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**91363 Demonstrate understanding of sustainability
in design**

EXEMPLAR

Achievement

TOTAL 04

91363 Demonstrate understanding of sustainability in design

Introduction

Throughout this report I will be discussing and demonstrating my understanding of sustainability in design. As a year 12 textiles student completing level 2 NCEA, for one of our internals we were given the brief of creating a sustainable jacket. From this guideline I decided to use second hand fabric as my main material to incorporate this sustainable element.

Sustainability in design.

According to the United Nations Academic Impact sustainability is

Sustainability in design is fundamentally about meeting the needs of the present while ensuring that future generations can also meet theirs. This idea emphasises a balance between resource use and conservation, ensuring that our designs today don't deplete or damage the resources that future generations will rely on.

True sustainability balances and maintains the economic, societal and environmental aspects of our world. Without these three spheres being in balance a product will never be able to reach sustainability. For example, let's look at the design of a reusable water bottle.


From an economic standpoint, the bottle should be cost effective to produce, using a mixture of affordable and durable materials. By using recycled materials the manufacturers (i.e producers of the bottle) are able to lower the cost and reduce the reliance on raw materials and natural resources.

From the societal aspect the design process should begin with community input to ensure that this product meets the needs of future users. Additionally by working with a community considerations of fair labour practices can be put in place. An example of this is the creators of this reusable water bottle design partnering with manufacturers that provide and maintain fair wages, safe working conditions and respect amongst employees, which will help enhance this product's societal value while also fostering a positive view of the product amongst consumers.

Environmentally this water bottle should help minimise waste and energy consumption throughout its life. This could mean using biodegradable materials or

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<https://www.un.org/en/academic-impact/sustainability#:~:text=In%201987%2C%20the%20United%20Nations,to%20meet%20her%20own%20needs.%E2%80%9D>



designing with the intent of recyclability. A good example for this design would be to use bioplastics, which are biodegradable after use meaning that when these reusable water bottles meet the end of their life cycle they break down and return to the earth.

Competing Priorities and Compromises in Sustainable Design.

Sustainable design often involves navigating competing priorities and making compromises between environmental, social, and economic goals. These competing priorities can create challenges, as achieving the most sustainable outcome may not always align with other design objectives, such as cost, performance, or consumer preferences. Often competing priorities are the balance between cost and environmental impact. Sustainable materials and manufacturing processes may be more expensive upfront, leading manufacturers to hesitate in implementing them. However, the long-term environmental and economic benefits often outweigh the initial costs. Products that are energy-efficient or that use renewable materials can save money and reduce environmental harm over time, even if the initial investment is higher.


Performance can sometimes conflict with sustainability goals. For instance, biodegradable materials may be less durable in comparison to synthetic materials, which can compromise product performance. In these cases, designers have to find ways to balance the trade-off between durability and environmental impact. This often involves innovating new materials or processes that maintain performance while minimising environmental harm.

Another area of compromise is in meeting consumer preferences. Consumers often prioritise convenience, affordability, or aesthetics, which may not always align with sustainable design principles. For instance, consumers may prefer products that are cheap and readily available, even if they are produced through environmentally harmful methods. In these situations, designers must weigh consumer demand against the broader environmental and social impacts of the product.

Sustainable design requires making difficult decisions and compromises. Designers must carefully weigh the importance of each factor, balancing the immediate needs of performance, cost, and consumer appeal with the longer-term benefits of sustainability. By doing so, they can create products that not only meet current demands but also contribute to a more sustainable future.

Life Cycle Analysis.

Prior to this internal, I knew of the life cycle in terms of animals, but I did not know what it meant in design terms. I learnt that Life Cycle Analysis is a process created to help comprehensively evaluate the environmental



impacts of a product throughout its life cycle. This diagram to the right explains the Life Cycle, and helps manufacturers, designers, brands and more people within the industry understand the ecological footprint of their products, from cradle to grave.

What does each stage look like?

1. *Raw Materials.*

This beginning phase assesses the environmental effects of sourcing specific materials for specific products. It assesses aspects such as, energy use, cost, resource depletion and ecological impact.

2. *Production.*

The focus throughout this stage is on emissions, energy consumption and the amount of waste generated throughout the production of this product. This phase evaluates the efficiency of specific manufacturing methods and the amount of energy used throughout.

3. *Transport.*

This stage examines the environmental effects transporting the product from the manufacturer to the market would have. This includes analysing fuel consumption, emissions and the efficiency of distribution methods.

4. *Installation.*

This phase analyses the environmental impacts the installation of this product could have. Evaluating the amount of potential emissions and waste generated and resources required for set up.

5. *Use.*

The analysis throughout this stage includes reviewing the products environmental effects while in use.

6. *End of life.*

This final stage reviews how the product is disposed of or recycled. Ensuring there is analysis of the waste generated and the impacts of recycling versus landfill or composting.

