

# AN APPROACH TO DEVELOP CREATIVITY BY UNDERSTANDING STRUCTURE IN FASHION DESIGN EDUCATION

## MODA TASARIMI EĞİTİMİNDE GİYSİ YAPISINI ANLAYARAK YARATICILIĞI GELİŞTİRMEYE YÖNELİK BİR YAKLAŞIM

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### ABSTRACT

There are numerous approaches that can be considered for analysing structure in fashion design. In order to create something new, a move away from conventional generic shapes toward more interesting structures is a necessity. The purpose of this study was to investigate an approach to the design process that could facilitate the understanding of structure as a fundamental component of fashion design and support students' development in creativity with structurally interesting garments. By developing a concept based on nature using 2-dimensional visual source material, drawing, collage, and experimental research development in the form of a sketchbook, a group of students from Department of Fashion Design who joined the project, were encouraged to make a rational analysis of the structural elements at their disposal. By executing a series of exercises aimed at exploring structure, students were observed to make a gradual progression from 2-dimensional research through design development, to 3-dimensional garment construction. In conjunction with the idea of structurally interesting designs, fabric choices, pattern making and garment construction were also considered. Each step from 2-dimensional exercises to garment construction was recorded as visual and written documentation. Additionally, a questionnaire was developed to receive student opinions and feedback. As a result, configuration of the design exercises and the project setup has been identified as an encouraging approach both to develop students' understanding of structure in fashion design and for the development of creativity in 3-dimension.

**Keywords:** Fashion design, education, garment structure, creativity, design process

### ÖZET

Moda tasarımında giysi yapısını inceleyen farklı yaklaşımlar bulunmaktadır. Geleneksel ve standart formlardan uzaklaşarak, farklı giysi yapılarına yönelmek, yenilikçi tasarımlar için bir yöntem olarak önerilebilir. Bu çalışmada; moda tasarımının temel öğelerinden birisi olan giysi yapısını anlamaya ve bu bağlamda, moda tasarımı öğrencilerinin yaratıcılıklarını geliştirmeye yönelik bir tasarım süreci incelenmiştir. Moda Tasarımı bölümünde bulunan bir grup öğrencinin katılımı ile gerçekleştirilen bu çalışmada, doğa teması doğrultusunda, öğrencilerin iki boyutlu görsel kaynaklar, çizimler, kolaj ve deneysel tasarım araştırmaları ile, farklı yapısal öğeleri analiz etmeleri sağlanmıştır. Proje kapsamındaki uygulamalar sonucunda, öğrencilerin, tasarım araştırmasından, tasarım geliştirmeye ve üç boyutlu giysi yapımına kadar, gittikçe artan bir gelişim gösterdikleri gözlenmiştir. Çalışma kapsamında, yapısal açıdan yaratıcı tasarımların yanısıra, öğrencilerin kumaş seçimleri, kalıp geliştirme ve giysi oluşturma aşamaları da incelenmiştir. Proje boyunca öğrencilerin tüm süreçleri görsel ve yazılı olarak kayıt altına alınmıştır. Buna ek olarak, öğrenci görüşlerini alabilmek üzere, çalışmaya katılan tüm öğrencilere bir anket uygulanmıştır. Çalışma sonucunda; geliştirilen uygulamaya ait içerik, kurgu ve akışım, öğrencilerin moda tasarımında giysi yapısını anlamalarını kolaylaştırarak, üç boyutlu yaratıcılığı geliştiren bir yaklaşım olacağı önerilmiştir.

**Anahtar Kelimeler:** Moda tasarımı, eğitim, giysi yapısı, yaratıcılık, tasarım süreci

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### 1. INTRODUCTION

In order to create something new in fashion, a move away from conventional generic shapes toward more interesting structures is a necessity. In the 20th century, research on new cutting technologies and materials intensified, and new

structural forms appeared [1]. Designers reinterpreted the structure of garments on the body such as body conscious cuts by Legere, biomorphic structures by Kawakubo, the deconstructed approach of Margiela, or intricate pleating by Miyake [2,3].

