia evasê com pence

Adaptação a partir do molde da saia reta

Este procedimento deve ser utilizado quando se quer uma saia evasê com pouca abertura na barra.



Para uma saia evasê com pouca abertura, são acrescentados alguns centímetros a mais na barra, formando um desenho mais aberto que a saia básica, o que proporciona mais abertura para as pernas, facilitando o caminhar, além de adicionar fluidez à peça. Podem ser adicionados desde 1 à 6 cm, usaremos 4cm.

#### FRENTE E TRASEIRO:

- Copie a saia básica em outro papel, usando carretilha e papel carbono se preferir.
- Determine o comprimento da saia (próximo a 45cm)
- Determine quanto será acrescentado nas laterais para fazer a abertura do evasê (4cm).

#### FRENTE

- a medida a mais nas laterais será adicionada, em linha, do ponto D ao ponto E
- $D - E = 4\text{cm}$

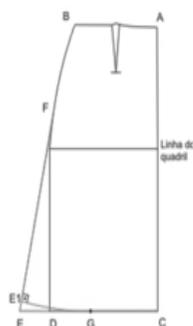
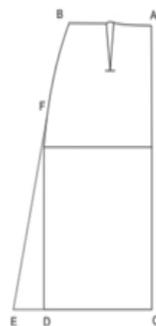
- Suba 1cm de E a E1

- Ligue do ponto E1 até um pouco acima da linha do quadril (ponto F) em linha reta.
- Ponto G:  $D - G = 1/3$  de  $C - D$
- Ligue os pontos: G - E1 com uma leve curvatura.
- Lembre-se que os pontos A - E1 determinam a nova lateral da saia, portanto o ângulo A-E1-G deve ser um ângulo reto.



Ângulo reto é o ângulo formado quando uma semi-reta, tocando em um ponto de uma outra reta perpendicular a ela, cria dois ângulos iguais de 90 graus.

Para o TRASEIRO, realize o mesmo procedimento.



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### Modelagem Tridimensional

Compreensão do corpo e de suas reentrâncias.

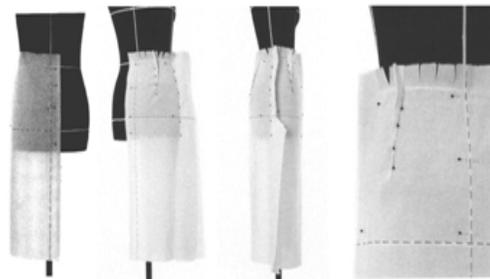


Figura 2: Modelagem da saia básica no manequim

Fonte: DUBURG, Annette; TOL, Rixa van der (2012)

Para desenvolver a modelagem da saia, pode-se começar envolvendo o manequim a partir da cintura.

Será necessário um tecido (toile) de algodão com a trama mais aberta (ex: mourim):

- **comprimento** = comprimento da saia+costura da cintura+Barra/bainha (aproximadamente 58cm) e
- **largura** = metade da circunferência do quadril + 20cm

Ao envolvê-lo, alfinete as sobras de tecidos na altura da cintura formando tanto as pences frente e costas, como a lateral (também representada por uma pence, que se transforma em recorte).



Compreender as reentrâncias dos corpos auxilia a desenvolver uma modelagem mais adequada aos corpos relativos ao público-alvo. Assim é importante reconhecer as medidas necessárias para o desenvolvimento dos diagramas com base no conhecimento dos corpos.

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Figure 1. Guidelines applied in a didactic material: Skirts course  
Source: Personal archive, 2013.

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## APPENDIX: Patternmaking methods analyzed

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