Innovative design.

Innovative design is the creative process of developing new ideas that are fit for solving current problems. Within fashion, innovative design is mainly concerned with sustainability and potential environmental impacts that could occur from design production.

Currently these are the biggest concerns for fashion globally, and as a result sustainable design is an alternative that has come from innovative design. As designers have used innovation to analyse and identify ways products are produced within the industry more ethical sustainable outcomes have been created. Innovation often allows issues identified from lifecycle analysis to be addressed. For example, it has become very popular for brands to use organic fabrics, such as organic cotton and hemp, these materials are grown without harmful pesticides and fertilisers making them more environmentally safe for both the consumer and the

environment. Not only are organic fabrics popular but so are recycled materials. For example many brands now incorporate recycled fibres such as recycled plastic bottles, fibres and more into their products diverting waste from landfills and saving money from sourcing raw materials. Throughout my design of a sustainable jacket I used innovative design by using second hand fabric instead of a store bought new fabric as throughout the project I was thinking of ways I could create something more sustainable.

Case studies.

Creating a sustainable article of clothing was not something I could complete without doing prior research to create a definition of sustainability that I agreed with. In doing this I looked at two case studies, [REDACTED].

[REDACTED] is a 100% natural fibre basics manufacturer and supplier from New Zealand. Their products are made with full traceability back to source and are recyclable.

[REDACTED] a manufacturing company they partner with progressive suppliers that share the same values. Through their website is their [REDACTED] option which allows suppliers to create customisable merchandise and uniforms while using the sustainable clothing basics [REDACTED] has to offer. In terms of customisation of these basics [REDACTED] offers screen printing, embroidery and supacolour branding³.

[REDACTED] also sells [REDACTED] The aim of these bags/boxes is to keep good quality clothing in circulation for longer and while those pieces are in circulation finding scalable solutions for end of life textiles. These bags/boxes consist of natural fibres which are available for sale. These articles are donated to [REDACTED] from a range of people and it gives them the opportunity to test textile recycling solutions. For example, up-cycling an old jersey into a pet bed or carpet underlay⁴.

Even though the work [REDACTED] is helping create more sustainable practices within New Zealand, due to lack of access to machinery and resources these

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<https://www.littleyellowbird.com/pages/about?srsId=AfmBOorMpuGEhcxiHhpouZDYDM5tV1Wtg5V8HKgmdUQUdTFUD5kh12I>

³ <https://www.littleyellowbird.com/pages/creators>

⁴ <https://www.littleyellowbird.com/pages/circularity>

practices will never be able to return the fabric its original fibre completing a cradle to cradle life cycle. Not only that but on a global scale the work that [REDACTED] has completed, although it is impressive, goes by unnoticed by large fast fashion corporations as they are their sole focus is not the wellbeing of the planet but how much profit can be made and how fast. Unfortunately many customers who purchase products from these fast fashion corporations prioritise convenience, affordability, or aesthetics over sustainable design practices, so the work that [REDACTED] is doing does not hold much value to them.


[REDACTED] are a Wellington based organisation which help businesses globally lower their impacts on the environment through to their consumption of clothing and textiles. Their mission is to “assist businesses strengthen their value by operating within the biophysical limits of planet earth, reducing new resource use and improving the lives of workers around the globe”⁵.

From their beginning [REDACTED] have had high ethical and sustainable values. An example of this is how for every textile group that reaches out to [REDACTED] they focus on one sustainable hotspot from different parts of the value chain. This includes animal welfare, carbon emissions, waste generation, modern slavery and more. By providing a textile brand with the opportunity to mitigate one of these issues [REDACTED] is enabling real progress while educating many of the people that work with them, or support them. One of [REDACTED] first and biggest jobs was working with [REDACTED] who redesigned their 16,000 worldwide stores and looking for solutions on how to incorporate their used coffee sacks into interior design. From using viable textile solutions and analysing the technical viability of producing new material from the old coffee sacks, [REDACTED] were able to help their partners develop and produce the product.⁶

The work [REDACTED] has done creating more sustainable practices within the fashion industry is remarkable, especially as they are from a small country like New Zealand/Aotearoa. But excluding their large-scale work with [REDACTED] I believe they might struggle to find other larger global corporations that are as willing to work with them, or willing to change to more sustainable practices. Although smaller brands may be inspired by [REDACTED] work and wish to learn and follow sustainable practices, for many larger corporations, particularly fast fashion companies, these sustainable practices would cost more to start using and would decrease overall profit to begin with. These fast fashion companies are dependent

⁵ <https://www.theformary.com/about-us/>

⁶ <https://www.theformary.com/our-work/>



on finding the cheapest and fastest options for their customers, and these innovative practices, despite being more sustainable, would not necessarily appeal to them. Until customers prioritise sustainability as a factor in their purchasing decisions fast fashion companies are not incentivised to change their practices.