Various approaches exist to learning in fashion design. These approaches include strategies that focus on the product, process of design, and concepts [4]. Jones (2002) and McKelvey and Munslow (2011) offer a comprehensive overview of fashion design education touching on all areas of the design process while offering an insight into various approaches to project briefs, pattern making and construction [5,6]. The link between the design development and the construction process remains vague, with little reference to the significance of the construction process to the final design outcome.

Kim (2014) proposes a solid fashion design education method with consideration for three-dimensional modelling [1]. Zaman (2014) explores the fashion process from research to garment production by proposing a simplified step-by-step introduction to creative and complex pattern making while encouraging the exploration of creativity by examining the relationship between the fabric and the three-dimensional form of the mannequin. It offers some predetermined sub-trends to guide the reader, namely Architecture, Natural Forms and Origami, but the focus is primarily on pattern cutting and not on the interpretation and development of concept ideas into 3-dimensional (3D) outcomes [7]. Another interesting research by Workman and Lee (2004) examines the effects of culture and training on the performance of spatial tasks and visual thinking through the administration of a Paper Folding Test and an Apparel Spatial Visualization Test to students from two cultures [8]. Hardingham (2016) analyses the pedagogy connecting fashion students' understanding of pattern making and garment construction by implementing a project as an alternative novel approach for students new to pattern construction. In this project, students are asked to transform 2-dimensional material into a 3-dimensional garment, creating unconventional shape and form. The project is considered as an alternative means of creating interesting shape, silhouette and form within a garment without in-depth pattern making and construction knowhow [9].

Currently, academics face a climate of academic programme restructuring for fashion-related curricula [10]. As stated by Black, et al. (2015), "Most educators would agree that the development of creativity is a crucial part of an apparel design curriculum and an essential component in the success of students. ...The formal study of creative behaviour in apparel design has been limited to a lack of

models and strategies specific to apparel design" [11]. Considering this, it is seen as an important contribution to develop methods and models of teaching in fashion design education with contemporary cases within the current globalised conditions of the fashion industry and fashion business. In this study, an application of new teaching methods for developing structural creativity in fashion design was conducted.

The main objective of this study was to understand structure in fashion design, to develop and analyse a process to assist university students with the creation and production of structurally interesting garments. The detailed research questions were set based on a project processes for university students studying fashion design:

1. How critical are research development techniques and sketchbook preparation in helping students envisage and extract creative ideas which can be subsequently interpreted as structure in fashion design?
2. Do 2D and 3D design development exercises facilitate an easier transition to pattern development and final garment construction?
3. Can the design and development of unique fabric surfaces assist students in creating more interesting design outcomes?
4. By eliminating superfluous design elements, such as colour and decorative finishing, does it encourage students to compensate by being more creative with developing their own fabric surfaces, and/or by creating something new with structure in the garment?

#### Understanding structure in garments

As a 3-dimensional entity, a garment is composed of various parts which interact with the wearer's body when the garment is worn. A garment can be classified according to different approaches to structure as basic silhouette, garment parts and fabric (Figure 1).

- **Basic Silhouette:** The overall shape or silhouette is the first noticeable feature of the design, and can be viewed from all angles. The silhouette is normally determined by current fashion trends, and can be used to emphasis, accentuate, support or conceal particular parts of the body [5,12].

