Study on the Establishment of a Structured Library for Clothing Design– The Case of Menswear

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Abstract

Students who work in clothing design or study clothing design need to learn clothing design drawings, clothing design drawing as a communication tool prior to manufacture in the clothing industry. Due to the diversification of the attributes, colors and styles of clothing design products, if we do one-by-one sampling, it will not be able to reach the manufacture date, and we will also bear a high cost of it. Therefore, a computer design drawing has become a trend in the design industry. If the clothing structure, to create a library which can be assembled or modified when needed. It is like a dictionary with sleeve type, collar type, pocket type, etc. Hence, it will improve the work efficiency, and reduce the cost of making samples, shorten the manufacturing process as well. Therefore, this research will focuses on the clothing industry, using the common drawing software to create basic styles of clothing design, to classify style components, and to create a basic library, and try to combine them quickly to create a new style throughout it. Furthermore, the creation of this library can provide designers or workers to improve their work efficiency, but also can be applied to the education which are related to the clothing design and clothing sampling.

Keywords: Clothing Structure, Computer Drawing, Clothing Samples

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1 Preface

In the past, I was a designer in the apparel industry and currently teach a class in apparel design and manufacturing at a school.

Besides sampling, clothing design drawing is an important communication tool prior to manufacture. For the education, it is generally called as "mechanical drafting". A complete clothing design drawing can specifically show the appearance, proportions and structural details of clothing styles. In addition to being shown in concept drawings and image boards, it also commonly used in design plans, sample sheets, manufacturing manuals and products classification in the clothing industry. The clothing drawing more focuses on the exact proportions of clothing and the human body, and it is necessary to depict the details of the clothing structure which close to the real object. The benefit of clothing design drawing is let pattern-making, manufacture and marketing department staff more easily understanding the overall clothing structure. Therefore, it will help the market operation going smoothly if the clothing appears on the market.

Nowadays, the uses of computer graphics in the industry can speed up the operation of clothing design drawing. However, the fashion clothing styles are changing with each passing day. Therefore, it takes a long time for designers to work out new styles of the season. How to apply the existing styles into a single basic element? That's why a clothing library is necessary to built out. This clothing style library is like a library of books in different categories, which can be used for reference. Throughout it, as long as the workers classify the existing styles and elements, they can recombine and modify them to develop a new clothing style according to their needs. This will shorten the communication process and accelerate the manufacture schedule.

2 Research Motivation and Purpose

Science and technology was not developed at that time, the clothing design drawing was often hand drawn by a fashion designer. (see Fig.1), and the line draft was photocopied into multiple copies, and the color matching as references were provided to the clothing design decision-makers.



Fig.1. Clothing Structure Line Drawing Source : Tatham& Seaman , 2004

In the clothing industry, the pre-work of clothing design and development is complicated. For example, searching for the fabrics and colors of the seasons to making samples, and confirming the final styles. Normally, it takes much time, and the hardest matter is to cope with the rapidly changing market. Hence, in order to quickly respond to consumer's feedback, it is necessary to speed up the clothing design and economize the sampling time in order to shorten the manufacture period, and to get more business opportunity. Therefore, the sample clothes and the clothing design drawing are the best communication tools. However, the hand-drawn clothing design is often difficult to conform to the designer's ideas and drawing style. It takes a lot of time to produce a color close to the fabric. In order to effectively provide more definite styles for decision makers to decide clothing styles or buyers to place manufacture orders, therefore a clear clothing drawing is indispensable. The "clear" defines some requirements which are proportions, colors and patterns, and detailed design that are close to the actual product.

There are often multi-color products in the same style in the market. In the past, the company's takes order, if the designer only provide a sample of a single color, and even if another color product was pre-listed in text or provided with a cloth sample, it will make the people hesitate to move forward, so that the companies often lose many orders. At this time, if there is a complete and clear clothing drawing, it will make the order to further theirs interests. On the other hand, it can also provide the needs of the manufacture and marketing process.



