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create

Women co-create
sustainable fashion garments

EDUCATOR'S HANDBOOK





PRODUCE CAPSULE, PATTERN DESIGN and ZERO-WASTE TAILORING



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Learning Objectives

- Introduction to Sustainable Technical Working Methods between the Designer and Learner. (how to create a collection from the scratch, brainstorm - moodboard - the process of conceiving an idea - a concept) - experimental
- Learn sustainable Design Techniques: Lay-Plan Pattern Cutting, Minimal Seam Construction, Zero-Waste, Upcycling, Design for disassembly, Design for longevity, Craft preservation.
- What is a Capsule Collection.
- The importance of Seasonless Collections and Collaboration.
- Steps for a Capsule Collection.
- Define the dynamics in separating the teams. How to choose the pairs.
- Define the main stakeholders for a capsule Collection.
- Zero-Waste Pattern Design-Making-Cutting Philosophy and Zero-Waste design approaches. Reduction in Fabric Usage, Maximising the creativity of Waste.
- Learn the combination with smart design for improving efficiency and improving packaging and transport - economic incentives to zero waste and smart design
- Define Sustainable Marketing and how to approach buyers or sponsors.

Introduction

The aim of this section is for the trainers to learn and teach the different techniques of transferring their design into the practice. It is going to highlight the zero-waste and circular steps to proceed into production and give alternatives and innovative solutions. It will also empower the idea of the collaboration and capsule collection and their meanings. Finally, it will provide information on how to transfer the student's products into sustainable marketing and approach buyers or sponsors by showcasing and pricing.



Working methods for designers

Extending the life of clothes by an extra nine months of active use would reduce carbon, water, and waste footprints by around 20–30% each.

WHAT ARE THE CIRCULAR DESIGN STRATEGIES AND HOW DOES THESE WORK?

VERSATILITY

This strategy is about keeping products in use through versatility: designing products to have more than one function, or to be worn by more than one customer, or in different styles. Different shapes, components or features give the wearer options for styling, and they can adapt the piece based on changes in their moods, needs or trends. This also helps to make inclusive pieces that are more accessible for the next person to use it, like one-size-fits-most and unisex products that any gender and any shape can wear. The result is design that aims to increase use by reducing the number of products a person needs (through fulfilling multiple functions), and/or by increasing the number of people that can wear the piece over time. Versatility is also a way to enhance the emotional durability of a product. Versatility enables a garment to be adapted across changes in a wearer's shape, size, aesthetic, style or lifestyle, so they adjust it to fit their needs or creative inspiration at the time.² This means they can keep it for longer, helping to build a stronger connection to the piece.

DURABLE CONSTRUCTION AND DESIGN for ADJUSTMENT & ADAPTATION

Most garments today are designed as 'closed', unchallengeable pieces that don't invite manipulation, or change. They don't call for alteration or unpicking. Instead they bear the air of shop finish and finality. But what if universal garment staples –the seam, the dart, the hem – signal "adjust to fit here"? Does it set a more open tone of conversation between user and clothing?

Working methods for designers

MODULAR DESIGN

Modular design is a design approach that creates things out of independent parts with standard interfaces. This allows design to be customised, upgraded, repaired and for parts to be reused. With modular design one product has the potential to be re-configured in a multitude of different ways. This can be whole garments or products –or an approach to creating the textiles themselves.

MONO MATERIAL

A barrier to successful product recycling and material re-use is the difficulty to take apart complex products, which are composed of many different types of material. Additionally some materials are easier to recycle than others.

DESIGN FOR DISASSEMBLY

If it's not possible to get a product to 100% mono-materiality, this strategy offers another route to ensuring that materials are reused or recycled.

Disassembly focuses on making it easier to take products apart, remove components, and separate different materials ready for recycling or remanufacture. For example, a cotton shirt with sheer polyester sleeves can still be recycled if you can take the sleeves off quickly and easily for separate recycling processes.