Sustainability in my jacket design.

My brief:

My brief was to design a tailored jacket that fits my client's specifications, while using a recycled/second hand fabric and applying sustainable practices/analysis throughout the design and production process.


For the bomber jacket I designed I used a second hand material as my main fabric. This fabric was found in my textiles classroom and came from second hand origins itself as the roll of fabric was donated to the school. It was a fabric shop end of line fabric that was either going to be donated to an op shop or going to landfill. The material was 100% polyester, which pushed me to use it as my main fabric in order to help reuse one of the hardest materials there is to recycle.

For my product I decided to design a bomber jacket for myself. After assessing what I was missing from my wardrobe I realised I was in need of a neutral jacket that could be worn both everyday or during special occasions paired with a more formal ensemble. Once I understood what was needed for the jacket and what I wanted for my jacket I began to list the personal specifications I wanted to make.

Aesthetics:

As I wanted this jacket to be relatively neutral, I selected a plain coloured fabric, without a pattern. By using a simple colour palette for my jacket, I could also incorporate another aspect of sustainability into my design, that is getting the most use out of other items that I already owned - as the simple fabric would match well with many other clothing items. Before I began the construction of the jacket I needed to run some trials of special features I wished to add, including constructing welt pockets. I practised constructing this feature by doing a toile mockup with fabric scraps found in my textile classroom. This proved useful, as for example, throughout this toile mockup of my welt pocket I noticed that the corner edges of the welt pocket tended to peek out through the pocket hole even after being sewn down, and so when I constructed my final welt pocket I made sure to refer to my notes and sew down closer to the pocket hole in order to ensure this didn't occur again. Taking these considerations into account when I began my final garment I was able to prevent these from happening again.

Functionality:



For my bomber jacket I wanted to create something that was suitable to wear during both winter and summer seasons and was comfortable. I also wanted there to be a good amount of storage within the jacket (at least two pockets included).

Testing.

I performed several trial tests prior to the construction of my jacket to ensure that my skills would allow me to complete my jacket to the highest quality. At the start of the design process I chose a fabric after applying a life cycle analysis of certain fabrics that I had previously worked with



The main fabric I decided to use was polyester, one of the most difficult fabrics to recycle. I met the sustainability brief by choosing to reuse a polyester fabric that would otherwise not be able to be recycled and had been donated to the school textiles department.

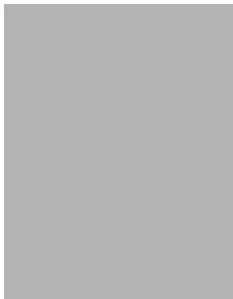

By choosing a silver/grey polyester fabric I was able to meet the brief of a neutral colour palette.


Unfortunately the polyester material proved to be incredibly hard to work with as it frayed easily, was slippery under the sewing foot and didn't hold stitches very well. From these issues I had to go back and redo areas and hand stitch some areas closed. This wasn't ideal in terms of the amount of time I had on this internal, but I persevered.

Regardless of these challenges I believe that I have created a product that reduces my environmental impact, while also being able to create an aesthetically pleasing and functional garment that I will wear regularly.

Innovative ideas.

If I had more time, along with unlimited access to materials and money then I would be able to implement more innovative ways of ensuring the sustainability of my jacket. However, as these are requirements I must follow I would most likely take my jacket and create a new garment out of it. A laptop case. I would be able to use all the fabric from my garment to potentially make more than just one case, and make different designs using different colours and fabric. To the right are images of sustainably designed laptop cases that I took inspiration from when creating this idea for what my bomber jacket could potentially turn into. The strawberry patterned laptop base is from San Francisco brand  which use recycled ripstop nylon, recycled PET polyfill to make their cases. Whereas the pale pink laptop case is from  which uses organic cotton for the material of their cases, while also donating a percentage of your





purchase to Feeding America's campaign to end hunger by helping donate meals to kids and families in need.

From taking my garment and making something out of it myself instead of donating it to an op shop, where most items that are not purchased end up in a landfill, I know that my garment actually received wear and that a cradle to cradle life cycle was completed.

Conclusion.

In conclusion, the research and understanding of sustainability in the fashion industry and how it is applied has guided me towards what true sustainability should look like and the importance of it. Before this report when hearing the word sustainability I always thought that referred solely to the natural environment, instead of there being societal and economic implications as well. I now know that all three cannot exist without the other. From my new knowledge on sustainability I was able to design and produce a bomber jacket meeting the specifications I required, while using second hand fabric and creating a new life cycle for this piece.

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Achievement

Subject: Technology

Standard: 91363

Total score: 04

Q	Grade score	Marker commentary
One	A4	The candidate explored the three pillars of sustainability and the role of lifecycle analysis in identifying opportunities for design intervention. A case study highlighted specific areas for improvement and described innovation as a strategy to enhance the sustainability of outcomes.