Fig.2. Clothing Design Development Process Source : This Research

3 Research Scope

Due to the diverse categories of casual clothing, there are different sizes, structures and design of the clothing styles. So that, this research only takes men's casual clothing as the main research object, and establishes a library of clothing style elements, to construct a clothing design drawing. It uses CorelDRAW[®] vector drawing software as the drawing tool.

4 Research Methods

The document analysis is used as a research method to collect common styles in the clothing

industry. Besides, the researchers' past practical work experience as a supplement to explore the clothing development process and procedures as well. A method is proposed to fulfil the needs of clothing industry, and to solve the clothing design workers' problems when doing the clothing design drawing. Therefore, a clothing style library is established by experimental practice for the operation, it can be applied to clothing designers and clothing design education.

5 Research Contents

5.1 Literature Review

A. Clothing design drawing

The clothing design drawing is a communication tool among the clothing industry departments. When a designer presents their clothing drawing to them, it must be able to precisely interpret the designer's design concept, and be able to reproduce and manufacture the clothing completely. There are some functions in the clothing drawing. According to Tatham & Seaman, its characteristics are as follows: 1. Aided creative ideas 2. Re-interpreted existing designs 3. Clear manufacture techniques and details 4. Actual size and proportion.

The clothing design drawing can enhance to depict the details of the clothing; or as a part of the creativity, it can also be used to link the original design of the existing clothing. Tatham& Seaman said, "As a designer, a clothing design drawing shows his ability in his portfolio, it is a useful technique skill, because most of commodity-oriented designers will use the design drawing to express their designs." (Shen Shuru , Min 2004) The first principle of drawing a design drawing is to be clear and precise, it will be able to convey the composition, proportions and decoration of the clothing design effectively.



Fig.3. Hand-drawn Clothing Design Source: Researcher

The clothing design drawing is mainly focuses on the exact proportions of the clothing and the human body, and it also needs to depict the details of the clothing structure that are close to the real object. In the industry, it is generally called "clothing drawing" as shown in Figure 3. "Clothing design drawing" is also known as a "mechanical drafting" in clothing education. It is an important communication tool for the clothing industry when deciding to place an order. It is not only shown in concept drawings and image boards, but also often used in

design projects in the clothing industry, such as manufacture manual or Production Plan Summary (See Fig.4), sample sheet, Product manufacturing instructions (See Fig.5) for design and marketing department to understand the styles of the season. In addition, if a designer proposed his idea to clothing industry series, it is usually necessary to attach a clear and precise proportioned clothing design drawing, which assists in explaining the design lines and details of the clothing, includes the color of the pattern. Therefore, the design drawing must accurately depict the composition of the clothes, all the details, decoration and the finishing method. In order to make a complete clothing design drawing, the designer will carefully consider each problem and solution, otherwise there will be uncertainty.



Fig.4. Production Plan Summary Source: Researcher/S.B.POLO



Fig.5. Product manufacturing instructions Source: Researcher

B. Clothing design drawing and body proportions

Before proceeding with the clothing design drawing, the first we must to understand the proportions of the human body. Kumagai Kojiro (1990) believes that we have to understand it before drawing a clothing design. As a fashion designer, the basic requirement is fulfill the creativity to establish new ideas or to break the traditional conventions. However, sometimes it is very useful to abide the existing design principles. Therefore, no matter how imaginative the source of inspiration or information to explore, the final destination must be on the human body. Tatham & Seaman believes that as a clothing designer, they must always remember that a real person to wear the clothing. Therefore, it is important for a designer to understand the structure and proportions of the human body (Shen Shuru, 2004).

