
Sustainability in Textile Design

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Abstract Biobased materials, made for interiors, product, fashion or construction purposes aim to inspire for a more sustainable living and building environment. Governments, scientists, designers and consumers alike are called to reconsider the way they operate, develop, create and consume for a more sustainable future. Innovation, up-cycling and the use of waste materials are a start to a symbiosis between the planet and us.

Keywords textile design, sustainable fashion, natural materials, new technologies, social responsibility

“Design is at the core of everything we do; from designing processes to materials, systems to brands. We believe design is an invaluable tool for partnering with science, embedding consumer needs from the outset to develop better products for a more sustainable future.” – S. Lee, *Wearable Futures*, 2014.

1. Introduction

Terms like ‘ethical fashion’, ‘eco-friendly design’, ‘bio-fabrication’, ‘sustainable textiles’ are splashed across the media, daily. Yet what does it all mean?

Sustainability is the quality of not being harmful to the environment or depleting natural resources, and thereby supporting long-term ecological balance. A way of meeting the needs of the present without compromising the ability of future generations to meet theirs. It has three main pillars: economic, environmental, and social. Through a sustainable environment government can maintain healthy communities, limit waste of natural resources such as energy and water and create growth opportunities through developing innovative products. Sustainable fashion is about values based on culture and living circumstances.

Materials are an integral part of all design disciplines. As such, materials have a critical impact

on the current state of the environment. They are a starting point for change and a valuable commodity for farmer, designer, manufacturing industry, consumer and recycler. The waste of such materials, often ends in landfills, which contributes to pollution and climate change affecting health and the balance of the ecosystem. Therefore, different solutions are identified which contribute to sustainability

2. Different perspectives of materials

The ‘Fashion for Good Museum’, in the Netherlands, is showcasing an exhibition on biomaterials, named ‘GROW’. On display are conventional materials like, ecological (lab-grown) cotton, flax and hemp, but also innovative materials like fabric made of citrus peels, mushroom leather, spider silk and dye made with bacteria and algae.

“With the rise of fast fashion, natural resources have been exploited all over the world. As a result, the relationship between fashion and nature has come under pressure. The GROW expo shows how groundbreaking innovations can instead draw inspiration from nature and how scientists use the cycle of creation and recreation to develop the sustainable materials of the future.” - article, *The Future of Fashion Materials*, 2021.

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Every day consumers use a variety of products and dispose of their packaging with little social responsibility. Such products include many kinds of plastics, paper, cardboard, metal, glass, clay, tires, textiles, clothing, wood, and electronics.

Sustainable materials include: fibers produced by plants (linen, cotton, hemp, wool), timber (wood), bamboo, straw bales, geo-textiles (a synthetic textile material used to improve the soil characteristics), materials made from crops (grasses, barks, stems, roots, seeds, leaves etc.) These can be felted, knitted, knotted, coiled, woven and plaited to produce sustainable surfaces.

Creative Studio 1, is a recycling and sustainability module that takes place at Alexander College. The aim is to encourage students to be inventive and take creative risks, while educating them about

responsible design, experimenting with a variety of materials and processes. This will form the basis of developing innovative outcomes for recycling and sustainability surfaces. Education for a sustainable development is the key to enhancing social values and environmental attitudes for better living conditions.

Groundbreaking technologies are being introduced in recycled, organic, and bio-fabricated materials. “Could the most ground breaking innovation be organic? Embracing nature rather than dominating it”, asks the narrator in ‘The Next Black’ - a film about the Future of Clothing’, 2014.

Thought provocative initiatives in the industry include Suzanne Lees’ work on Bio-couture, a design consultancy focused on bringing living and biological materials into fashion and sportswear. Suzanne Lee is a fashion innovator pioneer, whose ground breaking work on Bio-fabrication concentrates on growing her own fabric, a material made from a microbe rather than a plant. Her recipe, of green tea, sugar, acidic acid/cider vinegar, starter culture - that is yeast and bacteria, and other microorganisms, can spin the ingredients into eco-friendly fibers. This creates a fermentation process that produced something:

“Textile like in feel that it could saw like a normal piece of clothing. A method of producing fashion that is closer to brewing beer or making food than making traditional textiles. We collaborate with other companies, like scientists, who are growing materials in the lab using living organisms. Take those materials from the lab to the market and imagine the future products for fashion, apparel, sportswear.” S. Lee, 2014

Microbes can become the factories of the future, creating bio engineered clothing and reduce the impact of waist. Designers need to be thinking how to replace textiles that are made of synthetic fibres, dyes and plastic, with more natural processes, rather than fossil fuel derivatives. Fashion pioneers, like Suzanne Lee and ground breaking innovations draw inspiration from nature to create unconventional materials with the introduction of technology.

