

No part of the candidate's evidence in this exemplar material may be presented in an external assessment for the purpose of gaining an NZQA qualification or award.



Mana Tohu Mātauranga o Aotearoa  
New Zealand Qualifications Authority

## Level 2 Technology 2024

**91363 Demonstrate understanding of sustainability  
in design**

**mmdfu6l**

Excellence

**TOTAL 07**

## AS91363 (2.10) Demonstrate understanding of sustainability

### **Introduction:**

In the fashion industry, the frequent use of chemical materials can lead to environmental pollution. Unreasonable design will lead to clothing easily out of date. In addition, the use of low-quality fabrics for clothing will make it difficult to preserve and will not last for a long time. Being sustainable in fashion design is more important, since it is about environmental sustainability, for example, the landfill and pollution in the fashion industry is severe, and ecological sustainability because overuse of natural resources will lead to destruction of ecological balance. So that's why sustainability is important.

LCA is an <sup>1</sup> It is important since the sustainable designers and brands can use this method to check if the processes they use are sustainable and help for decision making in order to reduce environmental pollution. It also can enhance the transparency of the fashion industry so that the customers can easily know the process of making the clothes and enhance the competitive advantage of the businesses that follow the LCA. All in all, the LCA is important to the fashion industry because it can help the sustainable designers and brands to make more informed decisions to reduce the environmental burdens and can promote the sustainable development in the fashion industry.

The LCA method plays an important role in protecting the environment. It not only can improve the innovation of the resources choices, but also can reduce the resource consumption. The LCA method can help the designers assess the environmental impact of their product at each stage and optimise resource use and energy efficiency. At the distribution stage, for example, the designers can choose to support the local business which reduces the cost of distribution which can also help to protect the environment. If designers can always design in accordance with LCA, they can promote the concept of green environmental protection and truly realise the recycled development of the fashion industry.

---

<sup>1</sup> *Introduction to LCA - the Life Cycle Association of New Zealand.* (2019, June 19) The Life Cycle Association of New Zealand.  
<https://lcanz.org.nz/lca-guidance/lca-intro/>

The Sustainable Venn Diagram represents the three core elements of sustainability which are economic, environment and social. These three needs need to be met simultaneously and the centre area is the true sustainability that we need to achieve.



**Social:** Social not only relates to the human well-being, but also the equal development in society which includes race and gender equality which follows UN sustainable goal 5 – gender equality and goal 10 – reduced inequalities. Inequality threatens long-term social and economic development, so society needs to ensure the fairness and sound development of a society which is really important to achieve sustainability. For example, in the

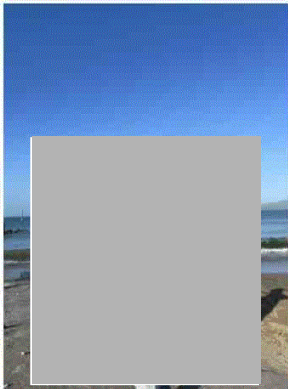
fashion industry, the workers should have equal treatment and fair salary. The rights of the workers should all be protected. Society also needs to provide equal opportunity to everyone not based on gender or race in order to achieve sustainable goals 5 and 10.

**Environment:** Environment relates to the natural resources sustainability and the environmental protection. According to the UN sustainable goal 13 – Climate Action, 14 – Life below water and 15 – Life on land, it is important to use the natural resources rationally and reduce the environmental consumption in order to protect the world to achieve sustainable development. What's more, the designs that are out of style easily and not that strong will cause landfill, resulting in global warming which will affect the eternal development of human beings. According to the United Nations Environment Programme, the fashion industry generates 20% of the world's wastewater which means during the process of making a garment, it is essential to have a water-saving scheme in order to save as much water as possible to achieve the UN sustainable goal 6 – Clean water and Sanitation.

**Economic:** It requires sustainable economic growth, employment and decent work for all which is related to the UN sustainable goal 8 – decent work and economic growth that the workers should all have fair wages and equal working conditions. And the economic growth must be based on something that does not sacrifice future economic development, which means the fashion industry needs to keep innovating that is related to the UN sustainable goal 9 – Industries, Innovation And Infrastructure. While promoting the economic growth, poverty must be reduced until no poverty since the poverty is not conducive to economic growth, affect the human well-being.

