Method of Patternmaking in Fashion Institution and Fashion Industry

Tee Tze Kiong, Elia Md Zain, Farah Najwa Ahmad Puad, Yee Mei Heong, Nurulwahida Azid

*Abstract***: There are many approaches and procedures that can be used to create patternmaking in higher education institutions and the fashion industry. Literature demonstrates that there are several methods that essentially generate patterns such as draping, flat patterns and Computer Aided Design (CAD) that include 2D and 3D applications. Many Malaysian institutions are studying patternmaking using flat pattern and draping [4], which is different from the fashion industry using CAD software. In order to produce skilled workers in the field of patternmaking, they must learn and apply the pattern-making techniques and methods well so that they do not have any problems when it comes to working in the industry or the education sector. This study describes the basic method, process and CAD software that can be used in the field of patternmaking.**

Keywords: Patternmaking, Draping, Higher Education Institution, Fashion Industry, Computer Aided Design (CAD).

I. INTRODUCTION

The fashion industry has always changed, either in terms of style, trends, designs and colours, from the days of the 90's to the passage of time and in line with the current flow. In the fashion industry, designers and pattern makers must have compatibility in design production because of the pattern makers capable of producing a pattern that is highly dependent on the idea visually conveyed by the designer and translated in the form of a clothing pattern by the pattern makers [18]. According to [1], the manufacture of patternmaking in produce garments has been used since hundreds of years ago, and so far, how to make patterns of clothing has evolved. [7] In their article on the Continent and England at the end of the 18th century, they explained that the pattern of drafting had begun. However, in order to produce clothing according to customer requirements, the designer must comply with the tastes of the customer [12]. It is supported by [5] stating that the dress is the main pillar in ensuring accuracy of the quality of the final product. In this article, the researcher outlines the method and process that

will guide students in the fashion industry or fashion institutions in the field of pattern-making. Patternmaking is the first step in the production of clothing [20] and is supported by [1]. She said patternmaking was a major step in the production of clothing and making sure the clothes produced were good for the wearer was a very important manufacturing process.

II. LITERATURE REVIEW

Patternmaking is the art of manipulating and shaping a piece of fabric to fit one or more human shape curves. According to [10] pattern-making is the process of transforming a fashion design into its constituent flat pattern pieces and them drafting them out. Patternmaking is the continuity between the design and the clothing to be made. Patternmaking is linked to fashion design and clothing making [24]. The results of the design can be translated into clothing by design interpretation into clothing. [3] Stated patternmaking is the important skill to be learned and mastered by a student. Using the technique of designing patterns of clothing depends on their suitability and there are many terms for designing the pattern. Methods that can be used to produce dress patterns either by drawing on ordinary paper, draping, flat pattern making and also using software such as Tuka Tech , Lectra, Optitex and more according to individual suitability [2].

A. Basic Pattern

The basic pattern is the starting point for the drafting of the pattern. It's a simple pattern that fits the size of the body and the comfort of the individual. In a study conducted by[24], designers create patterns of clothing in a number of ways, such as ideas, sketches or technical drawings, draping pieces of hanging fabric on a statue and rip-offs, patterns drawn from existing clothing. Finding from the study [1], there are different types of Pattern Making Practices in free hand where the pattern is drawn directly on the customer's fabric, and this method does not use pattern paper. Dress patterns are an important part of the production of clothing, particularly in the fashion industry [24].

B. Bodice Block / Block Pattern

According to [14], this is known as a basic template and there is pattern without any seam allowance. By doing the correct pattern, it will help to make an appropriate sample. Basic block consist of five parts which is front and back bodice block, front and back skirt block, sleeve blocks, front and back trousers / pants block [8].

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C. Draping

It involves the use of fabrics which drape over the dummy in or on the human body and which continue to produce clothing. The draping technique can be more accurate and more detailed to reflect the body shape of the individual. By using draping, it helps designers it see the overall design, silhouette, style and effect before a piece of clothing is cut and sewn with the actual fabric [12] and it also includes torso and shirt block [9].

D. Flat Patternmaking

Flat pattern had been introduced in Europe during 1840s and first appeared in Godey's around April 1853[7]. It involves the development of a basic pattern that focuses on comfort to suit a person or body shape. Sloper is the starting point for the design of a flat pattern. It is also a simple pattern that suits the body and is in good working order and comfort. Flat patternmaking divided into two, which is manual flat patternmaking and graphic flat patternmaking [5].

