



A study considering
methods to extend the
lifespan of fast fashion
garments whilst
maintaining the
psychogenic need for
“endlothed cognition”

The Reactivation of Fashion waste



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Author's Declaration

I declare that the work in this dissertation was carried out in accordance with the regulations of the University of Wales, Trinity Saint David. The work is original except where indicated by special references in the text and no part of the dissertation has been submitted for any other degree.

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Abstract

The fashion and textile industry for too long has been responsible for large proportions of the annual global carbon budget and is responsible for twenty percent of global water pollution. Alongside new methods for fabric and textile creation and methods to lower emissions from the outsource, the Ellen MacArthur foundation suggested that clothing that's already in circulation could also play a part in reducing the annual carbon and water pollution load. Estimates from Wrap that a small increase in the second-hand clothing market can make four percent water and three percent co2 emissions per tonne for every garment increasing its lifespan by fifty percent. This study considered firstly whether there were in fact garments hoarded in general public's wardrobes currently fashion waste that could be reactivated and enjoyed by someone else, and if so, what sort of proportion might be available for reactivation. The action workshop revealed an average of 4 items were hoarded per participant in the thirty person trial, and these items were reactivated and enjoyed by other participants, taking into account an equal quota was donated and exchanged, leaving little remaining fashion waste. The study secondly sought to attain whether and which sustainable practices might entice the chosen demographic of 18-35 into lengthening the lifespan of their garments. Findings demonstrated that clothing exchange was a popular choice and method to increase longevity in garments, in turn hopefully slow fast fashion consumerism and with significant statistical findings supported by the data. The third hypothesis considered the psychogenic effect that may hold some back from only utilising the second-hand market, the inner need for a feel good factor, which the researcher felt could potentially be a strong reason behind fast fashion consumerism in the 18-35 demographic. The upcycling proved less popular but both methods satisfied the need for enclothed cognition, again particularly the provision of a clothing exchange platform possibly due to the ready to wear factor of a new garment similarly obtained when shopping in stores. The study aims to add research and data to support existing literature around the upscaling of sustainable practices in the general population and potentially to commercial scale through local authority provision of the learning of skills such as upcycling and the concept of exchange as a new trendy path for consumerism.

Acknowledgments

I would like to thank my supervisor Lara Hopkinson for her timeless dedication and guidance during the course of this research project. I would also like to acknowledge the individuals that participated and engaged with the study and enabled this research to be possible Rhian Jenkins, Christopher House, Beverley Holland and David Williams. I would additionally like to thank my friends Sophie Preston and Alicia Priestly for their help with the event and Lynnet and Jeremy Dodds for their dedication and patience.

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Introduction 1.0

There is little doubt that the impacts of climate change are being felt worldwide and are having very real consequences to national economies, human life, biodiversity, and terrestrial/marine environments (Kappelle, Van Vuuren and Baas, 1999; Meehl *et al.*, 2007; Solomon, 2007; Moss *et al.*, 2010; Le Quéré *et al.*, 2015; Smale *et al.*, 2019). There are a number of industries in the forefront of debate around this issue, but there is a serious lack of attention to fashion waste and the multi-billion-pound fashion and textiles industry (Ellen MacArthur Foundation, 2017; Environmental Audit Committee, 2019) currently ranking second worst for pollution next to oil and gas, just above the meat and dairy industry (Moorhouse and Moorhouse, 2017; Uk Parliament Environmental Audit Committee, 2019). In 2015, the adopted Paris agreement highlighted the need to keep global average temperature rise to well below two degrees Celsius this century, and as close to one point five degrees Celsius as possible (Allen *et al.*, 2018; Masson-Delmotte *et al.*, 2018; UNFCCC, 2018; Uk Parliament Environmental Audit Committee, 2019). The UN fashion Charter was born at COP24 in December of 2018, an industry led initiative backed by forty three companies, which aligns the fashion industry with the Paris Agreement, setting a course towards carbon neutrality by 2050 (UNFCCC, 2018).

The majority of biotic things have some kind of symbiotic relationship with Planet Earth, giving as much as they take. Photosynthesis, the process in which plants convert water and carbon dioxide into energy, and release oxygen, a waste product which is essential for life as we know it (National Geographic, 2011). This is a similar process to the methodology of a circular economy, a system which continually feeds back into itself without the need for new resources. The fashion industry is wasteful from the outtake from the cotton farming process to the delivery of finished garments. In order to make these necessary savings throughout the different areas of the fashion chain, there is a need to make the move from a linear economy to a circular economy.

The Waste and Resources Action Programme (WRAP) estimates that as small as a ten percent increase in second hand sales could cut carbon emissions per tonne of clothing by three percent and water use by four percent if it extends the active life of a garment by fifty percent (table 1) or if garment were extended to nine months longer usage, eight percent carbon, ten percent water and four percent waste saving per tonne is achievable (fig1) delivering clear environmental benefits (WRAP, 2017a).

Table 1 table showing possible reduction percentages of second-hand sales – wrap, 2017

Second hand sales	% reduction when applied to		
	2% of clothing	5% of clothing	10% of clothing
Carbon (MtCO ₂ e)	-1%	-1%	-3%
Water (m ³)	-1%	-2%	-4%
Waste (tonnes)	0%	-1%	-1%

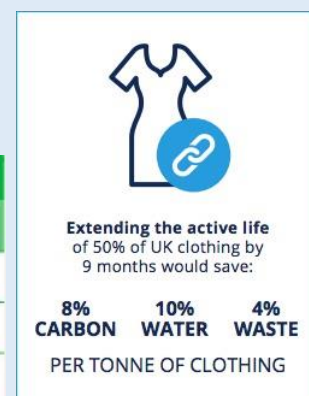


Figure 1 Diagram showing possible savings to carbon, water and waste – wrap, 2017

Point 11 of the UN Fashion Charter, which was formed at the Conference of the Parties, edition 24 (COP24) in Poland and stated that to achieve carbon neutrality there was a need to make serious changes.

“Establish a closer dialogue with consumers to increase awareness about the GHG emissions caused in the use and end-of-life phases of products, building towards changed consumer behaviours that reduce environmental impacts and extend the useful life of products” (UNFCCC, 2018)

This research aims to collect a mix of quantitative and qualitative data, through an action workshop, to understand whether there are in fact clothes hoarded in peoples wardrobes that could be reactivated and whether educating the public on sustainable practices such as upcycling or exchange can help to reactivate fashion waste, therefore lengthening the life of fast fashion garments, whilst still satisfying consumers psychogenic needs. Furthermore, the research aims to support existing literature that recommends the upscaling of upcycling to commercial level and contribute insight towards ambitions for a circular fashion economy, and decreased carbon footprint for the industry.

Fast Fashion 1.1

The fashion and textile industry to date uses ninety eight million tonnes of non-renewables annually and contributes to around ten percent of annual global GHG emissions (Ellen MacArthur Foundation, 2017). More than that of all international flights and maritime shipping combined. It's been implied that if the industry does not find new solutions, these figures are set to triple, with demand for clothing rapidly growing, in turn contributing catastrophically to global temperature rise. A recent study by the United Nations Framework Convention on Climate Change found that by 2050 the fashion and textiles industry could use more than twenty six percent of the carbon budget associated with a two-degree pathway (UNFCCC, 2018), indicating there is a drastic need for change and awareness to be brought about rapidly by industries with heavy carbon footprints. The sustainable clothing action plan (SCAP) 2020 was launched after The Waste and Resources Action Plan (WRAP) 2012, a pioneering report, looking at the environmental impact of clothing which in turn provided a collaborative framework for fashion companies to reduce their water, carbon and waste impacts (WRAP, 2017a). Some targets agreed upon by SCAP are outlined (fig2) and to achieve these goals and the move to a more circular economy, a number of aspects of the industry needs realignment.



Figure 2 A diagram showing targets agreed upon by SCAP for 2020 against a 2012 baseline - SCAP, 2018

Secondary Clothing Market 1.2

Fast fashion has aided the growth of a second-hand fashion industry through its disposability, recycling and marketing and the second hand garment industry has become a great addition to sustainability, with charity shops and the textile recycling industry providing essential ecosystem services and currently displacing about 8m tonnes CO₂ per year globally (HOC Environmental Audit Committee, 2019). According to a report by Thred Up, a national online resale clothing company, catering to higher end and unique items, the second-hand market is set to double over the next five years (fig 3) with the resale sectors predicted growth. The resale sector caters more to higher end and less used (but still second-hand) items, and the sector is growing in popularity (Reinhart, 2019). The second-hand market is no longer reserved for a certain audience, the market now attracts customers from varying social sectors with celebrities wearing vintage and ‘fashionistas’ proudly claiming their usage of thrift, these stores are no longer only for people with financial constraints.



Figure 3 Bar chart showing total second-hand apparel market to double in 5 years with resale sector driving the growth - Thredup, 2019

The second hand market has the opportunity to offset carbon through reactivating clothing which might otherwise be sent to landfill, although many articles suggest that only a small percentage of clothing sent to the second hand market is actually reactivated, with large proportions being shipped to low economy countries such as Ghana (which is currently the leading destination for UK used clothing), in less than adequate landfills to release methane gas (Sabanoglu, 2020).

There have also been discrepancies found from the amount of clothes purchased and the amount sent to landfill, suggesting there is a large portion of clothing missing in action and likely sitting in the back of many consumers wardrobes, not fulfilling its usage lifespan. The average amount of times that a garment is worn, before being discarded or relegated to the back of wardrobe has decreased (Han, Tyler and Apeagyei, 2015) and a huge sixty percent of German and Chinese citizens profess to owning more clothes than they feel necessary (Ellen MacArthur Foundation, 2017). It is therefore presumable that these hoarded items could be utilized given correct incentive and potentially upscaled through implementation of such services by retailers or local authorities (providing exchange platforms and opportunities to learn sustainable practice).

Fashion Psychology 1.3

When regarding the idea of transforming the way clothes are used to break free from an increasingly disposable nature, an often-overlooked area of perspectives is the pleasure factor/dopamine release associated with fast fashion, which may need addressing further when regarding consumer attitudes. Figure 2 shows the different motives for purchasing clothes.

An article found on fashion psychology introduced the term “enclothed cognition” which describes the systematic influence that clothing can have upon the wearers psychological processes and defined that this entailed the co-occurrence of two individual factors (fig 4); the symbolic meaning of the clothes and the physical experience of wearing them (Adam and Galinsky, 2012).

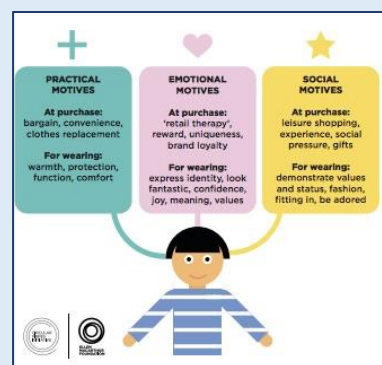


Figure 4 A diagram showing that the relationship between people and clothing is complex - highlighting motives - by Ellen MacArthur Foundation 2018

Aims and objectives 1.4

Aims

- Understand whether educating the general population on methods of extending the life and style of the items could help lengthen the lifespan of short-lived fashion items
- Understand how the population could break free from the disposable nature of fast fashion clothing
- Identify which of the aforementioned routes could produce the longest lasting results, in turn reactivating fashion waste
- Understand whether sustainable practices fulfil the societal psychogenic need for expression through clothing.
- Bring about awareness of the harmful effects of fast fashion and the inherent need for change

Objectives

- Collect data on sustainable practices and test which methods help participants to reactivate their fashion waste, i.e. through upcycling or clothing exchange
- Facilitate the learning of sustainable practice through provision of an action workshop demonstrating sustainable practices such as upcycling and clothing exchange
- Research the psychology behind fashion purchase and understand through qualitative data how to fulfil the societal need for 'enclothed cognition' whilst using sustainable practice
- Make use of statistical packages to analyse data for more accurate conclusions

Hypotheses 1.5

H1.

Garments hoarded have plenty of lifespan remaining and could be adopted by new users, reducing the demand for resource intensive fast fashion.

H2.

The learning of sustainable practices can help to reactivate fashion waste and lengthen the span of garments.

H3.

Upcycled or exchanged clothing can provide the same psychogenic effect of “feel good factor” as fast fashion garments.

Literature Review 2.0

Climate Change 2.1

The temperature and biodiversity of planet Earth is highly dependent on the existence of naturally occurring greenhouse gases (GHG) such as CO₂, and many others listed within the Kyoto Protocol (Pachauri, 2018). Since the industrial revolution and the rise of burning fossil fuels, the global climate has become susceptible to warming caused by the large extra quantities of these gases created by anthropogenic activity (Solomon, 2007). Evidence of these climatic changes have been apparent since the 1860's when a renowned physicist John Tyndall recognised the Earth's natural usage of GHG and implied that even slight changes could affect the atmospheric composition and bring about variations in climate (Hulme, 2009). In 1896 Arrhenius first predicted the growing levels of Carbon Dioxide residing within the troposphere could severely alter surface temperature (American Institute of Physics, 2020). There have clearly been issues with global temperature rise recorded by scientists and analysed over many decades, though the majority of the warming has taken place during the last thirty five years, with 2016 being the warmest year on record and the months from January to September the warmest individual months on record (NOAA, 2017). Warming oceans have absorbed a large proportion of this rising heat with surface temperatures showing warming of more than 0.4% since 1969 (Levitus *et al.*, 2017)

Some evidence showing the visible effects can also be found when considering the Ice sheets over Greenland and the Antarctic which have decreased in mass. Nasa's Climate experiment showed Greenland lost an average of two hundred and eighty six billion tons of ice per year between 1993-2016, while Antarctic lost roughly one hundred and twenty seven billion tons over the same period (University of California - Irvine., 2020; Velicogna *et al.*, 2020). During the last decade the Antarctic has lost triple the ice mass as previous decades (NASA, 2018; University of California - Irvine., 2020; Velicogna *et al.*, 2020). Other affects such as glacial melt, ocean acidification, declining arctic sea ice and extreme events all confirm the fact that human activities need to be reorganized (Solomon, 2007).