To start designing for disassembly, first look at simplifying products by reducing their material complexity (the number of components, trims, or fibres used). This means not everything needs to be taken apart, only the pieces that are made of different materials, making it a lot easier for the person who needs to recycle the product once the customer is finished with it.

Working methods for designers

REMANUFACTURE/ UPCYCLING

This strategy keeps materials in use by giving them a new lease of life as a new product. Remanufacture or upcycling (also known as 'repurpose') makes use of pre-consumer materials like offcuts, or post-consumer waste like second-hand garments or vintage fabrics. This design strategy aims to prevent textile waste from ending up in landfill, and helps to reduce the need for new fabrics.

This isn't a one-size-fits-all strategy. Designers will need an open mind and a creative approach to looking at waste materials, creating tomorrow's looks with yesterday's fabrics. Upcycled materials can be built into the design in a visible way (as a design feature) or in an invisible manner without any impact on the external look of the garment (for example hidden internal sections like pockets).¹ Transforming low-value waste into a desirable product is a truly creative circular challenge.

Designer Considerations:

- How can you bring the story of creating new from old to life for the end user? How can you design the piece so its different life cycles are highlighted, so its long-term value is understood by each of its wearers? Can you learn anything from the storytelling that already exists around vintage fashion?
- Are you able to give new life to offcuts or supply chain waste? Can you use these materials in visible or invisible ways?
- How could you deconstruct and reconstruct the garment? Can you splice existing pieces together?
- How could you design the product to be used more through upcycling in the future?
- Could you use an existing waste material from a different industry? Could you use upholstery or industrial textiles? What about unconventional materials like seatbelts?
- Creating an emotional connection between a wearer and a garment is an important way of making sure that an item is treasured for a long time. Can you involve the wearer in the remanufacturing or upcycling process in any way, for example through personalisation?

Working methods for designers

- Can you use techniques like cut and sew to patchwork the materials together into a new shape?
- Could you use existing materials over choosing new materials? What liability, deadstock, second-hand or other discarded fabrics could you use?
- How could you upcycle a garment to have a unique style? What can you do to make it one of a kind?
- Can you restyle or refinish an existing product to extend its life cycle? Could you use overdyed, embellishments or prints to change the look of an existing garment?

SEASONLESS COLLECTIONS

The importance of Seasonless Collections and Collaboration is a growing need. To fit in the global goal for sustainability, adopting seasonless clothing principle turns as the demand of time. A few of the key benefits of adopting seasonless clothing are, rise of sustainable garments, less pressure on factories for overproducing, reduction of panic buying or impulse purchase and less waste.

Sharing economy and collaborative consumption is another defining macro-trend behind sustainable and innovative fashion business models that involves the consolidation of sharing economy and collaborative consumption. Among the multiple framings for this phenomenon, we focus on those that consider it a pathway to sustainable consumption and a decentralised, equitable, and sustainable economy.

In this perspective, the sharing economy is a global, cultural, and economic paradigm shift from owner- ship to access manifested in approaches such as collaborative and access-based consumption, which can both promote economic growth based on innovation and entrepreneurship and mitigate environmental impacts associated with large-scale production. In this sense, collaborative consumption is not simply a cultural reaction against consumption, but a conscious and efficient alternative for adapting collective and individual needs to available resources. According to Botsman and Rogers (2010), collaborative consumption refers to the expansion and reinvention of exchanging, swapping, bartering, sharing, loaning, and donating practices, usually between people not previously connected.

Working methods for designers

COLLABORATION

As a driver of innovative and sustainable business models in fashion, collaboration refers to the adoption of a collaborative mindset by all stakeholders involved in a sustainable value network: suppliers, distributors, customers (who often are involved in co-creating initiatives), and even competitors. In fact, it does not seem uncommon to witness co- petition efforts among sustainable fashion startups. Collaboration allows the creation of a supporting ecosystem that drives resource and knowledge shar- ing, promotes the diffusion of sustainable practices, and ultimately allows business model experimentation. As a result, it is a critical driver for startups and small businesses and impacts the business model parameters related to value creation (key activities, key resources, and key partners), distribution (delivery channels and customer relation- ship), and potential impacts on cost structure and revenue streams, as many collaboration initiatives involve revenue sharing.