‘LAUNCH System Challenge 2013’, sought innovations that will transform ‘the system of fabrics to one that brings global economic growth, drives human prosperity and replenishes the planet’s resources.’ Such examples would be: ‘materials of which fabrics are made with a focus on positive social and environmental impact; Multi-purpose synthetic and bio-synthetic; Smart and/or self-healing materials; Technical fabrics with novel or

surprising attributes; Fabrics that efficiently and effectively enable recycling; Applications that eliminate toxins in fabrics’ and others. Sustainability is at the core of platforms like LAUNCH, which hold the industry and governments accountable to advocate policies for any real change. Only through established laws and regulations could companies be considered liable to change.

Change however, comes in different ways. There is an increasing demand for compostable materials that can be produced with minimal raw materials, toxins and water. The fashion industry is heavily reliant on precious natural resources. Once the fabric has been manufactured, most of its leftovers are simply disposed of, creating a chain of waist in each step of the process. Fashion is considered the second most polluting industry after oil refinement.

In her Vogue article, Emily Farra talks about how ‘Sustainability is the most pressing issue facing fashion’.

“We’re living in a moment when aesthetics and taste and personal style are equal to affluence. A recent U.N report states that, the global climate crisis could occur by 2040 if greenhouse gas emissions aren’t reduced soon; the fashion industry is estimated to contribute 10% of those emissions. Brands need to reconfigure their supply chains, slow down their production, and reduce their use of synthetic materials. Properly invest in new fabrics, conduct life cycle assessments, or develop technologies. Brands should divert marketing funds to research and development.” E. Farra, 2019.

Modern design practitioners are finding new ways of dealing with materials either through technology or responsible design. There are well known brands, who engage with ethical fashion, like Stella McCartney and new designers like Bethany Williams, who is unique.

Bethany has an MA from London College of Fashion in Fashion Design Technology and recently awarded the Queen Elizabeth II award for British Design for her contribution to sustainable fashion and issues of social responsibility. In her first menswear collection called “Breadline” she collaborated with supermarket chain Tesco, that supplied foodstuff to Vauxhall FoodBank that helps local communities with food. By using the left-over packaging, she created a collection from recycled and organic materials. For her second collection called “Women of Change”, she collaborated with London College of Fashion that has educational programs running in federal prisons for women, who helped in the production of the recycled textiles. The

models for the show by TIH agency, were young homeless people in London.

Such initiatives bring new meaning to responsible design, involving the community and secluded groups. Biodegradable raw materials and innovative fabrication processes, create consumer alternatives that are respectful towards the environment and empower responsible design.

Re-Fresh global is an innovation platform for sustainability and circular economy solutions for the textile industry. The aim of their Re-Born Textile model, is to provide a circular economy solution for municipalities and their textile waste, which comprises up to 10% of a city's solid waste. Their solution is based on three pillars:

1. Discarded clothes in new/almost new condition are returned to the retailers (re-use).
2. Discarded clothes and textiles are upcycled into new textile products with the help of new technology (re-make)
3. Clothes and textiles are recycled and used in other industries, such as construction and automobiles (re-purpose).

On June 17th 2021, the company organizes the first German-Israeli, 'Circular Textiles Business Matchmaking Showroom', that will be an online/offline event open to the public and give people a chance to engage. It offers a window to up-cycling and re-cycling solutions that were not previously confronted with.

Clara Vuletich, discusses how to get involved with ethical fashion. On TEDx 2016 she explains, how a T-shirt production may lead to pollution. For a cotton T-shirt to be manufactured 500gr of pesticides are used. Therefore, consider the production of a billion T-shirts on a yearly basis. After their use, clothes end up in land fields, using toxic dyes that take up to 200 years to biodegrade. Mending your clothes, buying second hand, swapping with friends and buying less are suggestions for a responsible consumer.

Sustainability must become therefore more than a 'trend' that serves mostly for marketing purposes, but rather the core for innovation, that involves governments, communities and individuals alike. Designers can contribute to change by considering the use of materials through technology and production. However, only governments have the power to implement any real environmental change, through a circular economy and provide solutions that are both competitive and profitable.

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3. Discussion