C. Computer aided design and clothing design

Computer aided design (CAD) defines the use of a computer as a drawing tool to draw the graphics. The way to compose graphics on a computer can be divided into a bit-based drawing system (Paint System) and a vector-based drawing system (Cad System). Computer drawing systems can be divided into two-dimensional drawing (2D) and three-dimensional drawing (3D). Two-dimensional drawing is also called graphic drawing. Common drawing software such as Photoshop[®], CoreDRAW[®], Illustrator[®], PhotoImpact[®], Painter[®], little painter and other drawing software. The three-dimensional drawing is usually used in engineering drawing, interior design, industrial product design, such as AutoCAD[®], form-Z[®] and other drawing software.

This research is based on the vector computer CoreDRAW[®] drawing software. It does not take the point as the recording unit, but the drawing element as the recording unit. The graphics are called vector graphics. Vector drawing uses basic shapes to combine graphics. The drawing elements include points, straight lines, continuous straight lines, circles, rectangles, and so on. Each graphic shows the position, size, direction and other information of the drawing element used in the graphic. Vector graphics shows the sequence of each graphic element, and the graphics will be displayed in sequence on the screen. Each element can be copied, moved, modified, deleted, or added new graphic elements. Vector graphics will not be distorted when zoomed in or rotated.



Fig.6. Hand-drawn clothing design Source: Researcher/Felix the cat

In the traditional hand-drawn clothing design (See Fig.6), the designer needs to go through multiple steps such as depicting the outline, fabric texture, detailed structure, and coloring. The pattern relies on the finalized thumbnail of the pattern designer in order to complete a clothing design drawing, so that these processes are really time-consuming and laborious. A hand-drawing is also difficult to grasp because of the proportional size, and if you want to replace the cloth pattern or color of the same style, you need to redraw a design drawing. Besides, the differences in the drawing techniques of each designer can easily lead to misjudgments by downstream workers, such as pattern-makers and samplers, it resulting in communication delays, imbalances in the design timing of derivative products, and even loss of corporate organizations. As the scholar Chen Fen-ling mentioned, in the past, hand-drawn clothing design was time-consuming and laborious. For example, in terms of coloring, if coloring of a design draft is not smoothly, the entire artwork will be discarded, and the repeated execution will cost more. However, it's not easy to try different color combinations because you have to copy many images and try to make them in different color combinations (Chen Fen-ling, 1996). At the same time, you can't get the actual effect of the finished product right away. If a computer-aided design system is used, the design creativity can be quickly expressed in a short time, and the color and structure of clothing can be unlimitedly changed. The use of computer aided design provides fashion designers with a convenient and effective environment when designing styles.

The two major advantages of computer aided design are 1. Shorten the design time and 2. Experiment of different design ideas to achieve creative results. The use of vector graphics in clothing design includes style description, pattern design, striped flower design (See Fig.7, Fig.8), display design, catalog design, and project planning. It can also be used with Painter[®] drawing software for the design and texture of plaid fabrics, as shown in Fig.9. Such drawing software includes CorelDRAW[®] owned by Corel and Illustrator[®] and FreeHand MX[®] produced by Adobe.



Fig.7 Jacquard Wool Vest Vector Style Computer Clothing Design Drawing Source: This Research



Fig.8. Stripped Knitted Top Vector Style Computer Clothing Design Drawing Source: This Research



Fig.9. Plaid Weave Shirt Vector Style Computer Clothing Design Drawing Source: This Research

6 Results and Discussion

The clothing design drawing focuses to achieve the purpose of communication, so that no matter the designer or upstream and downstream workers, they can communicate well through a clear clothing design drawing to achieve the ultimate manufacture and sales goal. This research focuses on the men's clothing industry to explain the categories and different ways of styles in the clothing industry. Then, create a structure diagram of classified styles, and give examples to complete the clothing design plan of shirt styles. According to the style components, create a gallery to facilitate the clothing design work to fulfill the needs of the person.