The fifth assessment IPCC report states that the global climate needs to stay below two degrees by 2020 and suggests that human intervention through mitigation is needed to reduce the carbon sources and increase the carbon sinks. (Allen *et al.*, 2018; Masson-Delmotte *et al.*, 2018; UNFCCC, 2018; Uk Parliament Environmental Audit Committee, 2019). Industry is clearly one of the prevalent causations when considering climate change with carbon dioxide Co2 concentration in atmosphere rising from around 280ppm preindustrial revolution to the projected four hundred and eleven Ppm throughout 2019 (Lüthi *et al.*, 2008; Lindsay, 2020). A forty six percent increase since the start of the industrial revolution. Temperature records reliably kept since 1850 show our planet is now about one degree Celsius hotter since our industrial era began. In order to restrict global temp rise to one point five degrees Celsius, GHG emissions need to fall by forty five percent by 2030 and zero by 2050 (IPCC, 2018)

Climate Change and The Fashion Industry 2.2

The fashion industry is responsible for creating large amounts of fashion waste and the multi-billion-pound fashion and textiles industry (Ellen MacArthur Foundation, 2017; Environmental Audit Committee, 2019) ranks second worst for pollution next to oil and gas (Moorhouse and Moorhouse, 2017; Uk Parliament Environmental Audit Committee, 2019). In 2015 the fashion industry produced almost five percent of manmade co2 emissions, one point seven billion tonnes of co2 (Petty, 2019).

Table 2 Changes in the carbon, water, and process waste footprints (per tonne) of UK clothing in active use in 2012 and 2016 - wrap,2017

	2012/tonne	2016/tonne	% change/ tonne
Carbon (tonnes CO₂e)	25.3	23.2	-8.29%
Water (m³)	7,570	7,060	-6.68%
Waste (tonnes)	1.7	1.7	0.00%

Carbon Dioxide Emissions 2.2.1

The Fashion Industry is currently responsible for ten percent of the global carbon budget and a recent study by the United Nations Framework convention on Climate Change found that by 2050 the fashion and textiles industry could use more than twenty six percent of the carbon budget associated with a two-degree pathway (UNFCCC, 2018), indicating there is a drastic need for change and awareness to be brought about rapidly by industries with heavy carbon footprints. In 2016, according to a report from Quantis, the fashion industry emitted the equivalent thirty nine thousand million metric tonnes of carbon dioxide and total GHGH emissions were equal to one point two billion tons annually more than all maritime and flight combined (Pauline Chrobot et al, 2018; Cerullo, 2019). To produce a single pair of jeans equates to thirty three point four kg of carbon emissions. A continuation of this and the obvious equitable growth of demographic and lifestyle patterns, the global apparel consumption could rise from sixty two million metric tons in 2019 to over one hundred millions tons by 2030 (Reinhart, 2019).

The Sustainable clothing action plan is a collaborative framework which companies can voluntarily join agreeing to commit to industry led targets such as fifteen percent reduction in water and co2 emissions and landfill. Signatories so far have made significant improvements and saved the equivalent of one and a half hot air balloons of co2 and twenty three thousand baths full of water (WRAP, 2017b). Despite the improvements in co2 per tonne, the emissions total footprint for clothing in UK was still two million tonnes increased from 2012. Below bar charts (fig 5) and table 2 above indicate the amount of carbon, water and waste for each item of clothing made

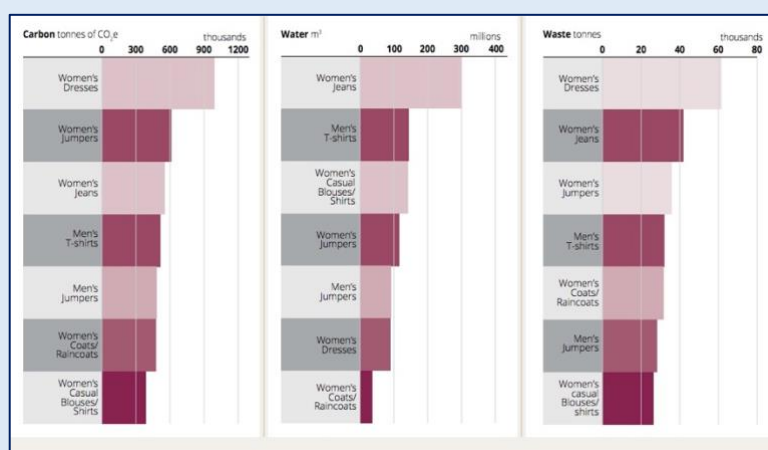


Figure 5 bar chart showing amounts of carbon, water and waste for each item of clothing made - wrap,2017

Water Pollution 2.2.2

The production and processing of cotton requires large quantities of water, arguably more than many other agricultural commodities due to the need of ground and surface water diversion for irrigation which can lead to loss of freshwater from evaporation and inefficient water management (WWF, 2020). It also requires the high use of pesticides and fertilisers which contributes to water pollution and in some places such as the Citarum river in Indonesia (fig 6), which is a hub for the dying of textiles and production of viscose, pollution levels can be 1000 times that of the US standard for drinking water, containing shockingly high quantities of lead, arsenic, mercury and a variety of other toxic chemicals (Cita-Citarum, 2014; Marselina and Burhanudin, 2017). To create a single t-shirt can take up to 3000ml of water and 10,000 for a pair of jeans though there are varying reports with UNEP reporting 3781 litres to make a pair of jeans from production to delivery of final product (World Bank Group, 2019). The global fashion industry is responsible for 20% of all industrial water pollution (Greenpeace, 2013; Ellen MacArthur Foundation, 2017) The fashion industry is highly resource intensive from the outset.



Figure 6 Image showing water pollution on citarum river, Indonesia - Photo retrieved from worldcrunch.com

Disposal and Incineration 2.2.3.

The global fashion industry is said to produce ninety two million tons of solid waste annually, according to data from Greenpeace. Brands such as H&M and Bestseller to name a few are actively encouraging consumers to recycle their unwanted garments, but a large proportion is still being incinerated or shredded behind closed doors (Greenpeace, 2013). Orsola de Castro, founder of Fashion revolution states that

“We are just looking at the tip of the iceberg when it comes to waste and is the next big thing that fashion industry must overcome. It really is shocking how much factories waste (Hendriksz, 2017).

Fast Fashion 2.3

The term fast fashion is a contemporary term, used to describe a new accelerated business model, involving increased demand for varying fashion collections seasonally with fast turnaround and lower prices, that has been evolving since the 1980's (HOC Environmental Audit Committee, 2019).

Historically, since the 1800's and the invention of the sewing machine, fast fashion has been gaining momentum (Breward, 2003). Initially, runway shows inspired fashion and these shows were primarily restricted to the likes of designers and buyers, but in the late 1990's, with the rise of internet, these shows became more of a public phenomenon with photographers and press eagerly in attendance. The availability of imagery published incited retail stores such as Topshop and H&M to produce restricted designs frequently, imitating high fashion (McKinsey and Company, 2017). The demystification of the fashion process and the insurgence of fast fashion was born.

A report by Bhardwaj and Fairhurst 2010 reviewed the literature available around the changing dynamics of the fashion industry since the 1990's, drawing attention to the dramatic changes, coupled with rising environmental concerns and found the nature of fast fashion increases disposability and upscales the need for small batches, with more frequent transfers of stock, and larger variance in style required for “floor ready” merchandising (Bhardwaj and Fairhurst, 2010). This

new model only enhanced the wholly linear direction of the industry. Figure 7 highlights the dramatic rise since 2000.

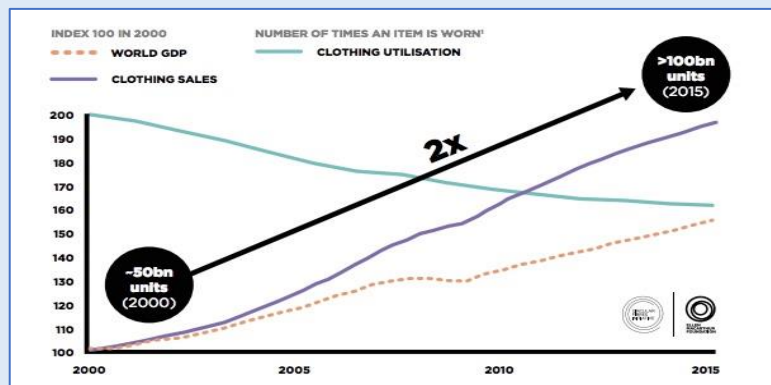


Figure 7 Graph showing growth of clothing sales and decline of utilisation since 2000 – Ellen MacArthur Foundation, 2018

Fashion Waste refers to the inactivity of garments, often rendered useless though they may still have heaps of physical potential life remaining (Reinhart, 2019). Fashion and various styles are transient and when a garment becomes unfashionable or a new fad comes along, these items are often delegated to the back of our wardrobes. From the production angle, manufacturing developments and the access to cheap labour have enabled prices to drop, consequently allowing consumers to buy more for their money and often incur buying binges as opposed to discerning fashion choices (Bhardwaj and Fairhurst, 2010). To keep up with the market, manufacturers are cutting corners and decreasing the quality of fabric, meaning often the garments will fade, stretch, shrink or distort. Fashion commentators such as Karen Webster, head of L'Oréal lament the homogenisation of clothing design and its supplementation of innovative design (Webster and Kevin Weng, 2008). Garments become fashion waste when the wearer perhaps changes styling, fit or shape, but often the owner may hoard the garment intending to utilise again in future. Consumption critic Juliet Schor suggest that as people become richer, they are more likely to buy items they rarely use hence increasing wasteful consumption (Schor, 2005). If this proposed correlation between wasteful consumption and affluence exists, this wasteful habit would likely continue to increase, opposite to the direction of sustainable development which is essential to reduce waste and reduce GHG associated with the industry. In 2016 based on HMR customs data, over one million tonnes of clothes were purchased in the UK, an increase of almost 200,000 tonnes since 2012. UK is the highest spending on fast fashion above any other European country (WRAP, 2017a)

Circular Economy and The Fashion Industry 2.4

The circular economy model (CE) is defined as

“an industrial system that is restorative or regenerative by intention and design, uses and reuses natural capital as efficiently as possible, and finds value throughout products’ life cycles” (Lewis, 2015)

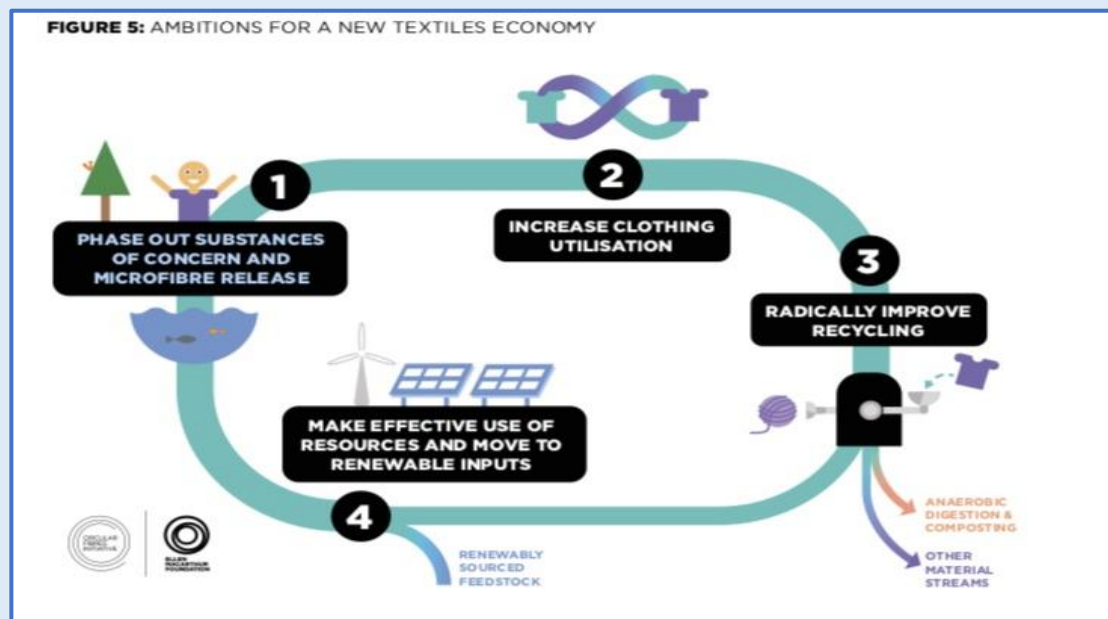


Figure 8 A diagram showing ambitions for a new textile economy, from the report by Ellen MacArthur foundation, 2018

The present linear economy model of take, make and waste is well illustrated by the clothing sector and many experts have suggested the need for change to a circular model of economy which will be a more collaborative or sharing economy (Moorhouse and Moorhouse, 2017; Koszewska, 2018; Ramkumar, 2018). A strategy known as the closed loop approach (fig 8) is based on the principle of controlling material inputs to maximise recycling and recovery of materials, minimise waste to landfill whilst greatly reducing the environmental footprint (Morris, 2017), within this system, waste does not exist, or to put it another way, one company’s waste is another company’s resources.

