

IS THERE A ZERO WASTE IN A FASHION DESIGN?

Māra BINDE¹ and Aija FREIMANE²

¹Art Academy of Latvia, Latvia

²School of Art and Design, TU Dublin, Ireland

ABSTRACT

Each year around 400 billion m² of textiles are produced in the world in the linear economy. About 15% of the fabric used to make clothes end up in the waste during the cutting process. Although there are a number of recycling initiatives in the fashion industry towards circular economy, the application of zero-waste principles in fashion design practice and production are only solitary cases.

Traditional fashion education methods emphasise the primary satisfaction of the designer's ambitions and there is a myth in fashion design that it is not possible to produce aesthetic clothing of any silhouette, assortment, and size with zero-waste principles. The work process is considered time consuming and too complicated.

This paper analyses zero-waste fashion design learning-teaching square assignment method, its challenges and opportunities to help students to practice the form and style, technological and prototyping towards sustainability in fashion design.

The analysis shows the purposefulness of the constraints in the experimental fashion design process and reveals the importance of missing skills, as well as prejudices of using zero-waste principles versus traditional fashion design technologies. Developed zero-waste fashion design learning-teaching methods are an alternative educational paradigm that provides students with knowledge and skills towards real sustainable revolution in fashion design and production.

Keywords: Zero-waste fashion design, sustainability fashion

1 INTRODUCTION

Over the past two decades the fashion industry and research community have become increasingly aware of the scale of the fashion's environmental problems [1] the linear economy – the 'take-make-use-dispose' model of production and consumption – date from the Industrial Revolution, considered an unsustainable [2], as the dominant approach in the fashion design education. The challenge for the fashion industry is transition towards circular economy practices [3]. Fashion design pedagogy asks the students to create a product assortment based on their unique vision of living or dressing, in a top-down design process that rarely starts from ecological considerations of the raw materials or sites of production [4]. Addressing the circular economy requires a new focus on the knowledge, skills and competencies required to create sustainable production and consumption [5].

As designers facilitated development of the linear economy, the paper discusses the method of the zero-waste fashion production cycle. Some existing practice theories suggest that appropriation (the use of goods and services to accomplish personal and social practices) and appreciation (the symbolic, communicative, and aesthetic aspects of consuming) are important processes [6] in practicing sustainability. Young designers must be sustainability literate; however, the fashion industry is reluctant to engage in sustainable design [7]. It is argued that changes in the design thinking and practice should occur if education for sustainable development is thoroughly embedded in the design curricula. Material efficiency is one of the principles that can be applied in designing and production cycle. Hence, this paper argues for a particular fashion design assignment by applying total zero waste methodology, namely, square of the fabric.

Fashion design education teaches the theoretical knowledge and practical skills of the design process, which are manifested through the application of the style, shape, materiality, colour radiance and pattern elements of a trendy item in fashion design. The silhouette and cut lines that define the fashion image, its style and attributes that tell the story of the fashion design collection, are very important. Designers are playing key role in converting clothes into the fashion [8]. The paradigm of the new,

sustainability approach is a change in attitudes and priorities regarding the fashion design process, changes in the thinking process that amend the sequence of actions and permit to stop using fabric waste in the fashion design process. The task of the fashion education is to nurture a sustainable attitude in the future designers, to develop knowledge and skills that help to develop an ethical understanding and the skills of practical application [9], and to make zero waste fashion design as an integral part of life by integrating it into everyday work. Students with a fresh view and creative approach are the real messengers of the new age, which is unthinkable without gentle attitude towards the environment and its inhabitants. Traditionally, the steps in the clothing design process are definition of the idea, identification of the problem, depiction of the image, technical drawing of the design, selection of fabrics, selection of the processing technology, manipulations with the dress-pattern modelling, development of the design pattern. Each step can include choices in favour of sustainability [10] if the fashion design process is implemented for an aesthetic as well as an ethical end product that points to the crucial importance of the designer's understanding, responsibility and craftsmanship [11].

This research uses an evaluative case study approach to demonstrate how zero-waste fashion designing assignment is embedded in the fashion design teaching programme and what impact it has on the students' development. In examining the teaching practice across a selection of the undergraduates it is argued that application of the zero-waste approach to the curriculum design can promote fashion innovation and stimulate deep learning. It proposes a method for the education for sustainable development in fashion design curriculum and identifies frameworks required for the transition towards embedding sustainability in the fashion education.