(Upcycling Is The Coolest Part Of The Ethical Fashion Movement, 2020)

Capsule Collection and methodologies of Zero-waste pattern design

A Capsule Fashion Collection consists of a few essential items of clothing that don't go out of fashion, such as skirts, trousers, and coats, which can then be augmented with seasonal pieces. It is highlighted by a collaboration of designers/shops/artists. Why could it be characterised as a more circular option? Because it is actually a small batch which could be dissected in all of its aspects from production to labour, from materials to energy use. Everything is controlled by the designers in an easier and direct way. Additionally, it is more likely not to end up with deadstock since the sales are completed. Furthermore, since it has a limited edition and unique approach, the products have an important value. Thus, they become long-lasting for the customers. Generally, it is a waste-free, localised production style.

Zero Waste layplan

WHAT IS THE CIRCULAR DESIGN STRATEGY AND HOW DOES IT WORK?

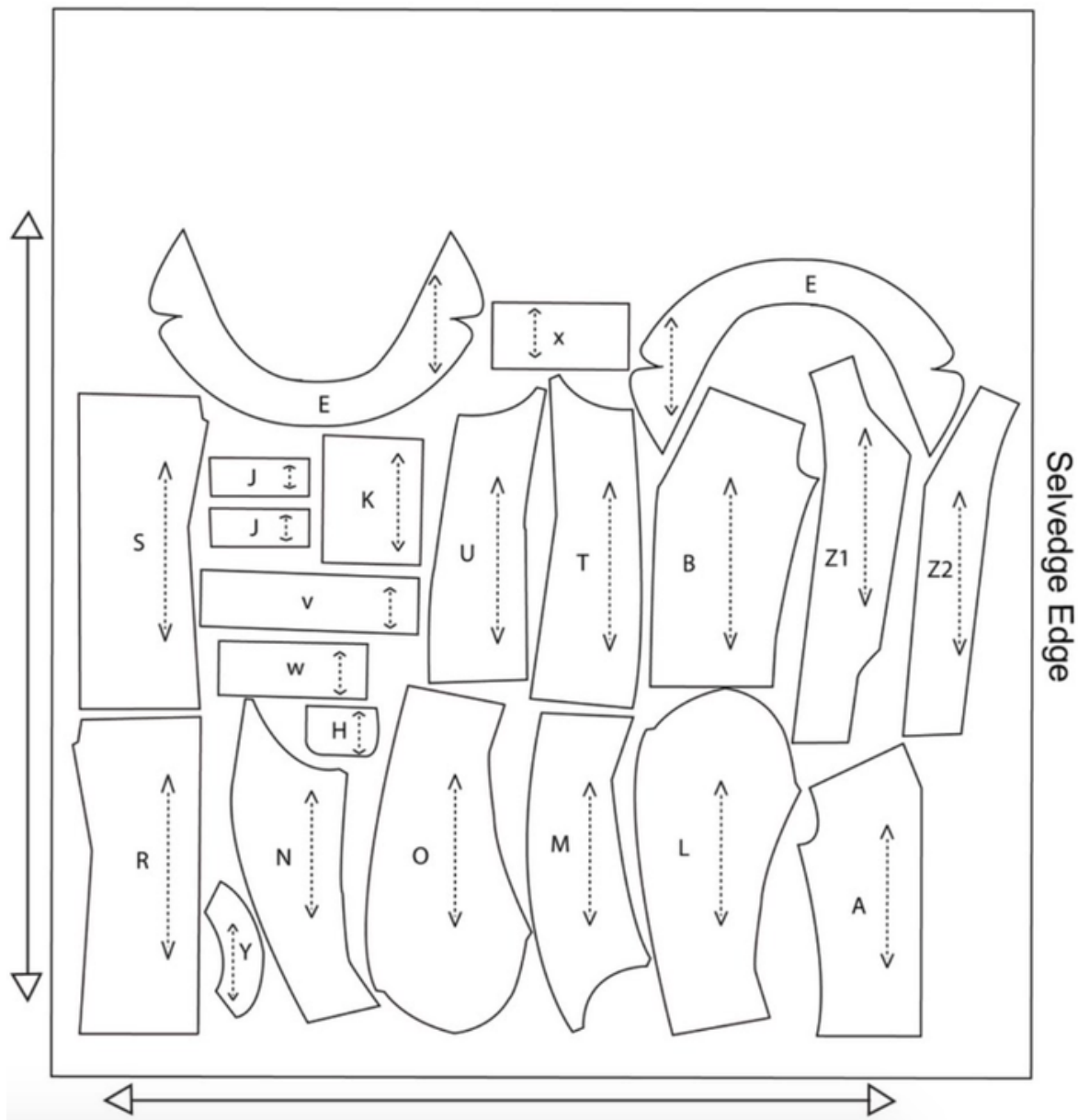
Right now, it's estimated that conventional production generates about 15% offcut waste for every single garment.¹ This is where zero waste comes in – it's a form of pattern development in which no fabric waste is created during cutting and sewing. All offcuts are incorporated into the final product.