In December of 2018, The UN fashion Charter was born at COP24, an industry led initiative backed by forty three companies, which aligns the fashion industry with the Paris Agreement, setting a course towards Carbon neutrality by 2050 (UNFCCC, 2018). Since many articles and programs towards have arisen with

conceptual ideas regarding sustainability. It has become clear that better design and reuse can greatly reduce the materials and disposal costs (Ellen MacArthur Foundation, 2017) which can be in the region of one hundred and forty million to the economy each year. Around seventy three percent of clothing is sent to landfill and with global production predicted to rise, this costs in the region of four billion by 2020 (HOC Environmental Audit Committee, 2019). Recycling the estimated one hundred and forty eight tonnes of fashion waste predicted to be produced by 2050 could save £3.7 billion to the global economy by 2030 (HOC Environmental Audit Committee, 2019). The Ellen MacArthur foundation, in a recent report, suggested that a new model for the industry to work as a circular economy should be based on four ambitions, shown below in figure 1, providing opportunities for new economic models and technologies to emerge within the industry (Ellen MacArthur Foundation, 2017). The second ambition suggests steps towards increasing the utilisation of clothing and utilising a number of innovative recycling models emerging in the general population such as clothing libraries, upcycling and repair cafés, vintage shops, online auction sites such as eBay and peer to peer vintage/used clothing sales on sites such as “depop” and the various second-hand clothing stores and rentals/exchange’s (Tyler *et al.*, 2017; HOC Environmental Audit Committee, 2019). Suggestions are implied of the benefits to retailers possibly implementing these methodologies, in turn boosting the second hand/ fashion waste market (HOC Environmental Audit Committee, 2019). Currently less than one percent of material used to produce clothing is recycled into new clothing at the end of its life.

Sustainable Fashion and The Second-hand Clothing Market 2.5

Table 3 table showing potential reductions from extending life of garments for 3 months - Wrap,2017

	% reduction from extending life	
	20% of clothing +3 Months	50% of clothing +3 months
Carbon (MtCO ₂ e)	-2%	-4%
Water (m ³)	-2%	-5%
Waste (tonnes)	-1%	-2%

Table 4 table showing potential reductions from extending life of garments for 9 months - Wrap,2017

	% reduction from extending life	
	20% of clothing +9 Months	50% of clothing +9 months
Carbon (MtCO ₂ e)	-3%	-8%
Water (m ³)	-4%	-10%
Waste (tonnes)	-1%	-4%

When considering the estimates provided by WRAP, which suggest that as small as a ten percent increase in second hand sales could cut carbon emissions per tonne of clothing by three percent and water use by four percent (table 3 and 4) if it extends the garments life by fifty percent (WRAP, 2017a) it would seem that an obvious way to increase this industry would be to involve more of the general public in this sector. Currently the second hand industry in the form of charity shops and the textile recycling industry providing essential ecosystem services and currently displacing about eight million tonnes CO₂ per year globally (HOC Environmental Audit Committee, 2019), but 300 thousand tonnes still end up in household bins with around eighty percent incinerated and twenty percent sent to landfill where they release methane (Sajn, 2019). The sustainable clothing action plan (SCAP) 2020 was launched after The Waste and Resources Action Plan (WRAP) 2012, a pioneering report, looking at the environmental impact of clothing which in turn provided a collaborative framework for fashion companies to reduce their water, carbon and waste impacts (WRAP, 2017a). To achieve these goals and the move to a more circular economy a number of aspects of the industry needs realignment

A report for DEFRA by Oakdene Hollins and Salvation Army identified that 1812 k tonnes of domestic textile products and 53k tonnes of used products entered the secondary UK textiles market annually. Of this quantity 1165kt were disposed of by consumers and industry, leaving 397KT or 6kg per head of population per year, unaccounted for (Morley *et al.*, 2006) which indicates a large proportion of clothing and textiles are being stockpiled or left in consumers wardrobes inactive. The average amount of times that a garment is worn, before being discarded or relegated to the back of wardrobe has decreased by thirty six percent when compared to data from fifteen years previous, and it is estimated that certain garments are discarded after just seven to ten wears, with seventy percent of lifespan still remaining (Han, Tyler and Apeagyei, 2015) Wrap has found on average that clothing lasts around three years before it is passed on or discarded, which is different from the initial report valuing our clothes which assumed the lifespan of a garment was on average two years. In the UK in 2016 3.6 million tonnes of clothing are considered in active use and the amount of clothing in household residual waste in the UK has reduced by 50,000 tonnes since 2012 (WRAP, 2017a).

Second-hand clothing is becoming more desirable for people wanting to exhibit distinction who are ill content with the homogenisation of fast fashion garments, second-hand styling of vintage items and mainstream fashion directs customers to seek out particular style i.e. seventies fashion looks in second-hand stores. Fashion that is commonly trivialised and considered disposable, has the potential for becoming a valuable commodity” in the form of vintage dress (Palmer & Clark, 2005) there is clearly a particular style and look which is definably vintage.

Fashion Psychology 2.6

Clothes are thought to have quite systematic and profound behavioural and psychological actions for the wearer. Studies found for example the priest wearing a robe may signify moral aptitude and a doctor wearing a lab coat more be more precise. These studies have been tested and proven by Dr. Galinsky who found that during a trial participants wearing white lab coats were more accurate than the control group, though neither group had more or less training (Blakeslee, 2012). This suggests that clothes do hold a strange power over the wearer. An article found on fashion psychology introduced the term “enclothed cognition” describing the systematic influence that clothing can have upon the wearers psychological processes and defined that this entailed the co-occurrence of two individual factors; the symbolic meaning of the clothes and the physical experience of wearing them (Adam and Galinsky, 2012). This relates the an already well documented subject embodied cognition which is the experience of washing hands and feeling morally purer or if you carry a clipboard you may feel more important. Well known social psychologists Vaughn and Hogg 1983 explain consumption as” an attempt to reconcile an individual’s identity through the attainment of material things so that this constructed visual identity can be interpreted by the public” so consumption allows individuals a vehicle to discover and display elements of their persona or perceived persona, tastes and individuality (Pears, 2006). Economists such as Hamilton suggest consumption is a by-product of affluence and representative of income generation, meaning people spend money on goods because their means allow it. The Australia institute study on wasteful consumption revealed wasteful consumption can manifest as guilt to many consumers which brings out feelings of fretfulness (Hamilton and Barbato, 2005) Garments can be attributed to identities and garments that may be associated with “discontinued identities are often unlikely worn again (Williamson *et al.*, 2002). Garments that connect to the wearers current self-perception will be more active than items that fit similarly, but don’t fit that perception. By holding onto these garments, the women can continue to viably testify what identity has been discontinued (Williamson *et al.*, 2002).

When regarding the idea of transforming the way clothes are used to break free from an increasingly disposable nature, an often-overlooked area of perspectives is the pleasure factor/dopamine release associated with fast fashion, which may need

addressing further when regarding consumer attitudes and ways to shift to a circular economy. Figure 2 shows some of the different motives for purchasing clothes and the emotive reasoning behind choice.

Upcycling 2.7

A good example of a circular economy emerging from the fashion industry is upcycling, a strategy to extend the longevity of clothing by reactivating textile waste into raw materials for new fashion garments (Ellen MacArthur Foundation, 2017). Upcycling is the process of transforming used garments by cutting and reshaping them into new garments, by adding adornments to existing clothing, or by using used fabrics to create new garments (Han, Tyler and Apeagyei, 2015). Upcycling can preserve and extend what's already made which integrates the use of waste as a resource, fulfilling the need for change by transforming and reusing existing fashion waste, through a new closed loop model that keeps the textiles in circulation. Apart from minimising the amount of discarded materials and waste being sent to landfill, upcycling also reduces the need for production in line with use of new or raw materials, which means a reduction in air pollution, water pollution, greenhouse gas emissions and conservation of global resources (upcycle studio, 2013). Increasing the lifespan of a garment could prove the most effective means of reducing their environmental footprint. Wrap suggests that to extend the life of a garment by an extra nine months could bring 20-30% reductions in carbon, water and waste footprints (WRAP, 2017a). London College of Fashion academics suggest enhancing the appreciation of material qualities and the development of maintenance and alteration skills, such as upcycling, and the move to a mindset that prefers existing items to new ones can also act to slow cycles and volumes of consumption. suggestions of implementation within the national curriculum and apprenticeships in craft skills for textile and garment production could also be mandated to provoke these changing attitudes in a consumer's developmental stages (HOC Environmental Audit Committee, 2019)

The Nottingham Clothing sustainability research group at Nottingham Trent argued that policy needed revising and recommended that there should be government support for initiatives such as repair cafes etc. Traid argues that social responsibility can be learned through these sustainable initiative which provide the public with skills and awareness of the damages of fast fashion. The up cyclers

collective waste not want not to proclaim there is neglect within schools regarding the learning of these sustainable practices (WRAP, 2017b)

Clothing Exchange 2.8

The concept Reduce, Reuse and Recycle are the basis behind sustainable practice. The first R Reduce is the suggestion of limiting our consumer habits, so purchasing less frequently in the beginning stage. The concept behind the second R is to Reuse which essentially suggests utilising the item for as long as possible which is the concept clothing exchange falls in line with. The third R Recycle helps to ensure the item finds a new purpose when it reaches end of use, which the concept of upcycling upholds (Environmental Audit Committee, 2019)..

The process of clothing exchange is a kind of reuse strategy for more style conscious and high end fashion garments. People meet in person or online to exchange used clothing ranging from high end luxury items to vintage one of a kind pieces. The process is an environmentally friendly process for acquiring new garments, instead of using typical consumption patterns, such as new product purchase (Rathinamoorthy, Surjit and Karthik, 2019). As these items are exchanged, they gain a new lease of life which extends the product life, reducing a load on the environment (fig 9). Clothing swap also helps people to further understand “end of use” and tries to get maximum utilisation of the end of use items (Torres-Martínez, Kharissova and Kharisov, 2019). This process often takes place online through various platforms and through swap meets, events and swap boutiques, bringing clothing swap to all classes of people where people can exchange garments in an eco-friendly sustainable way.

The Ellen Mac Arthur foundation suggested the upscaling of clothing rental and exchange as a step towards a circular fashion economy (Ellen MacArthur Foundation, 2017) . A thesis paper by Pearson, K. 2006, entitled “Fashion Re-consumption; developing a sustainable fashion consumption practice influenced by sustainability and consumption theory” provided a case study analysis on the benefits of a fashion exchange system and found positive benefits to clothing exchange events, but the data was limited in that it focused on a small network of

the researcher's acquaintances as opposed to varying target groups. Pears suggested further research be undertaken on a more public basis (Pears, 2006).

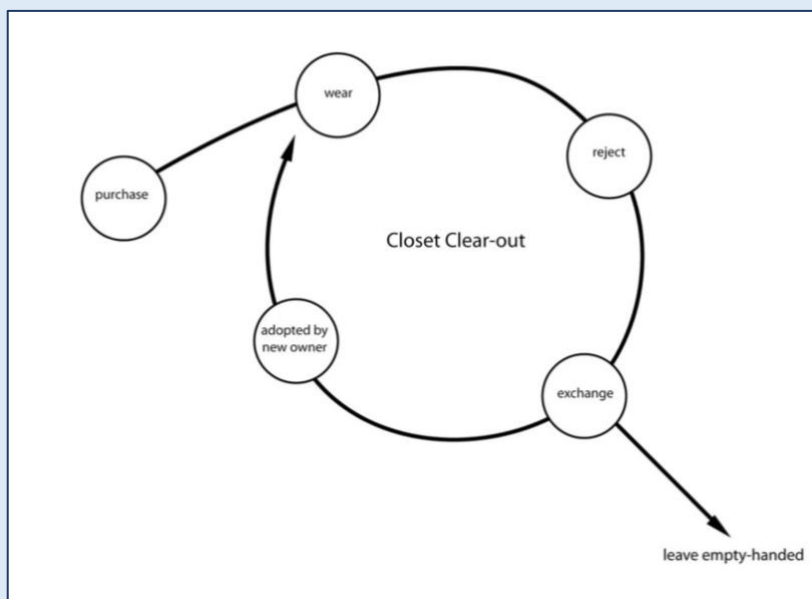


Figure 9 Model depicting the potential circularity of clothing exchange - De Montfort University, 2018

Fisher et al 2008 in a report for DEFRA implied that in western society, consumers do not typically engage in the practice of repairing or restructuring damaged clothing, other than the sewing of buttons or the repairing of hems and found that this lack of engagement can be attributed to a few factors, such as a shortage in knowledge of household skills or the price of repair, when compared to new garments and the availability of such services (Fisher, T, Cooper, T, Woodward, S, 2008), substantiating and reinforcing the importance of evaluating these sustainable strategies for fashion waste reactivation when aiming for a more circular economy, which appears largely based on achieving a better system of recycling. Figure 10 shows the percentage of people that felt confident to perform repairs and alterations in the UK in 2016.