## **Analysis of sustainable outcomes**

I will analyse the following sustainable outcomes.



Sustainable outcome 1 ( jacket that I made this year)

This outcome is a multifunctional jacket which is able to turn into a shorter jacket by unbuttoning the lower half which is sustainable. What's more, the sleeves and the pockets are all made from recycled jeans which is also sustainable. The fabric is high quality denim which can make the garment last longer. The seam method I used is strong that can make the garment last longer.



Sustainable outcome 2

This outcome is designed by [redacted] who is a denim designer from a sustainable brand called The [redacted]. This jacket is made from [redacted] aged inventory and irregular and leftover samples. He designed the jacket as simple and casual as possible since he hopes people can easily wear it and it is suitable for people in all age groups. The top stitch was used that can let the jacket last longer because it reinforces seams.<sup>2</sup>



Sustainable outcome 3

This outcome is designed by [redacted] which is a sustainable brand that recycled old jeans from vintage warehouses and deconstructed them to design new garments. The jacket is also simple so won't be outdated easily which means it can be worn for a long time. This jacket is also suitable for people in different age groups and from different cultures because it is not revealing.<sup>3</sup>

---

<sup>2</sup> Collective, T. R. (2020b, May 4). Big on courage. Low on climate. *The R Collective*. <https://thercollective.com/blogs/r-stories/denim-reimagined>

<sup>3</sup> ReJean Denim. (n.d.). *Sustainability*. <https://rejeandenim.com/pages/sustainability>

### **Sustainable outcome 1**

In order to achieve the sustainability of the jacket, I chose high quality denim which is 100% cotton because it is natural, durable, biodegradable and environmentally friendly which is related to the environment part in the Sustainable Venn Diagram. The sleeves and pockets are made from recycled jeans. I cleared out the jeans that I wouldn't wear anymore, deconstructed and recycled them in order to save the fabric and the cost which is about the economic in the Sustainable Venn Diagram. Before making the jacket, I put the pattern onto the denim rationally to make sure I can save as much fabric as possible. I chose the high quality denim and recycled jeans as my resource, and they are all sustainable which means I have a good start in the life cycle.



I did many different tests like a seam test to ensure I used the best way to sew the jacket, resulting in letting the jacket last longer and make the manufacturing part in the LCA more sustainable. For example, I did the top stitch in the collar and pockets in order to keep them always in the perfect positions, increase durability and reinforce the seams. For the embroidery, I got the embroidery tool from my mother which means I can save the cost to make the economic part more sustainable. During the manufacturing, I used two different sewing methods in order to make it last longer and I spent a lot of time in the embroidery part, so the jacket is unique and I

won't throw it away. In order to make the jacket more sustainable, I put some buttons on it to make it able to turn into a shorter jacket if the lower half is unbuttoned. It can make the jacket multifunctional and practical that people can wear it in any weather. But if the buttons are used very often, they may get worn and the fastness may not be good enough which makes the garment not that strong which is the negative part of the design decision. The reason why I used the buttons instead of zips is because I plan to recycle it if I am not wearing it anymore, so the buttons will be more suitable to recycle and let the jacket have a good "End Of Life".

It is a denim jacket and in the dark colour which means it doesn't need to be washed often because it won't get dirty easily. The advantages of not needing to be washed often are not only can save the resource like electricity and water, but also can make the jacket last longer that they won't get wear easily which are related to the "Use" part in the LCA.

The jacket I design is loose, so even when I grow older, this jacket can still be worn. Because this jacket is not revealing, so it is suitable for people in different age groups and from different groups to wear it. Based on the explanation above, the jacket I design achieves sustainability in the social part in the Sustainable Venn Diagram.