Zero waste pattern cutting is a technical process that involves pattern development, fit, grading and size ratios. Zero waste patterns can be created most easily with square-cut pieces: the pattern is made up of rectangular or triangular pattern pieces. Some zero waste patterns use curved pieces instead to create a more form-fitting or tailored garment, with the pattern pieces nested into each other.

Zero waste design has been around for centuries³ (well-known examples include the traditional Japanese kimono) but it has not been widely explored by the mass market or large fashion brands.⁴ Many of the contemporary zero waste designers profiled in the seminal text *Zero Waste Fashion Design* (2016) are researchers, students, academics, and smaller brands, including Zandra Rhodes and Maja Staffel.

The easiest way to start using zero waste is to select a product that's more adaptable to zero waste pattern cutting – for example, products with a boxy shape, products that use a lot of fullness, or products that are sewn together from fewer components and can be simplified into rectangular shapes more easily.

Capsule Collection and methodologies of Zero-waste pattern design



(Layplan - Fashion Capital, 2022)

Capsule Collection and methodologies of Zero-waste pattern design

Designer Considerations:

- Can you share fabrics across multiple garments, and/or distribute offcuts across a capsule of styles? This means that one style on its own won't be zero waste, but taken together, the full set will be.
- Can you use fullness, gathers, pleats, darts or tucks to create shape, instead of panels or offcuts? This will reduce the need for multiple fabrics cuts for one garment.
- Can you cut on crosswise grain to get pieces to fit together? How will this impact the garment fit?
- Will adjusting seam or hem allowance help your zero waste pattern to work?
- Are you manufacturing at scale? Can you order bulk fabrics only once the pattern and size ratio have been set? This ensures no fabric is wasted through over- or under-ordering.
- Can you design for one- size-fits-most? This will help you to avoid grading issues. You can incorporate adjustable elements (like tie waists) to help create shape and adjust fit for different wearers.
- Can you start the design process by considering the fabric first? Start with the width for a fabric you want to use, or look at similar fabrics with a different width if the pattern isn't working.
- Are you manufacturing more than one size at a time? How will size ratios affect the lay plan? For example, a zero waste lay plan might require cutting a small and a large next to each other, and two mediums next to each other. You'd need to order a 1S:2M:1 L ratio to ensure the lay plan works.
- How many fabrics will be used in your design? Don't forget your linings and contrasting fabrics. For a truly zero waste pattern, all cut and sew components must be included.

Subtractive Pattern Cutting

"The basic premise of Subtraction Cutting is that the patterns cut do not represent garments outward shape, but rather the negative spaces within the garment that make them hollow. Simply put, shaped holes cut from huge sheets of cloth through which the body moves." (Julian Roberts)

Quote and Image Sourced from:

<https://researchonline.rca.ac.uk/3060/1/FREE-CUTTING-Julian-Roberts.pdf>

(Free Cutting, n.d, Roberts, J.)