2 METHODOLOGY AND METHODS: THE PURPOSEFULNESS OF THE RESTRICTIONS IN TASK SQUARE

Specific restrictions of the square assignment help to reveal the missing knowledge and skills in education for sustainability in fashion design and to develop an understanding of the consistent patterns and the ability to identify them towards circular economy. For students, the assignment is a mind exercise through empirical experience that develops design thinking, the ability to see the clothing production process in a contextual perspective, provide the understanding and skills needed for professional work.

Why the square assignment? The use of the full-width fabric is well known in the fashion history. It has long been used in the manufacturing of Japanese kimono and Indian sari, ancient Greek Chiton and many other historical clothing, as well as traditional folk costumes. Timo Rissanens identified five fashion creation methods - the traditional "Cut & Sew", "Full Fashioned", "Jigsaw" puzzle and sustainable clothing design methods Cradle to Cradle and A-POC [12]. The Jigsaw puzzle method is a version of the "Cut & Sew" sewing method, where the cut-offs are joined together along the length of the fabric like pieces of a puzzle, so that no waste is created and the pieces of garments fit together in one layout. This method of cutting can be seen in the traditional folk costumes of various nations, also in everyday clothing until the Industrial Revolution in Europe [13]. Assortment restriction helps to focus on the silhouette, shape and size of a particular part of the body. In the process of generating ideas, changes in the sequence of actions cause stress and confusion and change the way we think. The steps of the traditional clothing design process during the prototyping stage - depiction of the image, technical drawing of the design, selection of fabrics, selection of the processing technology, modelling and manipulations with the cut lines, development of the design pattern must be planned simultaneously. The tools of lateral thinking are incorporated in the square assignment - the challenge, focus, concept and direction [14]. Creation of clothes without clippings is already a challenge as pre-prepared pattern blocks can be changed, trim details, fabric direction, pattern placement and other conditions must be envisaged and an understanding which of them can be changed, while maintaining the focus on the implementation of the idea in the fabric, without clippings, should be faced. The analysis of the student's survey conducted at the end of the assignment as a fashion design module shows that the restriction of the fabric area is an important catalyst for the paradigms of the thinking process towards sustainability in fashion design education.

In the process of developing the assignment "Square", an empirical research method is the key, based on the application of the traditional design, cutting and sewing skills, analysis of sustainable fashion design practices, practical experiments with the shape and cut lines in clothing. Exploration of creative thinking in the practical prototyping process reveals the opportunities of the assignment based on various limitations to expand the traditional fashion design approach to the rules and techniques in the

production of clothing. Determined restriction - the amount of fabric indicates a limited amount of fabric that can be used in the development of a particular model. By choosing the square as the area of the fashion design work, where the width of the fabric is equal to the length of the fabric (usually 140cm x 140 cm), type of the fabric, structure, the students create a layout using a block of basic cuts. Defining the exact pattern at the beginning of the first stage is a big challenge and a big risk, because the traditional sketch-cut-sewing technology will create fabric clippings, here we need to change the algorithm of thinking to keep all aspects in focus by manipulating with the skills and knowledge simultaneously. The width of the industrially woven fabric depends on the width of the loom and the type of the fabric attachment, which can be 90 cm-300 cm wide. This is an important factor at the stage of the fabric selection when the model is planned since it will influence the choice of the size and assortment. According to the experience in prototyping clothing, the proportions of a person's height can be compared to 1.4-1.5 m, which is the amount of fabric used on average to make trousers, dresses, coats, jackets or shirts, thus, this restricted area offers a sufficiently wide range of choices, selecting an S/M standard for both women and men to create a prototype. The recommended fabric width for the assignment "Square" is 1.4 m. The restriction of the type of clothing - shoulder clothing - marks the possibilities of the assortment, which are still relatively wide and can be matched with the idea and corporality. Restriction - the developed model must be wearable - determines the need for ergonomics, freedom of movement and indicates that the model is sewn by planning and performing the processing, fastening and other elements in accordance with the concept of the idea and the intended functions. The designing methods to be used in the design of the zero waste models are:

- Free arrangement of geometric shapes according to the idea.
- Use of the basic shoulder clothing cutting blocks.
- Combined use of draping and cutting blocks.
- Draping.