E. Computer Aided Design (CAD)

Table- 1 shows the CAD software that have been researched by researcher. Computer-aided design (CAD) is a primary tool to support the customization process [17] and a technique for drafting and accelerating fashion manufacturing processes in industry [16]. According to [18], this can also help to improve the accuracy and efficiency of the patternmaking process. As stated in [19], the CAD system will be more productive than the manual method and will quickly respond to multi-piece, multi-size orders in small quantities and by using CAD software to help students evaluate virtual prototypes and visualization skills [4]. [15] stated that CAD should be introduced early so as to motivate students to learn and enhance creativity and innovation. [19] stated that the major players in the CAD apparel companies are the USA, France, Canada and Japan. Meanwhile [25] reported that Selangor is the largest number of Apparel Company that uses CAD in Malaysia, accounting for around 67 companies. Although software is available in CAD, in some cases, pattern-making is done manually [18]. According to [3], the lack of CAD skills could be part of the problem facing the industry. That statement was supported by [23], which stated that it was difficult to hire a capable patternmaker. [20] the research that have been done that use the CAD software which is C++ Programming and gerber software, [4] 3D virtual prototype, 3D parametric & body scan, Optitex 2D/3D and pattern design software (PDS). Apart from that, in research that have been done by [12] which is focusing on 3D human body modelling, 3D garment modelling, 3D garment adjustment, 3D garment surface stretching, 3D garment construction curves, 3D surface generation, 3D surface unfolding and 2D garment pattern post- processing. [3] also using 3D body scanning and [11] focusing on 3D avatar and optitex meanwhile [25] is gerber, lectra, richpeace and tukatech. Each software have their own tool to make easier of patternmaking either in fashion industry sector or fashion institutions.

Table -1 below shows the CAD that have been researched in different countries. The latest research have been done in USA, Latvia, Bangladesh and Malaysia which is in 2017.

Table- 1 Patternmaking Using CAD by Country

	Country
Baytar (2017)	USA
Shin, Ng &Liang (2010)	USA France Canada Japan
Oppong, Aidoo &Antiage (2013)	Ghana
Tabraz (2017)	Bangladesh
Cho, Komatsu, Inui *et al* (2006)	Korea
Apeagyei (2010)	United Kingdom
Dabolina *et al* (2017)	Latvia
Zur & Syaimak (2017)	Malaysia

III. PROCESS OF PATTERNMAKING

Table-2 shows the various approach in patternmaking process based on different countries, each pattern maker will be use their own method and process to produce the pattern either using traditional methods or CAD whether in the institution on fashion industry. The most important steps in garment design is patternmaking process [6]. There are various processes that vary by country and depend on the individual to produce their pattern whether by using the process and method according to the design according to the requirement.

Table-2 Various Approach in Patternmaking Process

Country	Patternmaking Process
Australia	1. Existing Garment 2.Sketch 3.Pattern 4. Toile 5. Design Alteration 6. Pattern Alteration 7.Sample Garment.
Australia	1. Existing Garment 2. Pattern 3.Toile 4. Design Alteration 5. Pattern Alteration 6. Sample Garment
United Kingdom	1. Textile on print paper 2. Draping paper on body 3. Sketch 4. Pattern 5.Toile 6.Design Alteration 7.Sample another contemporary
Japan	1.Conceptual Idea 2.Pattern 3.Toile 4.Design Alteration 5.Pattern Alteration 6.Sample Garment
Malaysia	Step by step (flat pattern and draping)
Malaysia	1. Forecast/Trend 2.Designing 3.Final Design 4.Patternmaking 5.Toile Experimentation 6.Pattern Correction 7. Actual Fabric Cutting 8.Sewing Process
Malaysia	1. Selected Design 2.Patternmaking 3.Toile 4. Fabric Cutting 5.Sewing

General Process	General process that have been use in the industry and education line: 1. Sketch 2. Pattern 3. Toile 4. Design alteration 5. Pattern alteration 6. sample garment

IV. PATTERN MAKING PRACTICE

There are different patternmaking practices that can be produced by pattern-makers through the designer's sketches and notes. This is the common type in the fashion industry, where designers and pattern-makers are located in different locations. Apart from that, by means of a draping technique, using fabric or pattern and existing garments. Zandra Rhodes uses the printed fabric to determine the pattern [3]. Pattern-makers also create a pattern from an idea by communicating with the designer that approaches that Kawakub uses and will help their pattern-makers to interpret their design [18]. According to [22], the pattern also needs to be approved by buyers if we do it for any company. So here we can see, there's a lot of pattern-making practice, not only from the designer, but also from the client, so it helps to get more orders from the buyers [14].