There are a number of different events currently running such as the Little Green Wardrobe Swap in Bristol, which allows six items to be swapped and six items taken bimonthly for a charge of three pounds, this event has found success in

encouraging fashion lovers to move away from fast fashion and update their wardrobes through sustainable practice (Ellicott, 2020)

Closer to home an event called Swap don't Shop at a local venue operates around 4 times per year with a £5 entry fee including a drink. The idea of the events fills social space which might be filled with activities such as cinema, meeting friends etc, these events put sustainable practice into a fun light and has found success in reactivating fashion waste and positive experiences by consumers attending.

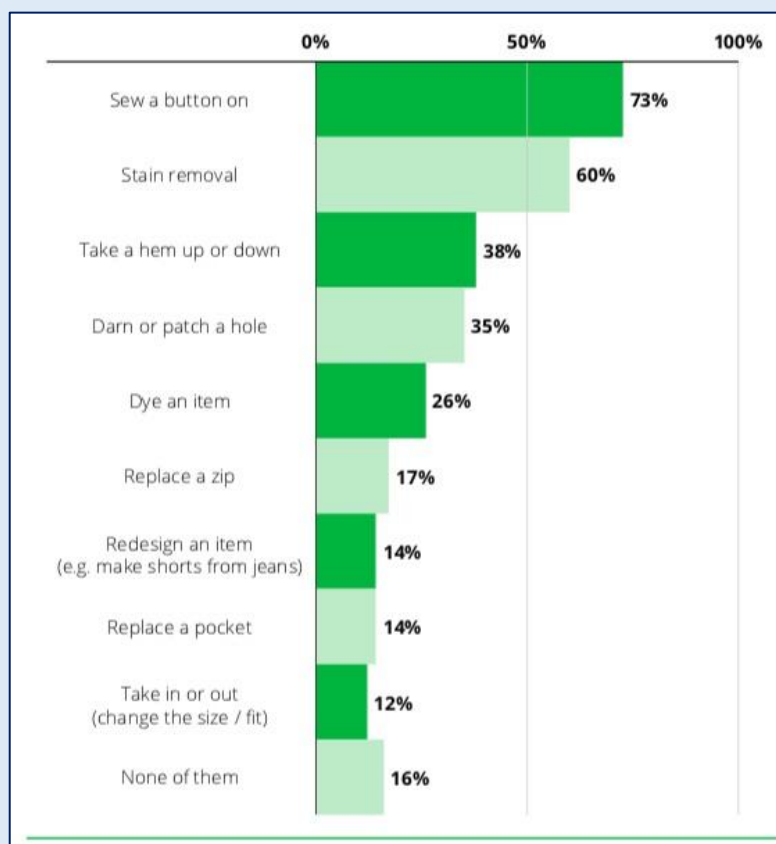


Figure 10 Bar chart showing the % of people that felt confident to perform repairs and alterations in the UK in 2016 - Wrap, 2017

Methodology 3.0

In order to test the hypotheses, an event based method was utilised following and adapting the methodology of a thesis by Pears (2006). The primary objective was to increase the understanding of how sustainable practices like upcycling and clothing exchange could be developed by participatory processes. The workshop and provision of event and exchange platform reflects the research methodology. The act of holding and evaluating an event tested the validity of the research and provided a platform to test the hypotheses (that garments exist with plenty of lifespan remaining but are hoarded when they could be adopted by new users, reducing the demand for resource intensive fast fashion, that the provision of skill learning can help to reactivate fashion waste and lengthen the lifespan of fast fashion garments).

A questionnaire was developed to firstly obtain an understanding of the participants personal details, current usage of fast fashion and equally the second-hand clothing market, the quality of the garments they were donating, their psychogenic needs for fast fashion and the feelings it inspired. The survey was piloted initially to a group of mixed gender students to ensure questions were understandable and provided the insight required for the research questions. The second survey which was administered via email, one month after the event (to allow participants a chance to use the skills learnt or wear the items exchanged) aimed to understand whether the provision of skill learning and participatory process did in fact encourage sustainable practice, thus lowering the need for resource intensive production. Questions were largely based on the participants reactions to the event and whether they had in fact used the skillset learned at the reactivate event or worn the exchanged items.

Event Plan 3.1

The event, taking place on February 20th, 2020 was hosted at the Elysium bar in Swansea, chosen due to close proximity with transport connections and the potential capacity. Participants were invited to arrive at the venue from 6pm-9pm with clothes they wished to exchange or upcycle. Tables were provided to display clothing. The thirty seven attendees were asked to complete the first survey before taking part in the active case study. Upon completion of survey, participants would select freely from garments displayed and no limit was set with quantity donated or taken (fig 11).



Figure 11 A selection of photos of the Reactivate event showing participants engaging in sustainable practice - photo - Ndodds,2020

After attending the clothing exchange participants were invited to join an upcycling workshop hosted by a local upcycling expert who runs a small local upcycling business, producing garments and teaching the upcycling of fabric skillset, chosen for her knowledge on the subject . During the workshop first the environmental and ethical benefits of upcycling were discussed and a variety of techniques to re-use fabrics and reshape garments were demonstrated. Participants were provided with a range of tools including scissors, buttons, fabric glue, range of fabric swatches, offcuts and a selection of books with ideas and methods (fig 12).



Figure 12 Image to left show books available to get ideas for upcycling and image to right show participants engaging in upcycling demonstration - Ndodds,2020

Tables were provided to allow space to create and participants sat around in a semi-circle to engage with one another and share ideas (fig 13). Two workshops were available, one hour apart, to allow all participants the chance to attend with enough space to then upcycle their chosen garments (fig 14). Some chose to upcycle, some preferred to observe and experiment at home at a later stage. The night was concluded with acoustic music to provide an enjoyable evening, drinks and snacks were also available. Any clothes not taken were donated to the local cancer research shop.



Figure 13 two photos from reactivate event showing upcycling demo – ndodds,2020

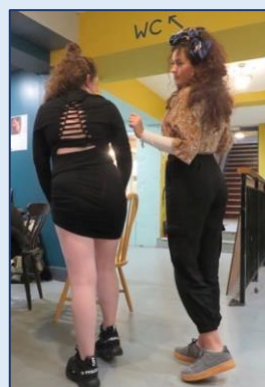
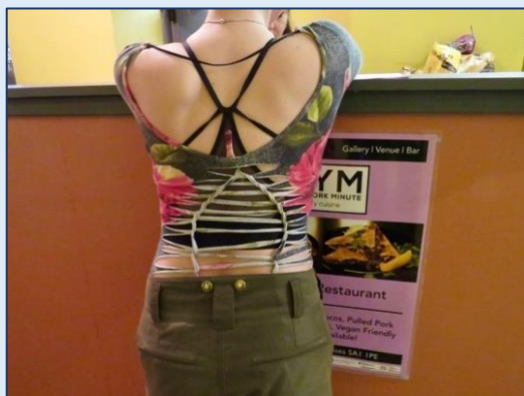


Figure 14 three photos showing upcycled items – ndodds,2020

Public Relations 3.2

The researcher strove to select completely random participants unknown to themselves and utilised social media platforms to engage with the general public and the chosen target demographic of 18-35. This demographic was chosen as they were of the age most likely to engage with fast fashion, and the group where greatest benefits from change could be achieved. Posts were shared with Extinction Rebellion, UWTSD Environment society and a variety of other varying social interest pages (fig 15). An Eventbrite event was also created with tickets available to reserve, though few used this process of booking. Though the aim was to find a varied group of participants, the end result of participants did appear quite environmentally conscious and this may be due to the reach of the researcher's Facebook page, so other forms of more varying PR would be considered in future and potentially the use of advertising from a blank non environmentally affiliated page. Another strategy considered was a social experiment conducted by Dublin university around the idea and benefits of an online clothing library App, for fashion sharing, which currently functions as a start-up, in the form of an online App to share clothing. This was eventually considered out of the researcher's capabilities, due to the need for App building capacity and knowledge, thus the former method described, an exchange event, was decided upon as a strategy to include. It was previously hypothesised in a paper by Pears (2006) that clothing exchanges would appeal to young adults who are eager to experiment with consumption and seek authentic experiences. Given the demographic chosen 18-35 it was prophesied that many would be students or low earners who participated, and this was true to form, many attending were "charity shop veterans" already highly reliant on second-hand clothing.

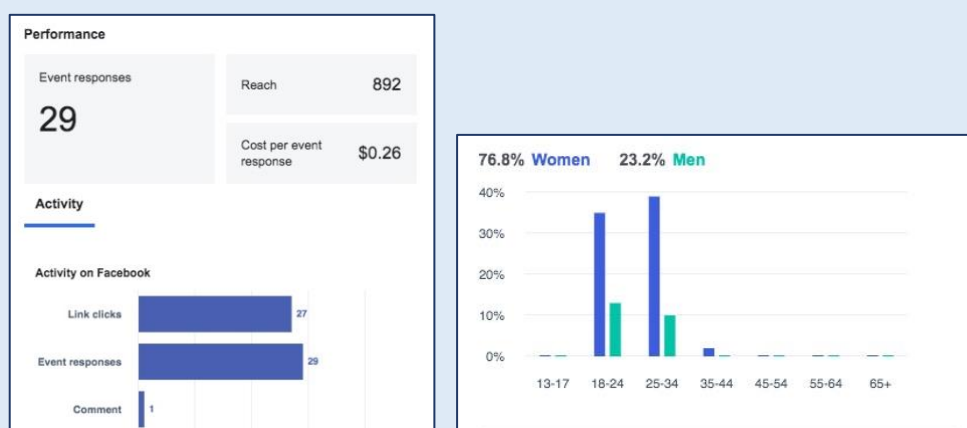


Figure 15 images from Facebook event boost showing analytics from PR - ndodds,2020

Analytical Method 3.3

The deductive method is utilised to test the aforementioned hypotheses and a combination of quantitative and qualitative primary data collected from 2 questionnaires (Full questionnaires can be found in Appendix 1. Results were obtained through the use of a Likert Scale. This is the format that responses are scored along a range, to provide ordinal variables and enable statistical analysis of results yielded. The use of inferential statistics Mann Whitney U, Pearson's Correlation Co-efficient and T tests enabled a scientific conclusion and a greater understanding of the successes or weaknesses of the experiment. These statistics were analysed through the use of excel data analytics package and an online social science statistical calculator and additionally checked over through interview with lecturer. Full workings and details of calculations are shown in (appendices 2). A Geographical information system (GIS) model in MapInfo was constructed in order to additionally visualise data and look for any further patterns in the distribution of data, a variety of layers were tested, utilising the Townsend index and Infuse four deprivation maps to understand whether there were any socio economic factors, such as affluence, that affected consumer habits, when regarding shopping for fast fashion and the second hand market.

Ethical Considerations 3.4

Ethical considerations are taken into account after guidance from literature by Bryman and Bell (2007). The event was publicly advertised on social media, so participation was voluntary, and participants were provided with information on the nature of the survey and what it entailed. A disclaimer statement (appendix 3) was issued with initial survey (appendix 1) explaining the privacy of participants and their right to withdraw at any stage. Confidentiality was highly regarded with participants information protected at all times, in conjunction with the data protection act (1998). The researcher strove to declare any conflicts of interest, communicated with respondents transparently and language used in surveys/questionnaires was kept non-discriminatory and without bias. (Bryman and Bell, 2007)

Results and Discussion 4.0

Gauging Participants Pre Existing Consumer Habits 4.1

When considering the data captured, 30 participants completed surveys and attended the event. The spread between male and female showing interest from the initial media generation was 83% female and 17% male (fig 15). This was as expected and fairly female dominated with 25 females and 5 Men attending (fig 16). A study found by Koca, 2016, considering purchasing behaviour, found that female consumers have different perceptions and were more influenced by fashion while men were more influenced by brand name, taking this into account, a clothing exchange would likely appeal more to females than males (Koca and Koc, 2016).

The ages ranged from 18-35 with the average age of attendee being 29 (appendix). To further discuss the research questions an understanding of participant consumer habits and whether they attended both the exchange and upcycling demo was deemed relevant and essential for discourse (appendix). 100% of participants attended the exchange and 50% attended the upcycling demo.