6.1 Men's Clothing Size

Due to the climate, customs and culture of various places, the menswear industry develops clothing styles every season, which are mainly divided into two, they are spring and summer, autumn and winter. Generally speaking, men's casual wear size based on their height and weight, as shown in Table 1. However, this is for reference only. Because, there are some exceptions, some industries will refer to the key parts of the clothing style, such as the hip or waist size, etc. For example, for pants, the waist is used as the size. For example, 34 means that the waist circumference is 34 inches.

| Weight (kg) \ Height (cm) | 155~160 | 160~165 | 165~170 | 170~175 | 175~180 | 180~185 |
|------------------------------|---------|---------|---------|---------|---------|---------|
| 45~50 | XS | S | М | М | L | L |
| 50~55 | XS | S | М | М | L | L |
| 55~60 | S | S | М | М | L | L |
| 60~65 | М | М | М | М | L | L |
| 65~70 | М | М | L | L | L | XL |
| 70~75 | L | L | L | L | XL | XL |
| 75~80 | L | L | L | XL | XL | XL |
| 80~85 | L | L | XL | XL | XL | XL |
| 85~90 | L | L | XL | XL | XL | XXL |
| 90~95 | XL | XL | XL | XL | XXL | XXL |
| 95~100 | XXL | XXL | XXL | XXL | XXXL | XXXL |
| 100~105 | XXXL | XXXL | XXXL | XXXL | XXXL | XXXL |

Table 1. Table of Comparison Men's Clothing SizeSource: This Research

| Category | Trousers | Tops | | Vests | Coats |
|--------------------------|-------------------------------|------------------------------------|-----------------------------------|----------------------|---------------------------|
| | Elastic Waisted Shorts | Ribbed Crew Neck Short Sleeves | Ribbed Crew Neck Long Sleeves | Collared Vest | Collared Jacket |
| Style Sh structure Ca | Elastic Waisted Shorts | Rolled Round Neck Short Sleeves | Rolled Round Neck Long Sleeves | Collarless Vest | Baseball Collared Vest |
| | Casual Shorts | V Neck Short Sleeves | V Neck Long Sleeves | Hooded Vest | Collarless Jacket |
| | Casual Pants | Polo Collar Short Sleeves | Polo Collar Long Sleeves | Seam Binding Vest | Hooded Jacket |
| | Slim Fit Trousers | Polo Collar Raglan Sleeves | High Neck Long Sleeves | - | - |
| | Casual Trousers | Shirt Collar Short Sleeves | Shirt Collar Long Sleeves | - | - |
| | Elastic Waisted Flat Pants | - | - | - | - |
| | Elastic Waisted Trousers | - | - | - | - |

 Table 2. Classification of Men's Casual Clothing Style Structure

 Source: This research

The research objects are men's casual clothes, and the styles can be roughly divided into tops, trousers, vests and jackets. Each type of style is divided into various styles according to the different details of the design. There are many variations of clothing styles. The name of each style is set as the structural name of the style based on its appearance or structure style difference See Table 2.

6.2 The Construction of Clothing Styles Drawing

CorelDRAW[®] drawing software which is a vector graphics editing software developed by Corel Corporation. Initially, CorelDRAW[®] was developed and run on the Windows version. Because of its relatively low cost, now it is widely used by the clothing industry. Indeed, it has been in clothing development and design for a period of time. Currently, there is an increasing trend in clothing industries which are using similar software.

Therefore, this research hopes that clothing education can also offer such clothing drawing courses to close to the clothing industry. The following is a menswear clothing design drawing based on the basic common styles in the industry development. These style drawings are based on the CorelDRAW[®] drawing software, using the "hand-drawn tools" and "Modelling tools" in the toolbox. The classification of men's casual clothing styles, which established as a style library, See Table 3, Table 4, Table 5, and Table 6.

| Tops | | | |
|-----------------------------------|------------------------------------|------------------------------|-------------------------------------|
| Ribbed Crew Neck Short Sleeves | Rolled Round Neck Short Sleeves | V Neck Short Sleeves | Polo Collar Short Sleeves |
| | | | |
| Ribbed Crew Neck Long Sleeves | Rolled Round Neck Long Sleeves | V Neck Long Sleeves | Polo Collar Long Sleeves |
| | | | |
| High Neck Long Sleeves | Shirt Collar Short Sleeves | Shirt Collar Long Sleeves | Baseball Collared Raglan Sleeves |
| K | | | e e |