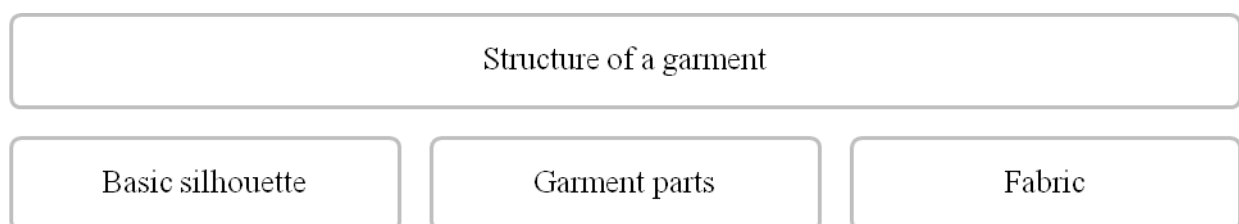


Figure 1. Structure of a garment

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- **Garment parts:** The overall shape is comprised of various sections as determined by the cut. The cut of the garment is denoted by the seams and the darts which create the line in the garment. Line can create a variety of different visual effects depending on placement. Proportion is also determined by the line placement, in combination with the other key design decisions such as the length, waist placement, neck width, sleeve choice, and numerous other design details [5]. In a dress, the bodice and skirt comprise the main part of the garment, where usually, seams and darts are utilised to create structural variations on the basic blocks. In addition, a variety of design details can be employed to add volume and 3D structures to the basic shape, common examples of which could be gathered inserts, layers, pleats, and folds. Collars are an extension of the bodice, and are applied as an additional 3-dimensional structure, creating different planes on the garment. Sleeves are not an essential design feature but can complement a garment, or become an underpinning feature of the overall style. Proportion and style can vary enormously from petite cap sleeves to exaggerated kimono sleeves. Other more functional design details such as pockets, belts and fastenings also offer additional structural possibilities [12,13].

- **Fabric:** Another fundamental component of any garment, which influences structure is fabric. Texture on a fabric surface is determined by the weave, knit, or pile and different techniques can be applied to change the visual and physical texture of a fabric. Furthermore, various techniques can be employed to create more 3-dimensional complex structural textures on the fabric such as shibori, tucking, smocking, and shirring. Incorporating structural fabric manipulations into a garment design can add an additional dimension and visual texture to the overall dynamic of the design.

## 2. PROJECT PROCESS

In order to develop a pedagogic approach to increase students' creativity by using structure, a student project was realised with 18 beginner level university students in the Department of Fashion Design.

### 2.1 Project brief: Structure in Nature

The project brief aimed to enable students to understand complex construction in fashion design through research into structure in nature utilizing visuals, sketching, 2-dimensional and 3-dimensional research methods. The project endeavoured to develop different approaches to design development, pattern making skills, and sewing knowledge for a specific product family.

Nature was selected as an appropriate inspiration source for the project. The extraction of good design and function from nature is called biomimetics or biomimicry. Using nature in this way, biomimicry forms part of a growing trend towards multidisciplinary design practice and thinking [14]. Entomology, or the study of insects, was elected as a starting point. The structure of the insect anatomy offers a diverse range of shape, pattern, and texture, which can be drawn upon as inspiration, and is more compatible with the

human form than geometric forms derived from architectural sources, for example [15,16]. Since project was developed for beginner level students, there could be many opportunities to discover through nature, and specifically from insects. Students conducted an in-depth research before focusing on one particular insect of their choice. Concurrently, students were asked to research the stipulated product family, the little black dress (LBD). Christian Dior stated,

"...Colour cannot transform a failure of a dress into a success: it merely plays a supporting role in a cast where cut is the star performer." [17]

By restricting the colour palette, interest could only be created by carefully deriving interesting structure and cut ideas from their individual inspiration sources. Fabric selection and development also became critical. LBD was not discussed in-depth as a fashion concept or from a historical point. The inclusion of LBD in this project aimed solely to focus students on structural creativity with silhouettes, garment parts and fabric as given in Figure 1. Considering that students were beginner level students, they were not asked to design elaborate full length evening dresses since their technical knowhow would have been limited for such dress construction methods. Within this context, LBD was an appropriate match for the project.

Additionally, through this aim, the project outline also avoids other parameters such as costing constraints, target markets, or brand consideration. This was a conscious decision to focus students solely on structure and cut.

### 2.2 Project realisation

The project was realised in a series of clearly defined steps over a period of 5 weeks to enable students to explore the concept as thoroughly as possible from a structural perspective:

- Sketchbook research development
- 2D design development through collaged paper structures
- 3D design development through experimental paper structures
- Fabric surface design
- Sketching for design development
- Product realisation / pattern development and sewing

### 2.3 Project evaluation

Contribution of the design exercises to students' creativity was evaluated from different perspectives. Students' progress and the final products were evaluated by the instructors teaching the fashion studio, and their opinions on the process were recorded. Through the project, personal communications with students were noted on a daily base. Other instructors' comments were also considered as input for the evaluations of this project.