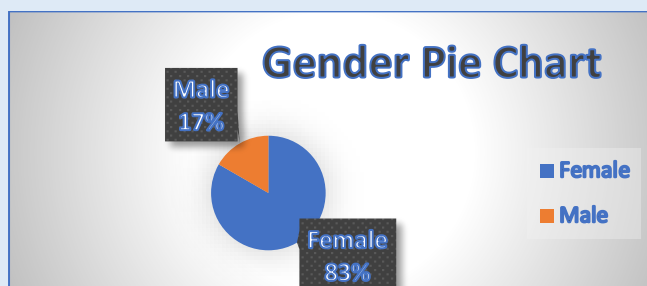


Figure 16 Pie chart depicting gender spread of participants

The first survey questions from questionnaire 1 (listed below each analysis for ease of reference) explored the participants pre-existing shopping habits and helped to gauge the audience. Initially participants were asked questions around their willingness towards sustainable practice (fig 17) and 53.5% answered they were always willing to buy second-hand clothing, indicating half the audience were already familiar and engaging regularly with the second-hand market. 30% chose

often, 13.3% chose moderately and 3.3% Rarely. The average response from attendees regarding their usage of second-hand clothing was 4.3 from a 1-5 scale with 1 being never and 5 being always indicating there were participants with varying consumer habits ranging from charity shop veterans to those less familiar with second hand buying, so the desired mix of shopping habits was obtained. When tested statistically with Mann Whitney U descriptive statistics, comparing the before opinion with the after to understand whether there were significant changes in opinion. The U Value of 96, Z score of -0.66 and P value of .509 proved not significant at $p < 0.05$. This showed there was not a significant change in opinion before and after event but then the majority were already eco conscious so a further study perhaps testing a specific target audience that are less familiar with second-hand clothing could be beneficial.



Figure 17 Question 6 from survey



Figure 18 Question 7 from survey

According to the data (fig 18) 34 % of participants bought new clothing a few times per year, with 26% buying only once per year, the remaining 17% every 2 months, 3 % monthly and 17% every couple of weeks with the average answer being 2.3 few times a year presenting an audience with varying consumer habits. The larger proportion 60% attending appeared to be highly eco conscious generally only using second-hand stores and only buying fast fashion when

unavoidable or rarely, confirming this exchange event appeals to a demographic with pre-existing engagement with second-hand clothing.

When considering motivations behind consumerism of fast fashion, the larger proportion selected the ‘other’ option as shown below in (fig 19) when shopping for new clothing, consumers had fairly varied rationale and when queried if they considered the environmental impact, the average score 3.1 ‘sometimes’ considered impacts (fig 20) 66% ranging from ‘sometimes considered’ to ‘always considered’, and just under 40% ‘rarely’ or ‘never considered the impacts. Again when considering the ethical ramifications (fig 21), the average response was 3.3, indicating participants were marginally more concerned with the ethical ramifications, but the larger proportion 50% always considered other reasons for purchase. These responses, in qualitative form, were analysed via word bubble (fig 23) and price was found to be the most common reason behind purchase followed with quality, make or whether 2nd hand. Again confirming the pro eco consumer status of some participants. This section provided a general understanding of the pre-existing attitudes of participants before further dissection of results.

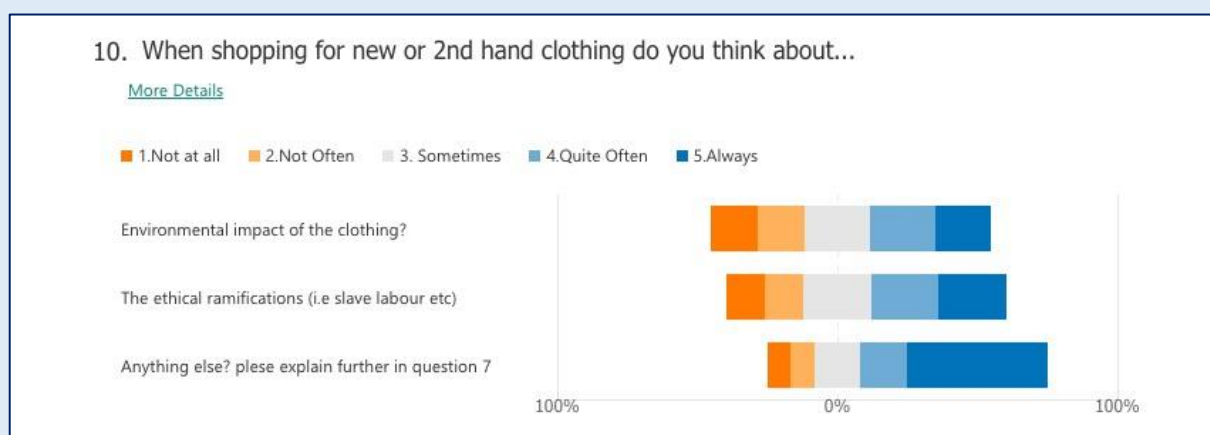


Figure 19 Question 10 from survey

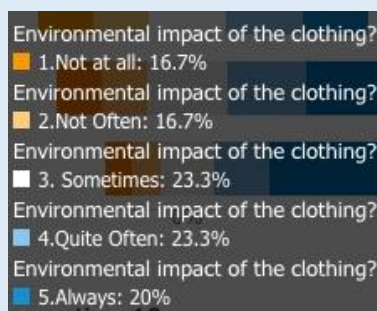


Fig 20 Environmental impact

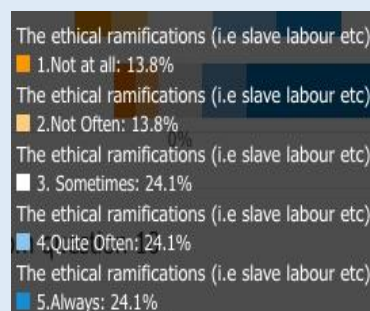


Figure 21 Ethical ramification.

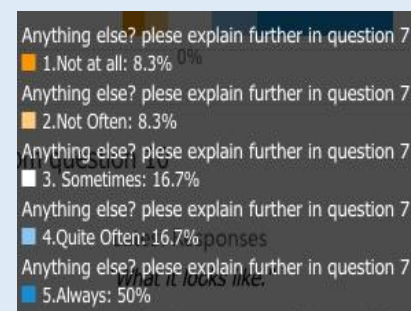


Figure 22 Other reasons



Figure 23 Word bubble of qualitative responses from question 19

Hypothesis 1 – Garments hoarded have plenty of lifespan remaining and could be adopted by new users, reducing the demand for resource intensive fast fashion. 4.2



Figure 24 Question 8 from survey



Figure 25 items never worn

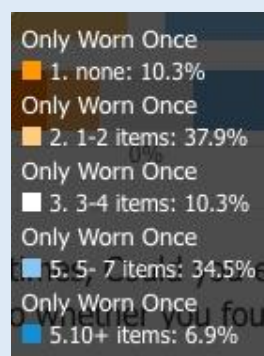


Figure 26 worn once results.

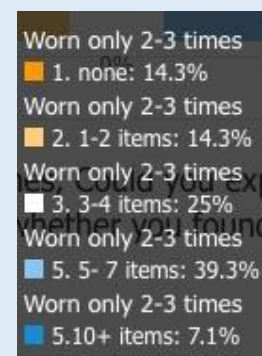


Figure 27 items worn 2-3 times

The data analysed for hypothesis 1 “there are garments hoarded” proved successful in showing that there are most certainly items hoarded that had in fact never even been worn (fig 26) with full lifecycle remaining, which could be relegated from fashion waste to a fresh lifecycle, only 26.7% had zero items never worn in wardrobes, leaving a staggering 60% with items never even worn once. The majority had 1-2 items (fig 27) 36.7% and 3-4 items 23.3% so 59% had between 1-4 garments never worn as shown above. Over 70% of participants had between 1 and 7 items only worn once, again with likely a large amount of lifecycle left in these garments, and with the correct incentivisation, enough stock to potentially

slow the fast fashion market. Forty percent of participants had 5-7 items they had only worn a few times (fig 25). Questionnaire 2 discovered that the average amount of garments donated to be exchanged was 3.7 items (fig 28) and the average taken away 3.1 items (fig 29), so with this equal amount being taken and donated it would appear that the objective of reactivating each other's fashion waste was successful, though possibly could be also described as more a shift of garments between wardrobes.

The data concluded that the average amount of garments hoarded was 4 items per participant, ranging between 1-7 items with the odd person having 10+ and ranging in quality from brand new to few wears. The quality rating given by 90% of participants for garments donated, which ranged from medium 33% to good quality 59% items with average quality donated was good quality to very good (fig 30). The second survey confirmed participants felt the donated/ exchanged garments to be equal standards. The fact that the garments contributed received similar ratings indicated high satisfaction with variety of optional garments and percent of participants found at least one item that they really liked and have worn since.

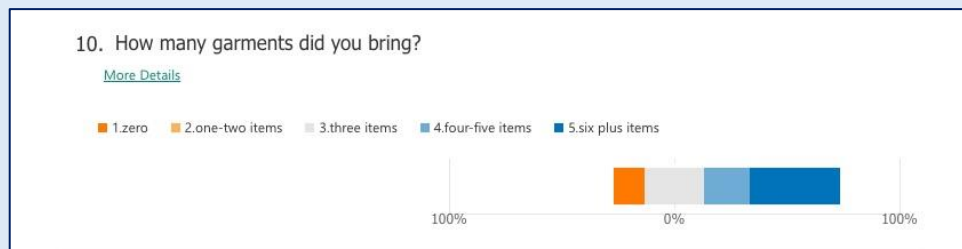


Figure 28 question 10 from survey



Figure 29 question 11 from survey



Figure 30 question 13 from survey

When asked for a further explanation of reasons behind only wearing items between 1-3 times or never, words that were frequently audible, shown below on a word bubble (fig 31) were words like occasion, indicating items unworn were perhaps specific to an occasion and have little place in daily activities, i.e. weddings, Christmas jumpers etc. Fit and 'stylability' were other words featured which suggest that peoples changing sizes and style desires were prevalent reasons behind the relegation of items to fashion waste. The varying styles, constantly changing in the fashion world, indicates these items can be reactivated as one person's waste can potentially be another person's treasure and maybe provide a similar feel good factor.



Figure 31 word bubble showing qualitative responses from Q9

GIS 4.3

The use of the GIS model compared various data sets from a socio economic perspective to understand further whether affluence affected consumer choices and willingness to use sustainable practice, as an additional foray into rationale, but did not find any conclusive patterns. This may be due to the fact that only four letters of the postcode were provided by participants, so the majority of the point data showed in SA1 as one point, hindering pattern visualisation. More exact point data could have allowed better conceptualisation of the data and perhaps helped to form further conclusions from a visual perspective.

The below GIS shows the range count of respondents in different post code districts to understand where the larger spread resides visually.

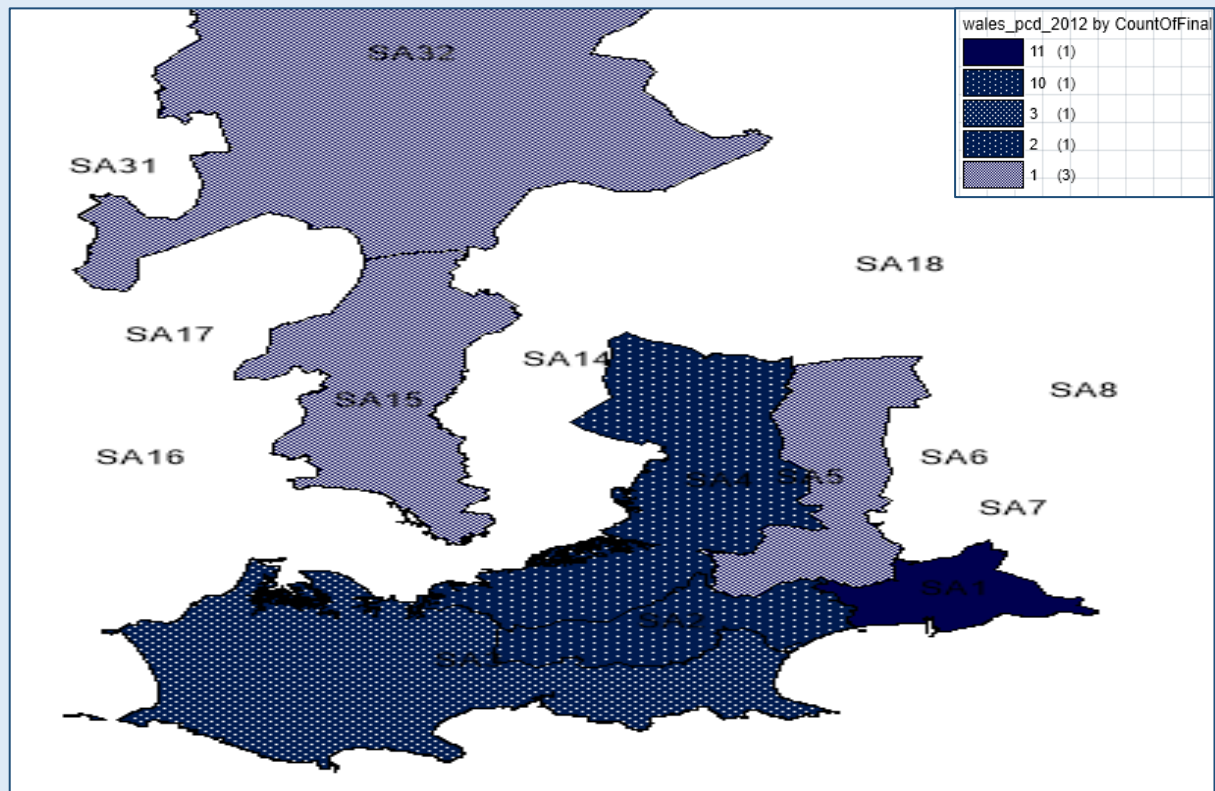


Figure 32 GIS model showing Range: Count of respondents in post code district - MapInfo