Students use constructive methods which each of them is more familiar with and have become known to them earlier, or better suits to the concept of the idea.

At the stage of the cut-off layouts, the greatest changes are possible in the silhouette of the model and in the cut lines, because clippings are formed from the mismatch between the trajectories of the curved lines when using the basic cutting blocks. In addition, the arrangement of all necessary parts and the compatibility of the parts must be envisaged. The use of the remaining pieces of fabric as shape modulation materials, for instance, to increase the size of the sleeves, pockets, trim details, or as décor, is the easiest way to use the leftovers. It is at this stage that the greatest lack of experience is revealed, which is confirmed by the results of the survey, as well as the experience in the laboratory work process. During the production phase of the mock-up in a scale 1:1 layout, errors and corrections in shapes, silhouettes or ergonomics are revealed, which require the correction of the cuts and the change of the layout again.

Zero waste clothing design assignment course is part of the third-year bachelor's programme and the first year of the master's programme of the fashion design programme to develop a sustainable thinking paradigm and practical skills for application of zero waste clothing design in everyday fashion designer practice based on traditional design prototyping knowledge. The participants of the course are fashion design students with previous experience who have so made at least one capsule collection before and understand the principles of modelling and sewing designs (Figure 1).

3 CASE STUDY ANALYSIS OF THE TASK SQUARE ASSIGNMENT

Within the framework of the assignment, the stage of the idea generation is the biggest challenge, because when you start working, by inertia, you sketch models forgetting about the restrictions, this stage is facilitated by creating an inspiration board to define the visual parameters of the idea and research of the shape with a 1:4 scale. Although in the survey after completing the Zero Waste course at 2021-2022 study year first semester where took part five bachelor programme students from Art Academy of Latvia and four master's programme students from the Estonian Art Academy fashion design department, to the question "Which methods made it difficult to implement the idea?" 50% of the respondents specified the small model in a scale 1: 4 as burdensome, however, the method acted as a catalyst in the start-up process (Figure 2).



Figure 1. Survey summary by Zero Waste courses 2021, student's previous experience in fashion

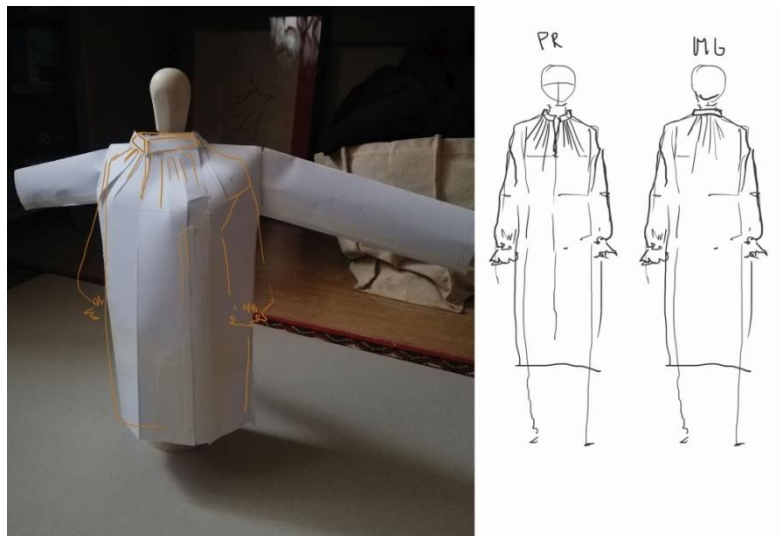


Figure 2. Laura Kreivina BA 3rd year student Art Academy of Latvia Fashion Design department 2021

Students have free choice of their stylistic expression in the process of creating models. In the search for the shape and development of the mock-up on a scale of 1:1, some students prefer the drapery technique; here they face the problem of converting the drapery into the cutting blocks and reproducing the model from the chosen fabric, which can be explained by lack of experience and underestimation of the importance of accuracy. Using pre-made basic cutting blocks in the design process, students arrange them as areas for marking different parts and configure them according to the idea; here it is important to understand the potential consequences of changes to give the product the intended shape, size and ergonomic capabilities. The dress created by the student Kirke Talu (Figure 3) is an example of an experimental search for shape, where the leftovers are used to model the shape of the garment and the finishing details on the collar.