As another perspective, students' feedback was collected by before- and after-questionnaires. The first questionnaire was conducted before commencing the project, when introducing

the topic to the students. Some main issues observed by the instructors throughout the project, which were also covered by the questionnaire were defined as; the importance of research development to explore their ideas for structure in design, the difficulty of analysing and developing 2D inspiration (source imagery) to 2D design solutions (fashion sketch), and to translate ideas from 2D (fashion design sketch) to 3D (finished product), and whether limited drawing skills and a lack of in-depth knowledge of construction limited creativity. Besides, students' preference of whether to develop structure ideas through drawing designs or making 3-dimensional experiments in paper or fabric was explored. The questionnaire also included a selection list for the most important stages of the process for students when developing a structurally complicated design.

The second questionnaire, which included additional questions, was conducted on completion of the project. Additional questions in this part mostly investigated students' evaluation on their individual learning process and the tasks in the project brief such as;

- how useful their research development was to explore ideas for structure in design,
- to what extent the 2D small scale paper experiments helped to develop garment construction ideas,
- to what extent the 3D paper experiments on the mannequin helped them to develop garment construction ideas,
- choice of fabric selection and designing their own fabric surfaces in relation to the creativity of final product.

This part of the questionnaire also examined whether the parameters set in the brief, such as a restricted colour scheme/product family made it more difficult to design for students. Finally, students opinions were collected as a general outcome of the project process on how useful this whole process had been to develop structural creativity.

Students were informed that the questionnaire was a part of a research into fashion design education aiming to assess study methods. Questionnaires were distributed in print-out copies and remained anonymous. Since the total number of students was limited, results were evaluated in combination with other visual and written documentation in order to investigate student tendencies and development progress. 10-point-ratio scaling was used for questions with additional 3 yes/no questions and 5 multiple-choice questions.

The given items included in the questionnaires were also the main focal points for the instructors who collected information from students by analysing their process and final products.

### 3. RESULTS

Projects outputs were evaluated through each step of the project progress as given in Section 2.2. This includes personal communications with students, observations through students' progress, feedback from academic personnel and questionnaire results as anonymous feedback from students.

#### 3.1. Sketchbook research development

After the initial research, students worked on developing ideas in a sketchbook. A spread from a student's sketchbook is shown in Figure 2. This process for investigation and presentation of ideas was self-directed with students using line drawing, pencil rendering, and collage to explore ideas accompanied by a written analysis.

For some students, the fear of free-hand drawing can hinder the actual process of designing. Therefore, exploring different techniques to extract ideas enabled students to approach the design process in a more relaxed manner. Although developing design ideas in a sketchbook is a typical practice for fashion education, what was specific in this approach was to encourage students to identify their preferred method of research exploration. It was seen that choosing their preferred method helped students to communicate their design ideas more methodically.

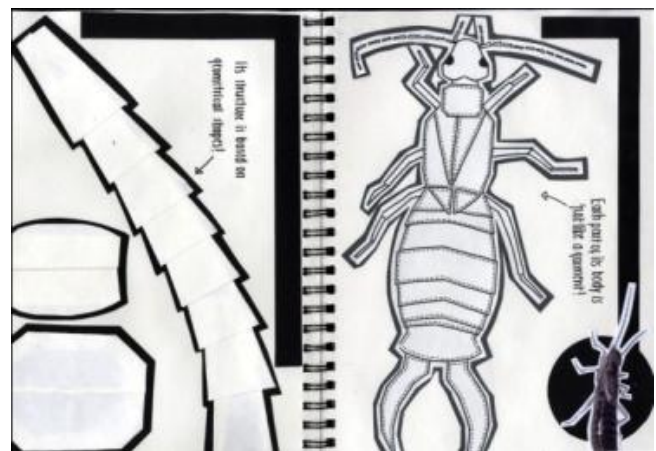


Figure 2. Sketchbook research development

Using the internet and fashion magazines, students researched contemporary examples of LBD including silhouettes, cuts, detailing and fabric choices. This research showed students limitless possibilities in terms of structure in a garment, which is often construed as a classic product. Prior to the project more than half of the students (61%) disagreed that the key to a successful design is, in-depth research, whereas questionnaire results on completion of the project showed that students had changed their ideas in a more positive manner (41%) and claimed that this research provided inspiration for creative structures as silhouettes, details in garment parts or fabric manipulations.