The GIS model below (fig 33) uses deprivation data from Infuse 4 dimensions pie chart by lower output, enabling a visual understanding of affluence over different areas

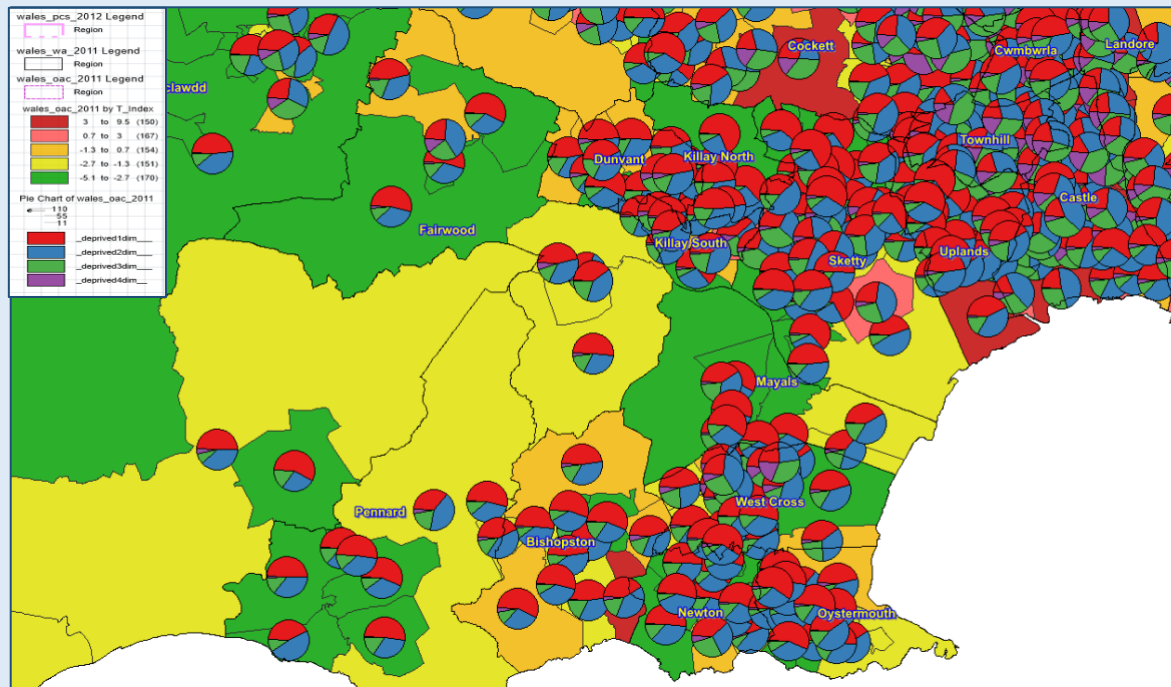


Figure 33 GIS model showing Deprivation - Infuse 4 dimensions pie chart by lower output - MapInfo

Fig 34 below shows Responders over Townsend index which Shows the distribution of the responders plotted over the poverty map, as the larger proportion of participants resided in SA1, the pattern was inconclusive

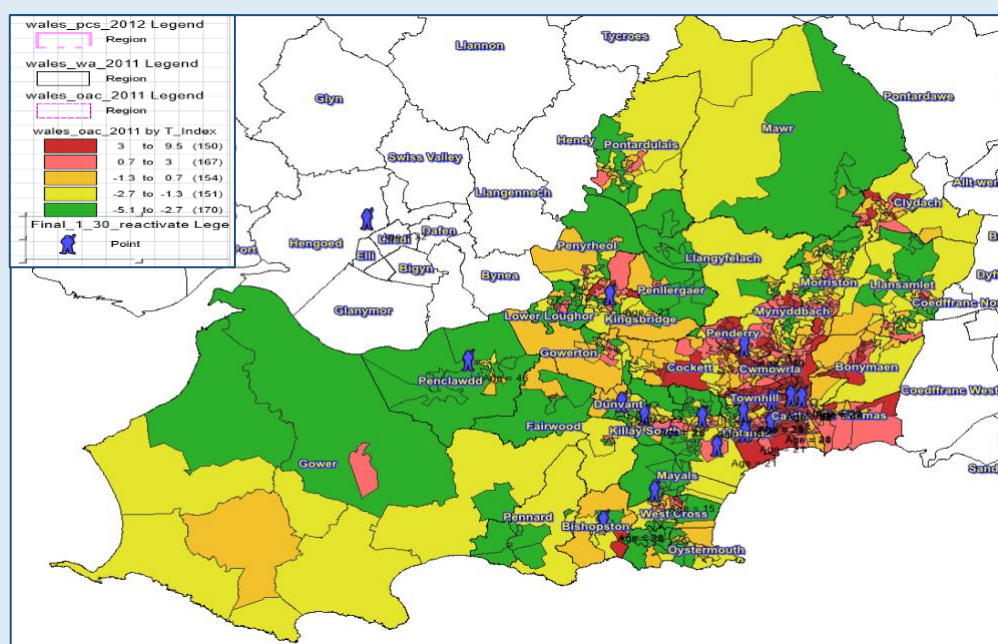


Figure 34 GIS model showing Responders over Townsend index – MapInfo

The combined layer below (fig) combines Reactivate point data with unemployment data of graduates in the area and shows some minor correlation with a cluster around the north SA1 area but nothing highly conclusive as some points are on top of each other due to restricted postcode data. These layers over a thematic map showing deprivation again brings no solid conclusion but some correlation where arrow points to more deprived in red and clusters of both reactivate participant data and unemployed after graduation data. There is an even spread which indicates this type of sustainable practice appeals to all socio economic backgrounds and as such affluence is implied to be an inconsequential factor. Further testing would be beneficial

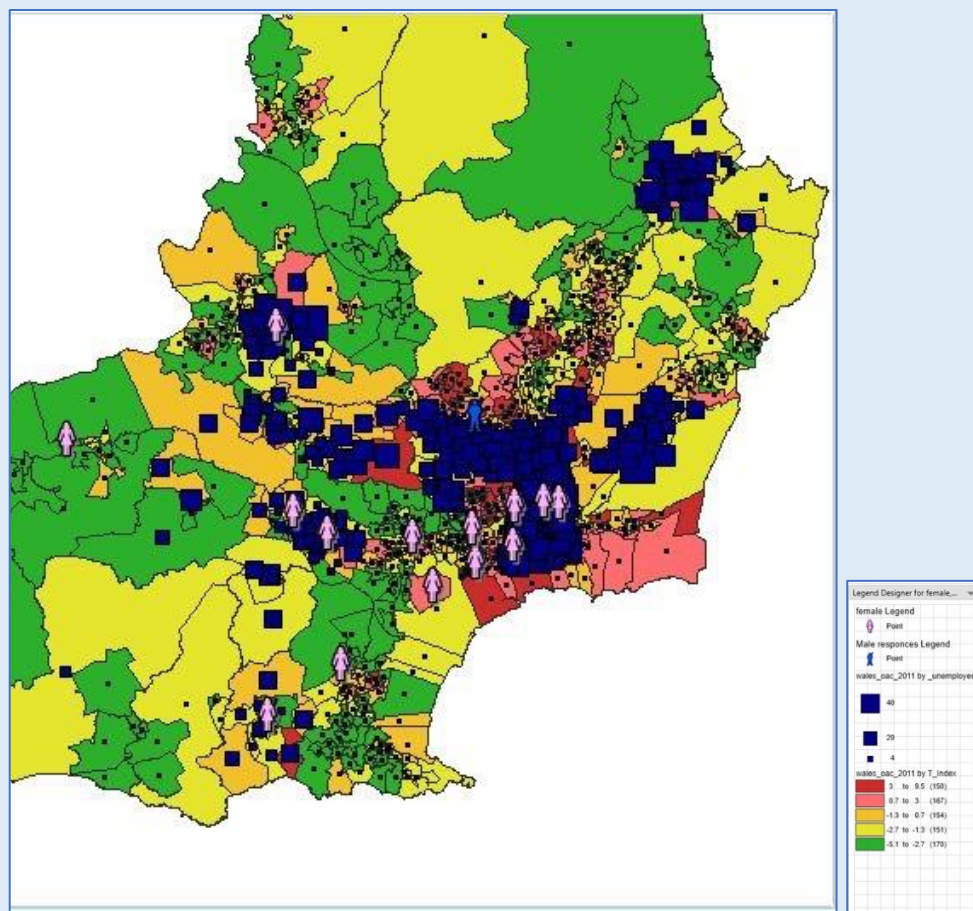


Figure 35 GIS model showing combines Reactivate point data with unemployment data of graduates in the area

H2 -The learning of sustainable practices can help to reactivate fashion waste and I lengthen the span of garments 4.4

50% of participants were fully aware of what it meant to upcycle clothing and 23% were fairly sure, so the average participant had some previous experience with Upcycling but only 13.3% frequently used this method at home. In comparison 50% had never attended a clothing exchange previously, 23.3% not often and only 10% attended them regularly. This may be due to the lack of provision of clothing exchange opportunities in the area. The researcher is aware of about 2 other events which already cater to clothing exchange and one of which had started around similar time to the Reactivate event at the local Environment centre. Of the skills taught in the upcycling demo (fig 37) 33.3% of participants had utilised the skills learnt from the upcycling demo at home, once since the event, 33.3 % had used the skills twice and 33.3% had not used the skills yet. The average utilisation of skills at home since event was used once since event. The second surveys were sent out after 4 weeks so there was not a large amount of time to use these skills but none the less the items were reactivated through the learning of upcycling and the skills used at least once by 70% of participants. A further survey provisioned at a later date would have been useful and recommended for future studies to understand over a longer time.

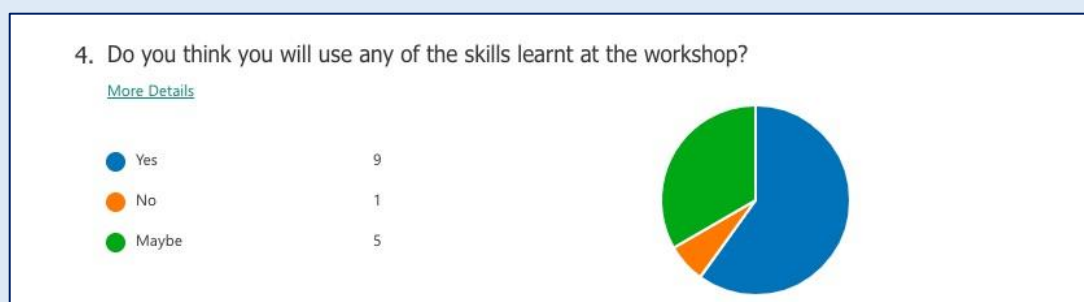


Figure 36 question 4 from survey



Figure 37 Question 3 survey 2

The average participant had upcycled at least once at home since the event, indicating the learning of sustainable practices can indeed help reactivate fashion waste and so this hypothesis is positively supported by the data presented. Only one person felt they would not utilise the skills again, but there were no comments provided as to why. When querying whether the participants felt they better understood the capabilities of upcycling after the demo, the average score of 2.9 indicated participants felt they understood a little more but not greatly. Six percent felt they understood a lot more and 26% a fair bit more, this could indicate that the one hour workshop was not hands on enough to provide a full grasp of the method, perhaps longer workshops could be trialled in future to provide greater skill learning. A study by Mont, 2002 felt that it is important to develop sustainable practices that are transferrable to other aspects of life rather than just initiating disparate initiatives (Mont, 2004). The clothing exchange data established 86% of participants had worn the fashion waste/garments obtained from the event, thus successfully reactivating it (fig 38). The average person took away 2-3 items and the average response when asked how many of the items had been worn since was ‘a couple of item’s’. Additionally, the average participant really liked the items they had taken indicating that the majority of waste taken had been reactivated, 20% had worn all the items taken already.



Figure 38 question 16 from survey

To understand whether either of these methods could become the main way participants shopped for clothes in future, a question was proposed before and after the event regarding whether participants could use either method. 46% percent responded they could use upcycling and 66% percent felt they could use clothing exchange presenting clothing exchange as the slightly preferable method.