Capsule Collection and methodologies of Zero-waste pattern design

Correcting the pattern and applying changes

Pattern alteration means customize patterns to fit according to body shape. For example, shortening arms or lengthening a top. Patterns are prepared according to standard measurement chart which are based on average sizes. After measuring the human body and adding needed ease, compare this measurement to the pattern's measurement.

All commercial patterns are made to standard average body measurements for each figure type or size. Companies spend a lot of time and money inviting the public to take part in measurement surveys, eager for their patterns to fit as many people as possible. In reality, of course, we are all different – but standardizing measurements is a necessary process for the industry.

A pattern can be altered and adjusted three ways:

- By folding out excess fullness to make an area smaller.
- By slashing and spreading to increase dimensions, or slashing and overlapping to decrease dimensions.
- By redrawing darts or seamlines.

Patterns Alteration Standards:

- Original grain-lines are saved.
- Patterns are kept in balance and proportion.
- Change is created only where needed and is not obvious.
- Designer's lines are protected.

Basic Rules or Techniques of Pattern Alteration:

Traditionally, alteration of garment patterns is an essential step in producing attractive and accurately fitting clothing from patterns which already exist. There have been numerous publications by tailoring experts on how to alter garment patterns for different figure forms. Alterations can be done by using measurements, taken by a tape measure and incorporating them onto a paper pattern using the slash, seam or pivot methods.

Capsule Collection and methodologies of Zero-waste pattern design

Principles of Pattern Alteration:

1. As far as possible make changes within the pattern by slashing and spreading or slashing and lapping. Patterns can also be altered by redrawing the edges of the pattern. (This is the method adopted for altering garments at the time of fitting.) But the first method is by far the best in altering paper patterns.
2. To preserve the original grain line, make all slashes and folds parallel or perpendicular to the grain line (to center front line, center back line etc.).
3. Where there are darts, make changes between the tip of the dart and the outside edge.
4. If an alteration in length is made along one edge of the pattern, take care to make an identical alteration in the adjoining edge. For example, if back shoulder seam is shortened the front shoulder seam should also be shortened.
5. When tucks or darts are used for making a pattern smaller, remember that the width of these should be just half the amount to be removed.
6. When decreasing or increasing the width of pattern pieces, if only half the pattern (half back or half front) is used, subtract or add only one fourth of the total adjustment to be made. For example, if waist measurement has to be increased by one inch, add $\frac{1}{4}$ " to the half back pattern and the same amount to the front pattern. If only a front or back section needs adjustment, add or minus half the amount of the adjustment to the respective section.
7. When the pattern alteration involves slashing and spreading, it is necessary to keep a sheet of paper beneath and to pin or stick to it the spread-out parts so that they will thereafter remain in position. On spreading or lapping after slashing, some edges of the pattern become jagged. These must be trimmed after drawing the new seam lines.

Minimal seam construction

This is a design technique that reduces the number of seams required to sew together a garment. It makes manufacturing much quicker and can save on materials. It can also allow the garment to have greater freedom of movement and increase comfort for the wearer. Some companies, like The North Face, are investing in technology that can fuse seams together, meaning no sewing required

Digital design and Innovations

There has been an enormous techno-economic trend encompassing various technological innovations, enabling improved sustainability in fashion. Among the technological innovations that currently impact business models in fashion, sustainable or alternative fibres seem to be the most prominent innovations according to our literature review. Impacts include improvements in clothing durability, reduced waste from cleaning processes, and the use of alternative (synthetic) raw materials instead of scarce natural resources. An already mature technology making important inroads in fashion is additive manufacturing, also known as 3-D printing. Finally, short-to-medium term technological trends that have the potential to impact fashion business models include wearable technology and augmented reality. Although still predominantly in the design phase, smart wearables can open up alternatives in terms of monitoring wear and tear of fabrics so as to best detect when and how to discard garments