#### 3.2. 2-Dimensional paper structures

Students were given basic mannequins printed on an A4 page (Figure 3). By supplying the figure, students were able to work to the exact proportions. They were then instructed to analyse the apparent structures visible in their chosen insect, and to interpret these ideas into preliminary shapes for garment design with collaged white paper. Students could interpret and extract ideas from their source material in any manner, but the following was communicated as a suggestion to begin the process (Figure 4).

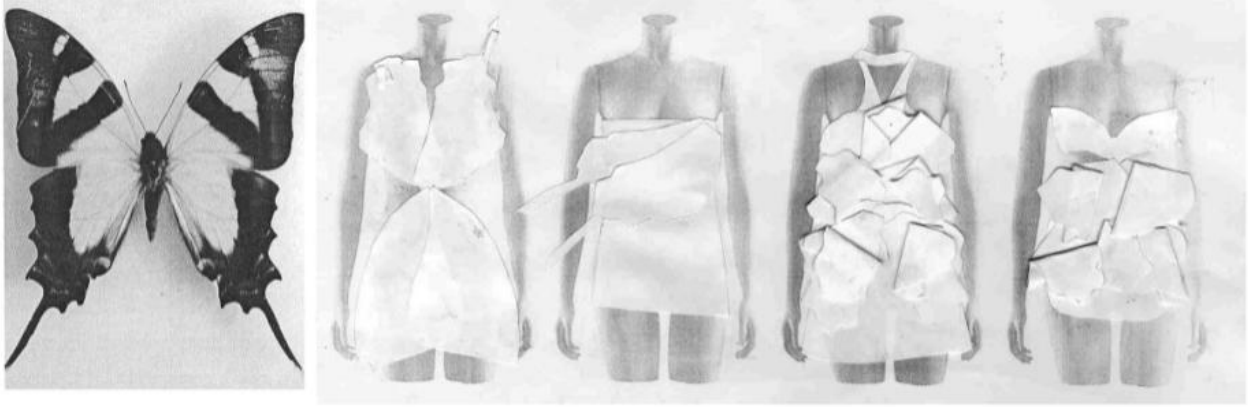


Figure 3. Collaged design development

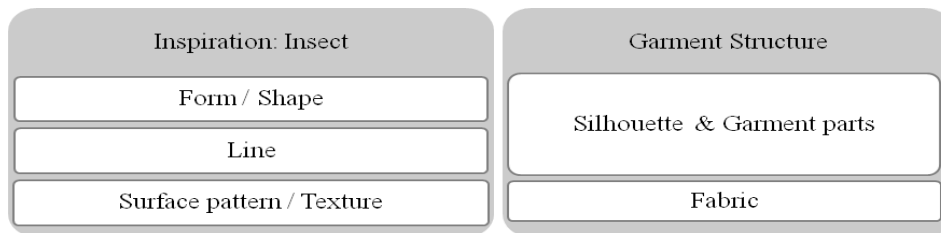


Figure 4. Suggestions for students to develop various design avenues

Students were encouraged to disregard the traditional basic form of the dress but instead to focus on experimental construction by taking risks and emphasizing the essence of the inspiration source to create interesting design ideas.

Often students had struggled to grasp the concept of seams and darts as a fundamental component of the overall structure of a garment. By placing the pieces of paper on the mannequins in an arbitrary manner determined by the original structure of the insect, the students were in effect, inadvertently creating seams and darts. They were also creating designs uninhibited by the pre-determined notions of garment construction. This ability to experiment with shapes on the body without immediate concern for fit allows some freedom to develop creativity before considering the 3-dimensional complexities of the human body. At the end of the project, most students claimed that 2-dimensional small-scale paper experiments enhanced significant inspirations to develop structurally interesting garment construction ideas.

### 3.3. 3-Dimensional paper structures

On completion of the 2-dimensional design exercise, students selected their two favourite designs before transferring their ideas to 3D full scale proportions on a tailor's dummy. To maintain a sense of fun, and to engage the students in the concept of experimental design, this exercise was to be completed using only paper.