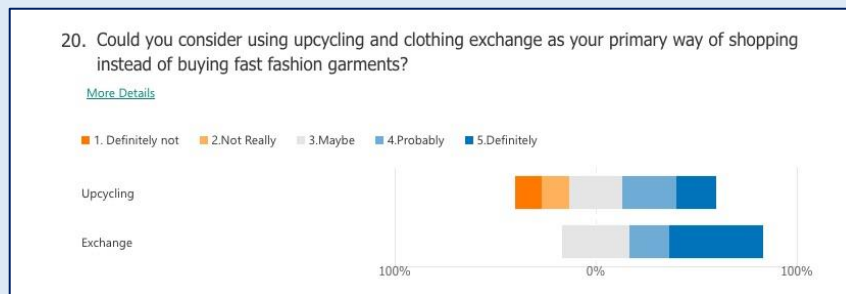


Figure 39 question 20 from survey

This hypothesis was further dissected via the use of various statistics including paired T-Test to test the dependable and Pearson's Correlation Co-efficient to understand whether the result was significant. The T-test was calculated via online calculator and also via excel data analysis package and by hand to ensure results. The value of T (fig 40) was 2.702 and the value of P is .01717 which shows a significant result at $p < 0.05$. This was the result from both testing methods and proved there was a significant difference in the methods that would work for participants with exchange being more preferable to upcycling. This may be due to the fact clothing exchange provides a ready-made garment and so replicates the consumer need for a new item without needing to put any effort in. Upcycling takes considerably more time as a sustainable practice. The Pearson's test also showed a correlation with a score of 0.52 (fig 40) which with 1.0 being the highest attainable score, shows a relatively strong correlation. It is possible to say from the data that the learning of these methods can certainly increase the length of a garment's lifespan, if upcycled or exchanged, but generally, the preference is towards clothing exchange. This could suggest that perhaps an upscaling of this facility nationwide could potentially slow fast fashion consumerism, further tests on specific consumer types could be useful targeting specifically people who use fast fashion regularly and are not already eco conscious.

t-Test: Paired Two Sample for Means		
	Upcycling	Exchange
Mean	3.2666667	4.0666667
Variance	1.78095238	0.78095238
Observations	15	15
Pearson Correlation	0.52894872	
Hypothesized Mean Difference	0	
df	14	
t Stat	-2.7026557	
P(T<=t) one-tail	0.00858357	
t Critical one-tail	1.76131014	
P(T<=t) two-tail	0.01716713	
t Critical two-tail	2.14478669	

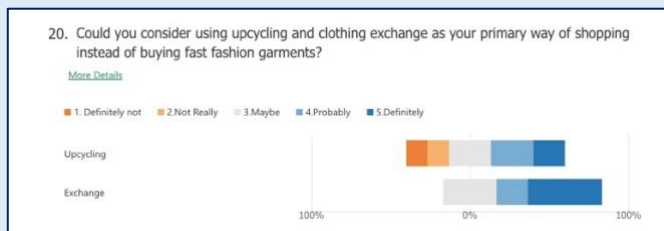


Figure 40 T value from paired t test result. Figure 41 question 20 from survey



Figure 42 question 3 from survey 2



Figure 43 question 19 from survey 2

H3 - Upcycled or exchanged clothing can provide the same psychogenic effect of “feel good factor” as fast fashion garments - 4.5

To further understand whether these sustainable practices can provide the same positive feelings as fast fashion, an understanding behind the reasons of participants consumer habits were first analysed. The most common response for functional reasons behind garment choice (fig 44) was 2.5 between not often and sometimes, whilst the average score of 4.3 (Quite often to Frequently) 34% of participants shopped more based on fashion and trends, 19% chose other reasons which are displayed and discussed below, in word bubble(fig 46). 2.8 (Not often to sometimes) was the average score for psychogenic reasons but 56% of participants chose quite often to frequently when mentioning psychogenic effect as their reasons for purchase, so the feel good factor obtained was from outfit choice.

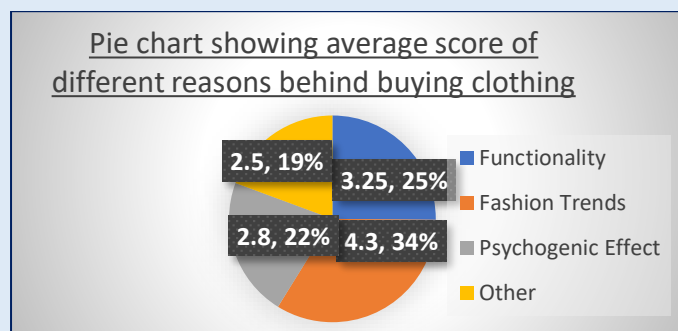


Figure 44 pie chart showing average score of reasons behind shopping

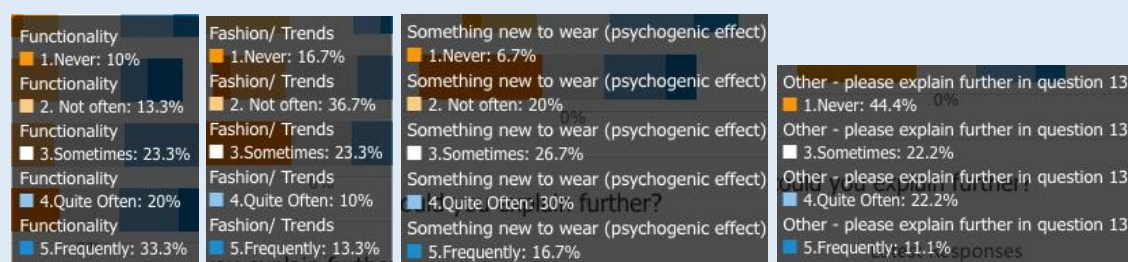


Figure 45 selection of 4 boxes showing results for question 12

Clearly half the audience related to this reasoning and when analysing the qualitative data in a word bubble (fig 46) , words such as Characters, Jeans, experiment came up, which were relatively inconclusive. The statements made (appendix 3) were easier to understand as a whole. Of the 9 choosing other and providing qualitative data, most comments could have fit into one of the former

options, those being, fashion, functionality and psychogenic need. For example one comment “ I generally buy new clothes when needed. (e.g. worn out jeans, old etc)” would have fit into functionality. From the 9 comments, two were of interest to this hypothesis, and leant on the side of indicating psychogenic feelings from the clothing one being “ To wear as costumes on stage as different characters. E.g. buy dresses” suggesting the person uses clothing to portray her persona or character. The other comment “clothes maketh the man” also implied the wearer took a sense of character/good feeling from the clothes they wore”.



Figure 46 word bubble showing qualitative responses from question 13 survey 1

The questions proposed to understand whether upcycling could bring the same feel good factor as the purchase of new garments, found an average score of 3.4 which represented somewhat to quite a bit. 46.7% chose quite a bit to definitely regarding the same pleasure “enclothed cognition” from wearing the upcycled clothing. 40% felt somewhat and 12 % felt not really to not at all.

When queried directly whether the same pleasure factor had been obtained from the wearing of the exchanged clothing, as it would have from a new item per say, The data concluded that the 57.1% of participants definitely felt the same feeling, 14.3 quite a lot and 28.6 some of the feeling. The average response was 4.4 (quite a bit-definitely) supporting positively the hypothesis that upcycled or exchanged clothing can provide the same psychogenic effect as fast fashion (fig 48).

When asked whether the same pleasure effect had been obtained from wearing an upcycled item, the average response was 3.4, 40% felt that it only somewhat provided the same feeling (fig 49), though 20% answered definitely. When comparing the two results statistically to understand which provided a greater psychogenic effect, the result (fig 48) from a paired t-test found the t value of 2.82 and a P value of .0134 which is significant at $p < 0.05$ on the side of clothing exchange, indicating this sustainable practice also provides the feel good factor of fast fashion, thus proving the hypothesis that sustainable practices can in fact provide the same psychogenic effect and particularly clothing exchange. This may be due to the simplicity and the fact that the participants obtain a new ready to wear outfit, fulfilling the same feeling of wearing something new.

t-Test: Paired Two Sample for Means		
	Upcycling	Exchange
Mean	3.26666667	4.06666667
Variance	1.78095238	0.78095238
Observations	15	15
Pearson Correlation	0.52894872	
Hypothesized Mean Difference	0	
df	14	
t Stat	-2.7026557	
P(T<=t) one-tail	0.00858357	
t Critical one-tail	1.76131014	
P(T<=t) two-tail	0.01716713	
t Critical two-tail	2.14478669	

Figure 49 pair t-test result from hypothesis 3

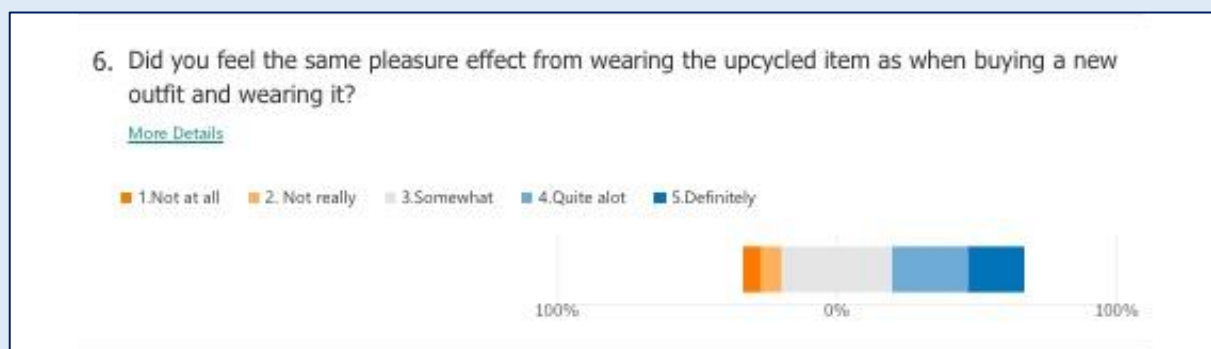


Figure 50 Question 6 survey 2

Conclusion 5.0

To reevaluate the findings and conclude, the study aimed to understand whether firstly there were in fact clothes stockpiled in people's wardrobes which could be enjoyed by others, if the opportunity to share was provided. The hypothesis was proven accurate and there were on average three point seven items hoarded per participant which were successfully reactivated, and eighty six percent of garments reactivated. On average three point seven items were donated and three point one items taken by each participant, which was left open, there were no limits set on amount taken or donated and a fair exchange was agreed without need for regulation. Ninety percent felt they had received medium-good quality items and ninety three percent found at least one item they really liked, with the average finding three point one items they really liked, and the average had worn a couple of the items taken in the month before second questionnaire was issued. The use of GIS modelling found an even spread which indicated this type of sustainable practice appeals to all socio economic backgrounds and that socio economic status, such as affluence, didn't affect choice of using sustainable practices.

The second hypothesis, the learning of sustainable practices, such as upcycling or provision of platform for clothing exchange can help lengthen the lifespan of fashion garments, was also proven accurate and the average participant had up cycled at home at least once since the event. The second surveys were sent out after four weeks so there was not a large amount of time to use these skills but none the less the items were reactivated through the learning of upcycling, and the skills used at least once by seventy percent of participants. Forty six percent felt they could use upcycling as a primary method for shopping and sixty six percent felt they could use clothing exchange as a primary shopping method going forward. Clothing exchange was found significantly more preferable when tested statistically via T-Test with a result of 2.702 and P, both significant at $p < 0.05$ or within ninety five percent and The Pearson's also found a correlation of 0.52 which was a positive correlation suggesting that clothing exchange upscaled could help to reactivate clothing waste and thus bring about the rise in second hand market, remembering each ten percent increase can bring about four percent water and three percent carbon emission reductions per tonne when lengthening

the garment by fifty percent. Suggestions of more frequent platforms nationwide could encourage a trend change to consumer habits, particularly in the 18-35 age groups. The average age at this experiment was twenty nine so it would be interesting to repeat the test with a 16-25 age group and see whether this demographic was more or less inclined to change trends of consumerism.

The third hypothesis was also proven successful indicating that when considering upcycling and the psychogenic pleasure obtained, the average response of three point four presented that participants somewhat obtained the feeling. Only twelve percent felt that this did not bring about the same feelings. The results however obtained from the clothing exchange discovered fifty seven point one percent of participants definitely obtained the same psychogenic effect from exchange clothing and an average response of four point four which represented quite a bit to definitely. Qualitative comments further supported this with some participants feeling even more pleasure was obtained, as the items were free as well as being new to them. Statistically speaking this hypothesis was proven significant with a T value of 2.8 and a correlation from Pearson's that the results significantly favoured the clothing exchange and felt that this provided the same if not more 'enclothed cognition'. Research by Pears, 2006 also found that inactive garments were reactivated, and awareness was simultaneously raised about the need for sustainable development in both cases and this study added statistical testing for greater accuracy. The event stimulated individuals to instigate extra sustainable action. To conclude it would appear that with the right motivations, a large proportion of clothing waste with ample wear left does exist and with the provision of skill learning perhaps by local councils or amongst peer groups, these hoarded garments could be reactivated, which could in turn slow the fast fashion market and set a forward trend for consumer habits, particularly in younger generations who can carry the message forward and make the use of sustainable practice the go to "trendy" way to shop, all the while fulfilling the societal need for unclothed cognition.

Recommendations and Limitations 6.0

A further survey provisioned at a later date would have been useful and recommended for future studies to understand over a longer time frame whether the sustainable practices demonstrated were in fact used regularly, to get a more accurate understanding of actual usage frequency of upcycling. It has to be considered that it's possible that though the skills were used after this event, it could also be from excitement rather than a transfer of method of consumerism and this needs further data and analysis. The skills need regular use to have an impact perhaps long-term. The average age of participants was twenty nine, so it would be interesting to repeat the test with a 16-25 age group and see whether this demographic was more or less inclined to change trends of consumerism. Full postcode information would have enabled a better interpretation of the data from a visual perspective and could have allowed easier analysis of patterns to understand whether socio economic factors affect consumer choice and would be recommended in future studies.