The potential of Digital Fashion for a sustainable system

For Evelyn Mora, CEO & Co-Founder of Digital Village, we are still thinking too small as an industry regarding the potential of Digital Fashion in achieving a sustainable system: "We have to think about this on a large global scale, how digital fashion can actually impact physical fashion. I don't believe that you can replace the physical fashion industry, which is a 800 billion US dollars industry, with digital fashion. But I do think that, when it comes to consumption and our relationship to clothes, the ways we express ourselves, this can be influenced by digital fashion". And she adds: "the fashion industry is about selling dreams and identities. It's so much more than just clothing. And I don't think that any fashion brand has elevated it and uses digital in a globally impactful way, which changes our physical consumption habits." For doing this, Mora believes that there is much work to be done by the fashion brands and companies, the supply chain must be involved, transparency should be enforced through the traceability of NFTs, and also we need to ensure that everyone working for the industry is fairly paid.

Digital design and Innovations

For Olga Chernysheva, Chief Officer Sustainability at DRESSX, Digital Fashion is already impacting how products are being made and consumed. She uses an example from a project in partnership between DRESSX and Farfetch, on reducing the carbon footprint through on-demand production: "Before we spoke about how digital fashion can be substituted by physical fashion, for everyday consumption, we worked with the brand. We created an only digital capsule collection and we did all the marketing digitally. Influencers were dressed digitally, nothing was produced. And just after the campaign, Farfetch collected the orders and the physical garments were produced on-demand. For the 40 garments created for this capsule collection, we saved 2,5 tons in carbon footprint." To have a sense of scale, the carbon footprint of a digital garment is only 3% of a cotton t-shirt traditionally made. This carbon footprint calculation is based on a study published in 2020 by DRESSX, and the methodology is published on their website. There is also a study published by Evelyn Mora for Digital Village in August 2020 about the carbon emissions of Digital Fashion and its impact on sustainability with some counterpoints that contribute to the relevance and complexity of the theme.

Introduction to Clo3d or Marvellous Designer. How a 3D fashion design software can be sustainable for pattern making.

One possible emerging aid in the implementation of zero waste design in the industry is the use of 3D modelling technology such as that offered by companies such as Lectra, CLO3D and Optitex. Digital 3D software enables for the simultaneous design of 2D zero waste pattern and the resulting 3D form. This action used to take place primarily in the mind of the designer until constructed in some form as a sample or toile.

he additional benefit of utilising digital prototyping and design tools such as CLO3D is that it can significantly reduce the use of materials for design and sampling. It can replace many of the initial sampling processes and speed up translation from idea to accurate form without the need for cutting cloth.

Rather than having to undergo a time-intensive physical iterative process of alteration/ sample/ alteration/ sample, this occurred entirely digitally and very rapidly.

Case Study: Social Fashion Factory / SOFFA

PARTNER: THE NEST
COUNTRY: GREECE
CONTACT: frontdesk@soffa.gr
Date: 30/06/22

Content

Smart Practice (1). [Project Name]

> **Name of the Project:** SOFFA

> Athens, Greece

> **Founded in 2015**

> **Contact:** www.soffa.gr

| <https://www.facebook.com/socialfashionfactory/> |

<https://www.instagram.com/soffa.gr/>

> **Type of Organization:**

Tailoring Production Studio/Cooperation

> **Field**

(Fashion entrepreneurship / Cooperation with migrants and designers

/ Female entrepreneurship

Social Fashion Factory-SOFFA, is a creative tailoring production studio, a cooperative of fashion designers and professionals aiming to create sustainable fashion garments with great social and environmental impact!

> **Project Description**

SOFFA is a manufacturing production studio, a cooperative of fashion designers, creates sustainable fashion garments with great social and environmental impact for its B2B customers being Sustainable Brands. offering to brands and retailers mending facilities for their collect-back schemes to go for used marketplaces and upcycling re-designing possibilities. provides work integration to women survivor victims of GBV.

Case Study: Social Fashion Factory / SOFFA

What is in it? / What does it contain?

Created Wear Your Origins to be a close loop circular brand. Protocols include SOFFA Impact Evaluation Metrics, Bribery & Corruption Policy, Due Diligence process, Living wage structure, SOFFA Fashion Production Islands, Zero Waste design, Recycling processes. SOFFA has signed the EU Charter for Diversity & Inclusion.