Paper does not have the same flexibility as fabric, however, it could be easily and quickly cut, folded and attached to the mannequin to achieve experimental structural compositions. Its rigidity proved beneficial when manipulating 3D shapes, permitting the creation of structures unattainable in fabric without substantial amounts of support from fusing or

boning, for example, and it could be easily removed and rearranged into numerous structural compositions. Each successful structural configuration was photographed as a reference to be developed further during the subsequent sketching process. An example from a student's work is given in Figure 5. Based on students' feedback from questionnaire results, some students remarked that the exercise helped to create new forms, but didn't help for the pattern making process. However, other students also mentioned that paper structures absolutely helped while making their patterns and it constituted the most important parts of the dress, and used the same structure in the pattern.



Figure 5. 3D paper structures on the mannequin

### 3.4. Fabric Surface Design

Although the colour scheme was predetermined as black, to fulfil the requirements of the LBD, it was still possible to create different visual textures by choosing different fabric



qualities. Students were asked to design and produce an original black fabric surface based on the structure and texture apparent in their insect (Figure 6 shows an example from a student's work). On completion, students were asked to consider how their fabric manipulation might be integrated in to the final garment design while complimenting the existing structural design.

Most of the class rated their choice of fabric selection positively in relation to the final product. The fabric design exercise offered the students the possibility to create their own unique fabric. Some students utilized these fabrics within their final garment as a crucial component of the overall design. It can be concluded that instead of using mass produced fabrics, encouraging students to create their own custom made fabric surfaces increases creativity, which can also be linked to structural detail.

### 3.5. Sketching

The design development process was further expanded through sketching (Figure 7). Students were asked to develop design variations from the 2D paper structure exercise and from the 3D photographs. Working in this manner proved beneficial when determining the overall shape, length, and the placement of seams, darts, structural details, and functional design details such as belts, pockets, and fastenings, as the student had a practical reference point.

### 3.6. Product realisation

The production phase of the final garments included three steps; pattern development, toile production and final garment. Since students were aiming for an interesting structure, they were encouraged to do trials on the mannequin; however, it was observed that students mostly

used a collaborative approach of draping and flat pattern making. To simulate the final garment and to make a fit trial, all students were asked to prepare a "toile" – a mock-up of an actual garment so that they could understand the 3D elements of their design. During this phase, students decided on fastenings, proportions with the real body, and exact placement of style lines. On analysis of the first toiles a variety of problems became evident, relating to both design and technical issues relating to cut, fit, design details, and fabric selection. Therefore, draping and toile preparation were observed to be critical phase in the overall final garment development.

Student perception with regards to structure is mainly based on creating a rigid structure by using wires, bones, fusing or similar support materials. However, even with limited technical knowhow, most students created interesting shapes by using sophisticated garment construction techniques inspired by their 2D and 3D paper exercises.

After the project, 83% of students claimed that a successful design requires in-depth knowledge of construction. This was important to attract student attention for technical courses and encourage practice for construction in order to develop structurally interesting designs.

### 3.7. Overall process analysis

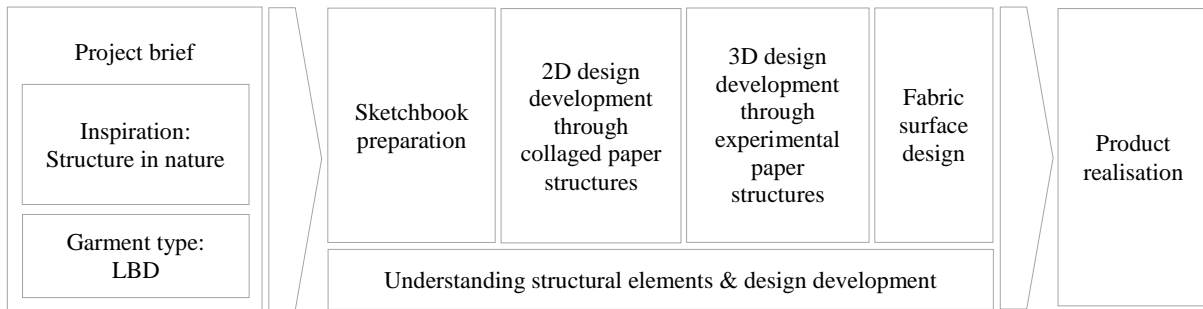
The teaching methods explored in the given approach was seen to facilitate the understanding of structural elements as a fundamental component of fashion design and support students' development in creativity with structurally interesting garments. The main items to be investigated in the process are given in Figure 8.