## **Sustainable Outcome 2**

The outcome 2 is made from [redacted] aged inventory and irregular and leftover samples. We are able to see the pockets are made from recycled jeans which are sustainable. For the resource part of the LCA, [redacted] used recycled denim garments to make the jacket that can let the denim have extra lives and make the jackets more unique. But the recycled denim may be less durable and more prone to wear and tear and also causes design limitations which are the negative part of this design decision. The designer also created a unique system that is based on each garment's shape to disassemble them suitable and then redesigning so he can save as much fabric as possible. This decision of using recycled denim not only can protect the environment, but also can save the cost which are related to the economic and environment parts in the Sustainable Venn Diagram.<sup>4</sup>

[redacted] is a designer in [redacted] which is a sustainable business that cooperates with a professional local sewing establishment. During the manufacturing part in the LCA, [redacted]<sup>5</sup> In order to achieve sustainability of the social part in the Sustainable Venn Diagram, the jacket that [redacted] designed is loose and simple which is suitable for people in different age groups to wear. What's more, [redacted] which is the business the designer works for has their own code-of-conduct and they provide fair wages and working conditions to all the employees. They also treat every employee with respect and equality.



Since the design is a dark colour jacket that won't get dirty easily, so it doesn't need to be washed often. In addition, the jacket can be washed in cold water by washing machine which is sustainable because it can save electricity, prevent the wear of jacket fibres due to high temperature and prolong the life of clothes. In addition, there is a QR code inside the jacket that every customer can know more about the jacket and can be inspired about how to care for the jacket. The [redacted] did a good job in the use part of the LCA.

The [redacted] is a social impact business in London and Hong Kong which means it's convenient for the customers in the UK or in China to order their products. So the business can be sustainable in the distribution part in the LCA. They also did a good job in the "End Of Live" part of the LCA that the customers can send their unwanted

---

<sup>4</sup> Collective, T. R. (2020, May 3). Meet the designer, Jesse Lee. *The R Collective*. <https://thercollective.com/blogs/r-stories/meet-the-designer-jesse-lee>

<sup>5</sup> *R Manufacturers*. (n.d.). The R Collective. <https://thercollective.com/pages/r-partners>

clothes back to [redacted] so that they can keep the product in use again instead of ending up in landfill.

### **Sustainable Outcome 3**

The outcome 3 is a design made from recycled denim which is related to the environment and economic parts of the Sustainable Venn Diagram because these materials are environmentally friendly and can save the cost. For the resource part of LCA, the [redacted] recycled the old jeans from the local denim warehouse, all hardware and labels they buy are from local stores in order to keep the carbon footprint to a minimum and deconstruct them to design new garments. Using all local materials is a sustainable design decision, but the local businesses have limited materials options, and the designer may not be able to select the most suitable materials. In addition, the supply of the materials may be unstable since local companies are smaller and have more limited supply chains than larger companies, resulting in the designer not being able to produce the clothes as intended.

During the processing part of LCA, they sort the jeans into sets of 3-4 carefully coordinated colours and deconstruct the jeans. They prepare each piece for pattern cutting and reconstruction carefully which can maximise the use of the jeans. They have an in-house wash and dry facility so that they can save as much water as possible which can protect the environment. These actions show how the [redacted] achieves sustainability in the environment of the Sustainable Venn Diagram.

[redacted] uses recycled paper and craft tape to package each order and ship by road via [redacted] as their distribution ways which are sustainable because they have extensive coverage and full tracking ensure that packages can be delivered quickly and safely to customers.

The jacket is loose so that people in different age groups can wear it which is sustainable in the social part in the Sustainable Venn Diagram. This jacket doesn't need to be washed often because it is made from denim and can prevent jacket fibre damage which is good for the use part in LCA.

### **Compare and Contrast**

#### **What I do the same as the designers:**

- We choose high quality fabric in order to let the garment last a long time.
- We all used recycled denim garments as part of our jackets.
- We all try to design the jacket as simply as possible to let the jacket not go out of style easily.
- The jackets are loosely designed, not revealing and convenient to put on.

### **Differences:**

- The designers work with professional sewing agencies, so the jackets are sewn very well. My sewing skills are not proficient, so the sewing effect of this is not good enough which may cause the jacket not to last a long time.
- The jacket I design is a multifunctional jacket that can be worn in two different ways, not the same as other jackets that can only be worn in one way.