What is the goal?

The purpose of SOFFA empowerment programs is to provide for their livelihoods through vocational training & work integration in eco-sustainable fashion

- help them become self-reliant
- use their own resources to achieve their long-term goals

Against:

- human rights violations, living wages and working conditions;
- modern slavery, child labour & lack of transparency of their entire value chain and even more, lack of action taken on all these issues from existing fashion brands.
- the environmental crisis and exploitation of resources;
- waste management and CO2 emissions from transportation

Who are the beneficiaries?

SOFFA targets the empowerment of women victims of human trafficking and women in risk of exploitation.

Who are the project stakeholders?

Beneficiaries

Immigrants

Women who have been through human exploitation

Case Study: Social Fashion Factory / SOFFA

What positive impact has been generated?

From 2015 until now SOFFA has received over 200 applications for its programs. In addition to that, SOFFA has offered 34 training positions and 37 remunerated job positions. All those number are constantly growing. From 2015 SOFFA, has changed location many times. Today, SOFFA is located in the center of Athens, in a permanent workspace, which is designed according to its needs, and it can offer 30 job positions.

- During 2015-2017, SOFFA received 43 applications and 16 persons were trained and six (6) persons were hired.
- During 2018, SOFFA received 77 applications and one (1) person was trained and 7 were hired.
- During 2019-2020, SOFFA received 78 applications and 17 persons were trained and 24 persons were hired.

Insights

What makes this project particularly interesting for Women Co-CREATE Sustainable Fashion Garments?

SOFFA first started its operations in 2015 by inviting fashion designers and scientists in a mentoring program to co-create a new business and production model.

Case Study: Social Fashion Factory / SOFFA

How can this project contribute to Women Co-CREATE Sustainable Fashion Garments?

It entered in a collaboration with a safehouse of women victims of human trafficking, with the scope of integrating the women to the workforce of SOFFA. At the same time SOFFA chemists and textile engineers were researching the most innovative novel plant-based sustainable textiles to source for its operations. SOFFA controlled its CO2 emissions by having all the supply chain locally and offered full transparency to its customers. SOFFA narrated a story of how a manufacturer can help preserve the environment, respect human rights, and help resolve social issues.

How does this case example relate to the topic area of this specific module? What can we learn from this?

SOFFA is a Tailoring Production Studio that offers Zero Waste processes, Circular Fashion principles : Recycled, natural, vegan and plant-based textiles; database of sustainable textiles. These details contribute to the topic area of the specific module.



Bibliography

- Esquire. 2020. Upcycling Is The Coolest Part Of The Ethical Fashion Movement. [online] Available at: <<https://www.esquire.com/uk/style/a32730678/upcycling-is-the-coolest-part-of-the-ethical-fashion-movement/>> [Accessed 5 July 2022].
- Fashion Capital. 2022. Layplan - Fashion Capital. [online] Available at: <<https://www.fashioncapital.co.uk/tools/layplan/>> [Accessed 30 June 2022].
- Free Cutting, n.d, Roberts, J. [online] Available at: <https://researchonline.rca.ac.uk/3060/1/FREE-CUTTING-Julian-Roberts.pdf> [Accessed 30 June 2022]



Resources and Videos

https://docs.google.com/presentation/d/12RBcJsXLrOJ4oX093q-w83G0TNYFv1F_/edit#slide=id.p37

https://www.ted.com/talks/mylene_l_orguilloux_zero_waste_design

<https://textilevaluechain.in/in-depth-analysis/articles/textile-articles/zero-waste-pattern-cutting/>

<https://fashionandtextiles.springeropen.com/articles/10.1186/s40691-021-00262-9>

<https://researchonline.rca.ac.uk/3060/1/FREE-CUTTING-Julian-Roberts.pdf>

https://www.researchgate.net/publication/348944790_Pattern_Making_Solutions_for_Sustainable_Fashion_-_Case_Studies



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FRAMEWORK



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