Figure 6. Fabric manipulations



Figure 7. 2D fashion sketches based on 2D paper exercises and 3D photographs



**Figure 8.** Methods assisting in this approach

Evaluating all students' final garments, it was seen that students developed creative silhouettes and garment parts with the help of this approach even though they are beginner level students. Instead of interpreting the shape, line and textures of their inspiration source directly to final products, they could come up with creative ideas as a silhouette, seamline or cut of the garment as seen in progress given in Figure 9. Besides these, Figure 10 illustrates some details from student works as 3D decorative attachments, structural elements as pleats, straps or added collar sections.

It is observed that students benefit from sketchbook preparation when exploring ideas of structure. However, results showing student tendency to transfer 2D inspiration (source imagery) to 2D design solutions (fashion sketch), and to translate ideas from 2D (fashion design sketch) to 3D (finished product) are not clearly perceivable. Similarly, positive and negative results for a potential benefit of 2D and 3D paper exercises for garment construction ideas show variety.

Before the project, even though more students were thinking that the restrictive parameters related to colour scheme and

product family would make it more difficult to design, after the project more students believed that this did not restrict creativity.

Before the project, when students were asked whether they would prefer to create a technically perfect basic garment or a structurally interesting experimental design, 61% claimed that they would prefer structurally interesting experimental design. However, this percentage increased to 83% after the project. It is believed that the project encouraged students to experiment on a structurally interesting garment design through a step-by-step structured approach.

Considering the stages of the process when developing a structurally complicated design, before the project application, half of the students suggested that all processes are important; however, 44% of the students marked pattern development process as the most important stage. On completion of the project, perception of the importance of various process stages altered (as seen in the second pie chart), which indicates a realisation that design development and this overall process is critical for students' creativity, which was supported through the suggested exercises in this approach (Figure 9).



**Figure 9.** A student's progress from 2D paper structure to final garment



**Figure 10.** Some details from final garments of students



Figure 9. Change of allocations of students' perceived importance for steps before and after the project

#### 4. CONCLUSIONS

In this study, a beginner level fashion design project was applied and evaluated; some notable results were found useful for student development and could prove beneficial for similar student projects.

The choice of theme is critical, in this example, the insect's anatomy offered numerous structural inspirations to be interpreted as garments. Likewise, the step-by-step structured approach to the project brief encouraged students to identify their preferred method of research exploration and development, which lead to stronger garment designs. Limiting the parameters of the brief (in this case, the colour) enabled students to focus on other points such as structural creativity, this could be a potentially useful design project strategy to focus beginner students. This process also helped students to refine their designs in a logical manner and reduced literal interpretations of the insect structure that could potentially result in designs more akin to costume.

The initial 3D experimental paper exercises on the tailors dummy produced interesting paper compositions with no immediate concern for fit, this approach could offer freedom to develop creativity before considering the 3D complexities of the human body. Although the 3D design development exercise did not seem to facilitate a transition to pattern development and final garment construction, this approach

did help students visualize 3D ideas for garment construction. In this respect, applying such a project is seen as a visionary approach for beginner level students in fashion design to develop their creativity and technical skills.

A reoccurring problem relating to design arose with students' failure to treat the garment as a three dimensional entity in the production stage. Functionality and wearability were often overlooked. Working 3-dimensionally enabled students to envisage a garment from all sides, something that is unattainable in a sketch.

Creating experimental structural patterns facilitated the creation of structural silhouettes without supporting materials such as wires or boning. However, a lack of understanding of the body as an organic form in comparison with the rigid solid form of the tailor's mannequin also caused problems.

This design project outlines in detail the project processes and outcomes for a beginner level fashion design project, and is of value due to a lack of applied and theoretical literature in this field. The results can be used in fashion design education development to assess course content, study methods, and knowledge transfer, and can help improve the syllabi and curriculum. It should be noted that since this is a small-scale local study, some of the findings may not be transferrable to other academic education settings.

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