The jacket I designed is unique since it is a multifunctional jacket with hand-made embroidery which means a lot to me. The jackets that designers designed are also special since the fabric they chose are all recycled denim garments which set them apart from other jackets on the market. Although these jackets are different, their designs are special and not easily outdated, customers may be more willing to keep them for a long time.

### **Innovations:**

**Innovations I made:** I used recycled jeans as part of my jacket and used buttons to achieve the multifunction. I also do the embroidery at the back and the pocket.

**Innovation designers achieved:** They all use recycled denim garments to make the jacket.

The innovation I made of using buttons to achieve the multifunction can let the jacket be able to be worn in two different ways so that I don't need to buy two kinds of jackets in the future. In addition, I spent a lot of time doing the embroidery, so it means a lot to me that I won't throw it away and keep wearing it so it won't go in the landfill.

The innovation that designers achieved made the jackets more unique since the jackets are made from different colour and texture denim garments. The customers are willing to keep the special jackets and since they are sustainable, they may support the sustainable fashion and reduce waste in the future.

### **Competing Priorities**

The most important part of the jacket is the fabric choice. Because the fabric will affect the comfort and durability which is the sustainability of the jacket. For this part, at first, I plan to use the recycled jeans to make the whole jacket. But I didn't have enough jeans which means I only can use the recycled jeans to make the sleeves. For the main part of the jacket, in order to make the jacket last a long time and be more sustainable, I decided to use the high quality denim which is 100% cotton though it is more expensive than other ones. Though it is a higher cost, it is worth it since it can make the jacket stronger.

The second most important part is the hand embroidery. Because it takes a long time and has a big impact on the appearance. The embroidery can not only make the jacket unique, but also can make the jacket more textured and layered which is really important. There are a few sewing skills like running stitch and back stitch. I did

different tests in order to choose the best sewing methods and the results show the back stitch is the most suitable one. Although the back stitch method takes a long time, it can make the embroidery stronger and last longer which is more sustainable. So I decided to choose the back stitch as my main embroidery method since it can stay for a long time.

The third most important is the set-in sleeves, because it can affect shoulder mobility and the shape of the jacket. If I was not able to make it well, the stability of the jacket will not be that good and not comfortable to wear. I chose the classic insertion to make this technique instead of using a two-step method because classic one can have a stable structure and high quality appearance though it took more time to sew well. In my opinion, making the jacket more high-quality and lasting longer is more important than the time spent.

In the Sustainable Venn Diagram, my most successful parts are the economic and environment parts. Because I used recycled jeans as part of my jacket and got embroidery tools from my mother which can help me save a lot of cost. What's more, the jacket I designed is a multifunctional jacket which means I don't have to pay extra money to buy other kinds of jackets. I also achieved the environment part well because I used recycled jeans as part of my fabric that reduces the natural resources consumption. In addition, I paid a lot of time to make the embroidery which makes the jacket unique and it is a classical design that won't go out of style easily, so I won't throw it away which will not go into the landfill.

My design, [redacted] design and [redacted] design are all use recycled denim as part of our jackets. [redacted] used the vintage jeans, [redacted] used the aged inventory and irregular and leftover samples and I used the recycled jeans. This decision is viable since from the economic point of view, the recycled denim materials do not cost a lot of money and from the environmental point of view, using recycled fabric can help protect the environment. My jacket and the other designers' designs all meet the requirements of sustainability of economy and environment that protect the environment while supporting circular economy and reducing consumption costs. Our designs are sustainable because they are bearable, equitable and viable since the jackets meet the sustainability of social, environment and economic. These jackets are designed to promote social equality while supporting sustainable economic development and protecting ecological balance.