V. PROPOSED METHODOLOGY

The data that have been used in matrix analysis of patternmaking is retrieved from the database which are Scopus, Science Direct, Google Scholar, Research Gate, Eric and Bera.
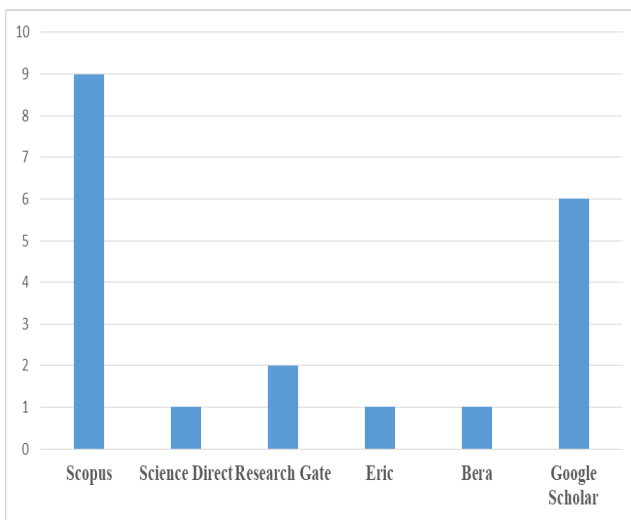

Fig. 1. Sources of Data

VI. DATA ANALYSIS

From the sources that have been research, In Malaysian institutions, there are many institutions offering fashion courses where the subject of fashion is related to patternmaking in the production of clothing. The sources that have been done which is more focusing on CAD. The CAD patternmaking in fashion institution not more been highlight compared with in fashion industry. According to data in the bar chart which that have been done by [25], there are a total of 177 companies in Malaysia that have used CAD in the SME industry. With regard to the data collected, Malaysia has the highest number of CAD applications in companies such as Selangor 67 and Kuala Lumpur 29. The main factor is

due to the increase in the number of jobs in the fashion industry growing and production company that is focused in the state. According to [20], CAD is the process tremendously fasters that can made the pattern in lesser time and also can retrieve the similar pattern which quickly perform. Apart from that, it is more beneficial in terms of labour and time savings, a large amount of data can be stored in computer ads that can also be easily forwarded to buyers [22].
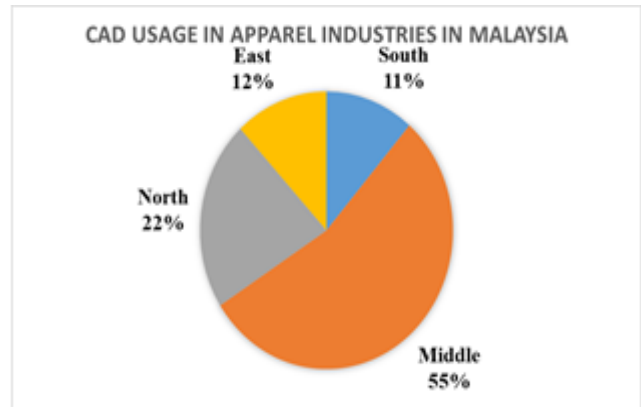

Fig.2. CAD usage in apparel industries in Malaysia

Apart from that, there are 178 colleges in public education in Malaysia offering this programme from degree level, diploma level, Malaysian diploma level (DKM), Malaysian skills certificate level (SKM) at vocational college level, Malaysian skills certificate (SKM) in fashion and dress-making, and Malaysian skills certificate (SKM) in pattern cutting garment production at Giatmara. There are six universities offering degrees and diplomas, two in polytechnics and one in Kolej Kemahiran Tinggi Mara (KKTM), and sixteen community colleges (KK), eighteen in vocational colleges (KV), five in Institut Kemahiran Belia Negara (IKBN) and a total of 130 branches in Giatmara.
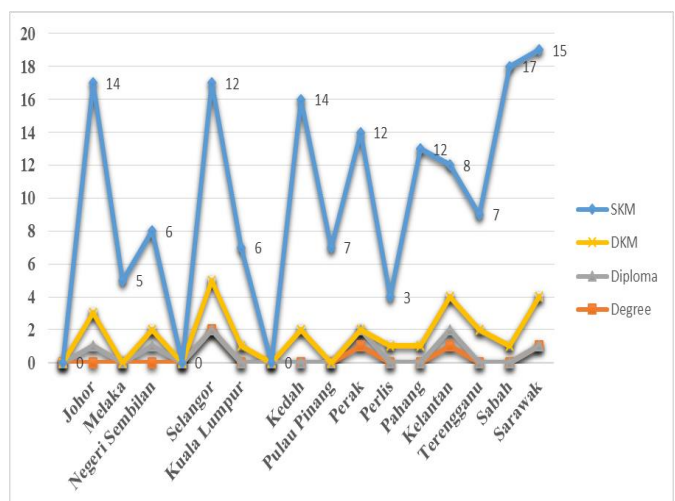