Figure 3. Kirke Talu MA 1 year student Art Academy of Estonia Fashion Design department 2021

The use of traditional clothing shapes, such as the Japanese version of the kimono, helps to organize the layout of the cutting areas owing to the potential for a clear and predictable result, such as silhouette, assortment and shape of the garment. The ability to react to changes at the stage of the design pattern development is of great importance in the process of completing the assignment, as shown by the analysis of the survey, 50% of students adjusted the silhouette of clothing to avoid having textile trimmings (Figure 3).

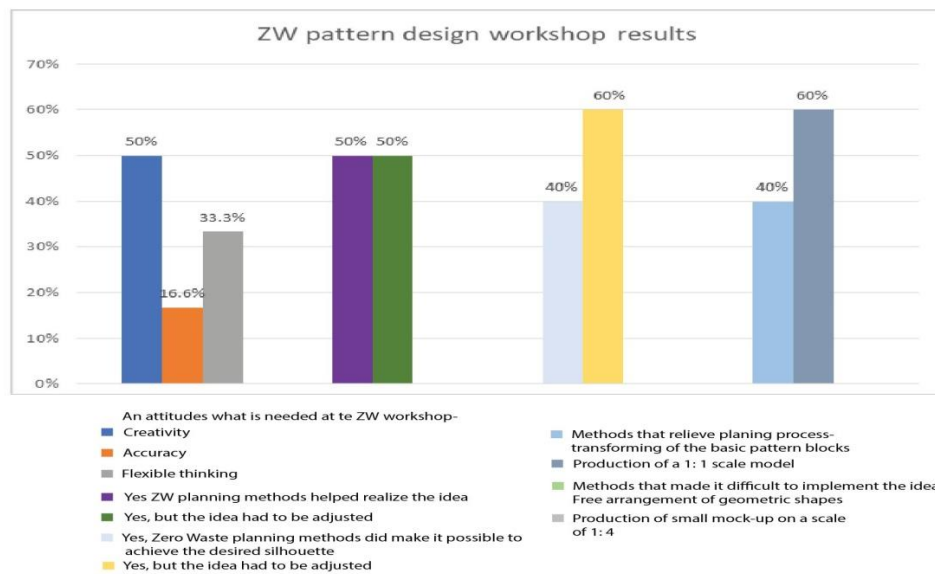


Figure 4. Survey summary by Zero Waste courses 2021

4 CONCLUSIONS

Experiments of the clothing prototyping assignment show that most of the course students have prior knowledge and previous experience in fashion design, have knowledge of the clothing design process, skills to depict the idea, model the cut-offs and sew. A survey of students conducted after the course shows that the ideas of sustainability as such are not unfamiliar to students, but most of them lack the experience to apply them in their daily work in the fashion design process. The garments created at the end of the course and the answers to the question “Did Zero Waste planning methods help to implement the idea?” (Figure 4) show an unlimited variety of styles, which confirms that the Zero Waste square method does not restrict the variety of stylistic possibilities of the models developed by future designers. During the work on the assignment “Square” the weakest and missing skills were detected, which complicated the model development process. It was confirmed by the results of the analysis of the students’ survey after the course that students recognize the need for the designing and layout skills in

the Zero Waste fashion design. Students with prior knowledge of designing have a better understanding of the cut-off layout, the ability to identify potential opportunities and freely manipulate with the shape, silhouette and cut lines of the garment. These findings points to the need for practical skills in the process of sustainable fashion design. 50 % of students indicated creative approach, 33, 3% - flexible thinking and 16, 6% - accuracy as the required attitude to solve the assignment “Square”, which confirms the importance of creative thinking for the achievement of the paradigms of the fashion design education. Responding to the question is there a zero waste in a fashion design, it should be said that it is not yet fully recognised by the fashion design education as production system. Implementation of the square method – assignment into the sustainable fashion design programmes in fashion education as a learning-teaching method will provide students with knowledge, skills and support zero waste design thinking, practising towards real sustainable fashion design and production.

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