### **Compromises**

The compromises I made in my practice are the **embroidery** and **lower half part of the jacket**. The embroidery tools I got from my mother, she brought that from China, so there are not too many kinds of sewing thread and they are all the traditional colours, which means I have to choose from them. I have no way to choose the best colour for the patterns, otherwise I would have to spend extra money

on sewing thread which affects the economic part of the jacket. Another compromise I did is the lower half part that I didn't do the overlock of the fabric first which may cause the denim to wear in the future. Because I did this part in a rush, I was not able to fix the problem, otherwise I need to cut extra fabric and redo the sewing which will use more resource and extra time. This compromise can save money and be more sustainable. However, it will affect the durability of the clothes. I spent most of the time and effort in the manufacturing in order to make the jacket well so that it can last a long time and be comfortable to be worn. The resource component is also essential because high quality fabric also plays an important role in the jacket, so I spent most of the money in order to make the jacket more sustainable. During the process, I kept asking stakeholders' feedback to make sure the decisions I made were suitable. For example, before I cut the pattern pieces out, I asked my teacher to have a check, she found out the better way to put the pattern and help me save much fabric which means it is really important to get the comments from the stakeholders.

### **Relevance**

**Environmental:** Improving the resources part will play a great role in protecting the environment since the clothing raw material mining consumes lots of non-renewable resources. For example, the outcome 3 which is a design by [REDACTED] that uses recycled jeans to make a jacket can provide a good idea of resources that use recycled fabric. Choosing the recycled fabric or degradable material can reduce the carbon footprint and reduce the impact on the environment and use the material from "End Of Life" to finish the life cycle to achieve sustainability.


**Economic:** We all know that processing and manufacturing will use electricity, water or many other energy that will cost a lot of money in production. The outcome 3 shows the innovation that uses less water during the processing by having an in-house wash and dry facility. In addition, using renewable energy sources such as solar power can reduce the cost and energy consumption.

**Social:** The outcome 2 is the design by [REDACTED] who is the designer in The [REDACTED]. The business has their own code-of-conduct that provides a fair and equal working environment to the employees. The working conditions are also good so that they can work safely. It shows [REDACTED].

Through having the innovations in environmental, economic and social, not only can make the garments more sustainable like using biodegradable fabric, but also can reduce the sources consumption like use recycled materials or renewable energy

---

<sup>6</sup> *The R Collective | Code of conduct.* (n.d.). The R Collective.  
<https://thercollective.com/pages/code-of-conduct>



sources and improve the equality of the society that provides fair wages and safe working environment. These can promote social progress and sustainable human development to achieve sustainability in the future.

The practice I did is a multifunctional denim jacket and the sleeves are made from recycled jeans. This practice not only reflects that the people are concerned about sustainable fashion and the pursuit of environmental protection in the present society but also shows that sustainable fashion design will be the trend of the future. With the development of the trend of social sustainability in the future, multifunctional jackets are in line with future society's expectation for sustainable development and can be improved through adding more technology in order to drive innovations. For example, smart fibre materials can be used to adjust the breathability of jacket by detecting the environment. At high temperatures, it can have strong breathability. When the temperature is low, the breathability becomes poor. By changing the breathability of the jacket, it can be worn all year round which is more sustainable. The people will be more inclined to buy more durable and environmentally friendly clothing, and detachable jackets can better reflect consumer's environmental awareness and social responsibility.

#### References

- Introduction to LCA - the Life Cycle Association of New Zealand.* (2019, June 19) The Life Cycle Association of New Zealand.  
<https://lcanz.org.nz/lca-guidance/lca-intro/>
- Collective, T. R. (2020b, May 4). Big on courage. Low on climate. *The R Collective*.  
<https://thercollective.com/blogs/r-stories/denim-reimagined>
- ReJean Denim. (n.d.). *Sustainability*.  
<https://rejeandenim.com/pages/sustainability>
- Collective, T. R. (2020, May 3). Meet the designer, Jesse Lee. *The R Collective*.  
<https://thercollective.com/blogs/r-stories/meet-the-designer-jesse-lee>
- R Manufacturers.* (n.d.). The R Collective.  
<https://thercollective.com/pages/r-partners>
- The R Collective | Code of conduct.* (n.d.). The R Collective.  
<https://thercollective.com/pages/code-of-conduct>

## Excellence

**Subject:** Technology

**Standard:** 91363

**Total score:** 07

Q	Grade score	Marker commentary
One	E7	The candidate demonstrated a strong understanding of sustainable design through a thorough analysis of a case study and their own practice. They identified and thoughtfully evaluated key competing priorities and compromises within their analysis.