Table 3. Drawing of Men's Casual Clothing Styles-Tops Source: This research

| Vest | | | |
|-----------------|-----------------------------|-----------------------------|-----------------------------|
| Round Neck Vest | Round Neck Oversize Vest | V Neck Button Front Vest | Rolled Button Front Vest |
| | | © © © | |

Table 4. Drawing of Men's Casual Clothing Styles-Vests Source: This research



Table 5. Drawing of Men's Casual Clothing Styles-PantsSource: This research

| Jacket | | | | |
|-----------------|-----------------------------|-------------------|---------------|--|
| Collared Jacket | Baseball Collared Jacket | Collarless Jacket | Hoodie Jacket | |
| | | | | |

Table 6. Drawing of Men's Casual Clothing Styles-OuterwearSource: This research

6.3 Establishment Clothing Style Drawing Components

The establishment of clothing design drawing style svaries greatly due to different styles. The similar style structure can be combined or modified using the copy function of the drawing software to achieve the purpose of style reconstruction. In order to achieve this goal, the style can be deconstructed. The garment structure is composed of many different and single elements. These elements are collars, sleeves, pockets, front pieces, back pieces, zippers, etc. The collars can be divided into shirt collars, round collars, polo collars, etc, while the pressure line can also be divided into single pressure line or double pressure line. The details of the clothing structure can be described as numerous, for example the shirts. So that, we will create a drawing file of its style components. The drawing file can be adjusted individually according to the needs of the designer. It can also be flexibly reduced or expanded according to the mode of editing the library and referring to the current design in time. See Table.7.

| | Clothing Design Drawing | | | |
|------------------------------------|----------------------------|------------------------------|----------------------|--|
| | Components | Pressure Line Combination | Front Side | |
| Collar | | | | |
| Sleeves | | | Back Side | |
| | | | | |
| Cuff | | | | |
| Pocket | \square | A.C | | |
| Front Piece &Crimping Button | | | Color Editing | |
| Back Piece | | | Graphic Print Design | |

Table 7. Menswear Shirt Style Elements Source: This Research

7 Conclusion

The process of clothing design is complicated, no matter it is fabric sewing or the design process through paper, pen or computer drawing, it is constructed step by step throughout many details. Therefore, the clothing design drawing plays an important role in the design process, because it is clearly to show the presentation of every details of the clothing design. Today, there are diversified styles of clothing design, in order to meet the preferences of different consumers, it is often necessary to speed up the design and production process. In order to respond to changing market demands, a rapid design skills and manufacture system are important matters in the clothing industry. Therefore, this study establishes a garment style library that can not only improve the design efficiency of workers but also increase the productivity of the industry.

Due to space limited of this research, it could not present the various styles and components one by one. Furthermore, the shirt styles of men's clothing actually are more than what this research presented. However, the research will follow up the other clothing, just like women's, uniforms, or maternity clothes. The long-term accumulation of clothing designers can surely to make a comprehensive and easy-to-operate the library. The choice of drawing tools software which used in this research are CorelDRAW[®], they can be extended apply to the clothing design.

For the education, if clothing teachers can good use in computer aided design and establish a complete education gallery, it will allow learners to quickly enter the learning field and increase their interest in the cognition of clothing structure and design style changes. In addition, the researcher had tries to introduce the curriculum of clothing composition and manufacture, and do a questionnaire survey to the students about their learning needs. The results show most of them are feel very interested in this and they believe that it could improve the efficiency of clothing design. Now, What must be considered is the increase in knowledge which corresponding to the study hours, or try to combine it with general computer aided design courses, this operation might will shorten the distance between industry and academic.

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