Fig.3. Patternmaking in Malaysian educational institution

5402

VII. DISCUSSION

From the data retrieved by the various sources, USA is the most common country preferred by researcher to gain their data regarding CAD in patternmaking process. With the increasing usage of CAD in patternmaking process, there is also an increase in CAD software used by the country to provide better choices which is easier to be used. Lectra, optitex and gerber software in CAD the highest software used in the fashion industry among the nation's top data rankings in the US, but in the clothing sector in Malaysia, as found by [21], not overall in Malaysia using this software, it may be because they lack information on the advantages of CAD where it helps speed up the process in clothing making can also be faster in manufacturing operations, less labour-intensive and lower costs in terms of sampling costs and not only speed up the process but also reduce material costs and labour intensity [6]

But although software is available in CAD, in some cases pattern-making is done manually [18]. The lack of CAD skills could be part of the problem faced by the industry, and this statement was supported by [23] but in fashion education in Malaysia, not all institutions are using this software because of the expense of obtaining software that the institution may not be capable of, and the manual process is still used in the production of clothing pattern-making, such as by referring notes that they will following the guidelines, flat pattern and draping. guidelines, flat pattern and draping.

VIII. CONCLUSION

In this paper, we proposed methods to be used in patternmaking. It is clear that there are many methods for designing patterns of clothing in both industry and educational institutions, either by traditional methods or by CAD. In the fashion industry, many have used CAD methods to produce patternmaking. However, the poor application at institutional level may be due to the high cost of obtaining such software. It may be necessary to find another alternative to help students better understand the importance of pattern-making in education, and it may be necessary to find another alternative to help students better understand the importance of pattern-making approaches and procedures so that they do not have any difficulties working in the industry or in the education sector.

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Tee Tze Kiong was born in Melaka, Malaysia on the 25th of April, 1979. He obtained his first degree in bachelor of technology with education (civil engineering) at the Faculty of Education, Universiti Teknologi Malaysia, Skudai, Johor, Malaysia in 2002. In 2003, he completed his Master's degree in technical and vocational education at University Teknologi Malaysia, Skudai, Johor, Malaysia. At the year 2013, he obtained his Ph.D. in technical and vocational education at Universiti Tun Hussein Onn Malaysia, Batu Pahat, Johor, Malaysia. His Ph.D. research focuses on higher order thinking skills and Buzan Mind Mapping. His working experiences include; secondary school teacher, subject matter expert, e-tutor, e-grader, proctor for final examination at Open University Malaysia, industrial practicum supervisor, undergraduate project, master and Ph.D. thesis supervisor, undergraduate, master and Ph.D. examiner, subject matter expert and examiner in Technical and Vocational Education courses, professional consultant for Multiple Intelligent Tests and Learning Styles Inventory, instrument construction workshop, senior lecturer and head of department of Engineering Technology at Sultan Idris Education University. Now, he is a senior lecturer in the Department of Professional Education, Faculty of Technical and Vocational Education, at Universiti Tun Hussein Onn Malaysia. Current and previous research interests are thinking skills, thinking tools, self-instructional modular approach, learning styles and inventive problem-solving skills. He is a member of Universiti Teknologi Malaysia Alumni, Universiti Tun Hussein Onn Malaysia Alumni, Malaysia Technical and Vocational Education Association and TRIZ level I instructor.

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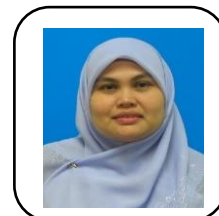
Nurulwahida is senior lecturer at the Universiti Utara Malaysia. Seven years ago, she was teaching at MARA Junior Sciences College. Now she is the Head of Curriculum and Instruction unit. Nurul's researches mainly focus on the effectiveness of interactive application, enrichment module and interactive module using psychology elements (multiple intelligence, thinking intelligence, higher order thinking skills, decision making skill and problem solving) across curriculum and instruction. Her latest research is about higher order thinking skills in School Based Assessment and the development of interactive application (smart i-think) for teaching and learning science in secondary schools. She has received several awards for her research output from International exhibitions.

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5404

Among them are Silver and Bronze awards for Malaysian Multiple Intelligence Finder, Gold and Silver for Hisbah Refleksi Al-Nafs. In addition, she has also obtained copyrights for the two research output from two national research grants. The latest achievement is 'Special Award for innovation in teaching and learning' awarded by Universiti Utara Malaysia. She has successfully completed 11 research grants since 2011 and is now working on three ongoing research grants. She is at present involved in publication and research using pre-experimental research design, true experimental research design and quasi experimental reseach design. Currently, she is also a member of the Language Editorial Board for a Scopus journal, International Journal of Instruction, Turkey.

5405