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Appendix 7.0

Appendix 1

PR material advertising event



TSD Swansea Environment Society

Welcome all on Feb 20th to a dissertation event looking into ways to Reactivate old clothes and relegate them from the backs of our wardrobes. Please bring some old clothing items that you would like to exchange or upcycle.

Did you know it takes 10,000 litres of water to make a single pair of jeans and 3000 for a t-shirt?. The UNFCC suggested that by 2050 if ways to slow fast fashion aren't found that the fashion industry will be responsible for 26% of the global carbon budget associated with a 2 degree pathway and currently the fashion industry is responsible for 20% of industrial global water pollution!!!

There will be a clothing exchange in the gallery and upcycling demonstration and workshop where we can help you create new items from old ones. Surveys will be handed out firstly at the event to gauge your response to the event and methods of reactivation of clothes and then a second survey will be emailed a few weeks later. The exchange and workshops will be running from 6pm til around 9pm and then there will be music from Felix Subway and Tom Emlyn after ❤️

All clothes donated and not taken by other participants will be donated to Cancer Research in town ❤️

Upcycling Demo by the talented Helena Flanagan Dixon from Miss.chievous Gladrags - take a look at her stuff ❤️

www.facebook.com/MissChievous-Gladrags-277913175575317/?hc_location=group



Comments from Question 19 for Hypothesis 3

19. Please comment further on question 18- perhaps you do not relate to the feel good factor or could explain further how you relate to it.

9 Responses

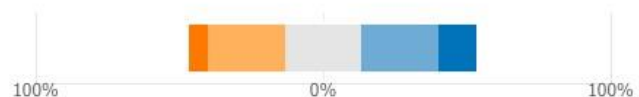
1	anonymous	I felt I got that same feel good factor because the item really helped update my wardrobe. However I think it depends on the item- for example, I prefer to buy or swap vintage clothing as opposed to going to charity shops as I feel the clothes in charity shops are sometimes a bit dated/cheap/ugly. I don't think I'd get the same 'feel good factor' from all second hand clothing - sometimes I think you do just need something brand new!(as a treat lol)
2	anonymous	I actually prefer wearing second hand clothing. It's a lot more satisfying! Since I didn't spend any money, I don't worry about potentially having bought something I didn't reeeeeeally need.
3	anonymous	Its nice wearing new stuff, new to you is new. I hate shopping its stressful, so the ability to acquire new clothes without having to go in to a shop blows my mind. im really happy with the clothes i picked up, and happy to get rid of old stuff that was kicking around, great venue too, hope you do the event again!
4	anonymous	Yeah, the clothes was suitable to my style and my body shape
5	anonymous	I thought that it felt just the same as buying something new to wear! I was pleasantly surprised, would love to attend more.
6	anonymous	Any new item be it new or from an exchange gives you that feel good factor as it's a new item to wear ... its doubly good when you know getting it from an exchange means helping sustainable fashion!
7	anonymous	Feels exactly the same as you are getting something new which is exciting and even better because it is free so actually I think it feels better then shopping
8	anonymous	Probably even more so
9	anonymous	Same feeling as a used store item after many uses

Selection of questions that aided conclusions

12. Did you find any garments you really liked?

[More Details](#)

1.None 2.One item 3.A couple items 4.three to four items 5.five plus



15. Have you worn the items you took?

[More Details](#)

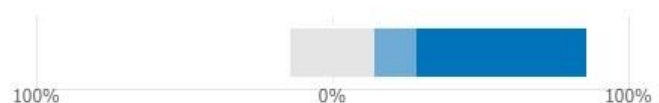
Yes 12
No 2



18. Did wearing the items you took give you the same satisfaction/"feel good factor" as wearing a new item of clothing?

[More Details](#)

Not at all A bit of the feeling Some of the feeling Quite a bit of feeling Definitely



19. Please comment further on question 18- perhaps you do not relate to the feel good factor or could explain further how you relate to it.

[More Details](#)

9
Responses

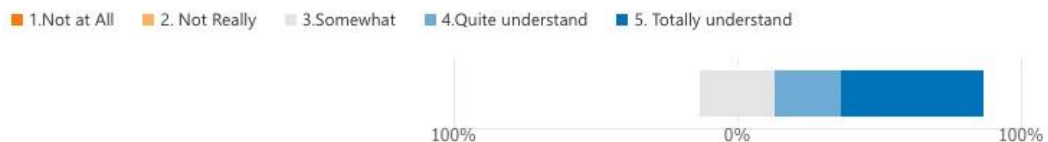
Latest Responses

"Same feeling as a used store item after many uses"

"Probably even more so"



16. Do you know what upcycling means - regarding clothing?

[More Details](#)

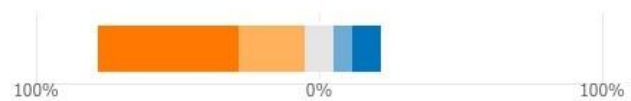
5. Would you say you have more of an understanding of the capabilities of upcycling after attending the workshop?

[More Details](#)

14. Have you attended a clothing exchange before?

[More Details](#)

1. Never 2. Not Often 3. Sometimes 4. Quite Often 5. Frequently



2. Did you attend the upcycling workshop?

[More Details](#)

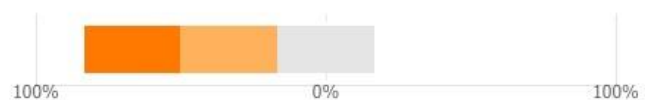
Yes 14
No 1



3. Have you used any of the skills you learnt in the upcycling demo since the event?

[More Details](#)

1. Not at all 2. Once 3. Couple times 4. Regularly 5. Daily



Appendix 2

Hypothesis 1-3 Calculations

Question - More willing before or after the event to acquire second-hand clothing?

Answers from 2 surveys before and after event analysed.

Mann-Whitney U Test Calculator

The value of U is 96.

Explanation of Results

As you can no doubt see, this calculator spits out quite a lot of information. Most of it is self-explanatory, but there are a couple of things worth noting.

First, there is no standard way for the Mann-Whitney U test to handle tied ranks, which means if your data has tied ranks, you're going to get a different result for U depending on the statistics package you use (for a discussion of some of the issues this raises, see [this article](#), for example).

Second, where the number of scores (i.e., the value of N) in each sample is 10 or more, you can assume that your sampling distribution is approximately normal. This means you can use a Z -ratio to calculate the value of p .

Sample 1	Sample 2	S1 Values	S1 Ranks	S2 Values	S2 Ranks
5	5	2	1	3	3.5
5	5	3	3.5	4	10.5
5	5	3	3.5	4	10.5
5	5	3	3.5	4	10.5
4	5	4	10.5	4	10.5
5	5	4	10.5	4	10.5
3	3	4	10.5	5	22
5	5	5	22	5	22
3	5	5	22	5	22
5	4	5	22	5	22
3	4	5	22	5	22
5	5	5	22	5	22
4	4	5	22	5	22
4	5	5	22	5	22
2	4	5	22	5	22

Significance Level:

☐ 0.01

☒ 0.05

1 or 2-tailed hypothesis?:

☐ One-tailed

☒ Two-tailed

Result Details

Sample 1

Sum of ranks: 216
Mean of ranks: 14.4
Expected sum of ranks: 232.5
Expected mean of ranks: 15.5
 U -value: 129
Expected U -value: 112.5

Sample 2

Sum of ranks: 249
Mean of ranks: 16.6
Expected sum of ranks: 232.5
Expected mean of ranks: 15.5
 U -value: 96
Expected U -value: 112.5

Sample 1 & 2 Combined

Sum of ranks: 465
Mean of ranks: 15.5
Standard Deviation: 24.1091

Result 1 - U -value

The U -value is 96. The critical value of U at $p < .05$ is 64. Therefore, the result is not significant at $p < .05$.

Result 2 - Z -ratio

The Z -Score is -0.66365. The p -value is .50926. The result is not significant at $p < .05$.

Hypothesis 2 – Tested with T-Test and Pearson’s correlation coefficient

Question – Could you consider using upcycling and clothing exchange as your primary way of shopping instead of buying fast fashion garments?

Upcycling Exchange

Online Social Science calculator -

<https://www.socscistatistics.com/tests/ttestdependent/default2.aspx>

T-Test Calculator for 2 Dependent Means

The value of t is 2.702656.

Explanation of results

The output of this calculator is pretty straightforward. The values of t and p appear at the bottom of the page. If the text is blue, your result is significant; if it's red, it's not. The only thing that might catch you out is the way that we've rounded the data. The data you see in front of you, apart from the t and p values, has been rounded to 2 significant figures. However, we did not round when actually calculating the values of t and p . This means that if you try to calculate these values on the basis of the summary data provided here, you're likely going to end up with a slightly different - and less accurate - result.

Treatment 1	Treatment 2	Diff (T2 - T1)	Dev (Diff - M)	Sq. Dev
1	3	2	1.2	1.44
2	4	2	1.2	1.44
5	5	0	-0.8	0.64
3	5	2	1.2	1.44
4	4	0	-0.8	0.64
4	5	1	0.2	0.04
4	3	-1	-1.8	3.24
5	5	0	-0.8	0.64
3	5	2	1.2	1.44
4	5	1	0.2	0.04
3	3	0	-0.8	0.64
5	4	-1	-1.8	3.24
3	3	0	-0.8	0.64
2	4	2	1.2	1.44
1	3	2	1.2	1.44
		M: 0.8		S: 18.4

Significance Level:

- ☐ 0.01
☒ 0.05
☐ 0.10

One-tailed or two-tailed hypothesis?:

- ☐ One-tailed
☒ Two-tailed

Difference Scores Calculations

$$\begin{aligned}\text{Mean: } 0.8 \\ \mu &= 0 \\ S^2 &= SS_{\text{diff}} / (15 - 1) = 1.31 \\ S^2_M &= S^2 / N = 1.31 / 15 = 0.09 \\ S_M &= \sqrt{S^2_M} = \sqrt{0.09} = 0.3\end{aligned}$$

T-value Calculation

$$t = (M - \mu) / S_M = (0.8 - 0) / 0.3 = 2.7$$

The value of t is 2.702656. The value of p is .01717. The result is significant at $p < .05$.

Excel Calculation of mean, standard deviation and variance done by hand on excel

Answers	Upcycling	Exchange
1. Definitely not	1	3
2. Not Really	2	4
5. Definitely	5	5
3. Maybe	3	5
4. Probably	4	4
4. Probably	4	5
4. Probably	4	3
5. Definitely	5	5
3. Maybe	3	5
4. Probably	4	5
3. Maybe	3	3
5. Definitely	5	4
3. Maybe	3	3
2. Not Really	2	4
1. Definitely not	1	3
Total	15	
Mean	3.266666667	4.066666667
Standard Deviation	1.334523279	0.883715102
Variance	1.780952381	0.780952381
Total	15	15

Excel calculation with use of Excel Data Analysis Package

t-Test: Paired Two Sample for Means		
	Upcycling	Exchange
Mean	3.26666667	4.06666667
Variance	1.78095238	0.78095238
Observations	15	15
Pearson Correlation	0.52894872	
Hypothesized Mean Difference	0	
df	14	
t Stat	-2.7026557	
P(T<=t) one-tail	0.00858357	
t Critical one-tail	1.76131014	
P(T<=t) two-tail	0.01716713	
t Critical two-tail	2.14478669	

Hypothesis 3 – Tested with paired T-test and Pearson’s correlation

Question from after survey

Q 18 - Did wearing the items you took from exchange give you the same satisfaction/“feel good factor” as wearing a new item of clothing?

Q 6 - Did you feel the same pleasure effect from wearing the upcycled item as when buying a new outfit and wearing it?

Social Science Calculation Online

T-Test Calculator for 2 Dependent Means

The value of t is 2.827232.

Explanation of results

The output of this calculator is pretty straightforward. The values of t and p appear at the bottom of the page. If the text is blue, your result is significant; if it's red, it's not. The only thing that might catch you out is the way that we've rounded the data. The data you see in front of you, apart from the t and p values, has been rounded to 2 significant figures. However, we did not round when actually calculating the values of t and p . This means that if you try to calculate these values on the basis of the summary data provided here, you're likely going to end up with a slightly different - and less accurate - result.

Treatment 1	Treatment 2	Diff (T2 - T1)	Dev (Diff - M)	Sq. Dev
1	5	4	3.13	9.82
3	5	2	1.13	1.28
5	5	0	-0.87	0.75
3	3	0	-0.87	0.75
3	3	0	-0.87	0.75
3	5	2	1.13	1.28
4	5	1	0.13	0.02
5	5	0	-0.87	0.75
4	4	0	-0.87	0.75
4	5	1	0.13	0.02
3	3	0	-0.87	0.75
5	5	0	-0.87	0.75
3	3	0	-0.87	0.75
4	5	1	0.13	0.02
2	4	2	1.13	1.28
		M: 0.87		S: 19.73

Significance Level:

☐ 0.01

☒ 0.05

☐ 0.10

One-tailed or two-tailed hypothesis?:

☐ One-tailed

☒ Two-tailed

Difference Scores Calculations

Mean: 0.87
 $\mu = 0$
 $S^2 = SS_{diff} / (n - 1) = 1.41$
 $S^2_M = S^2 / N = 1.41 / 15 = 0.09$
 $S_M = \sqrt{S^2_M} = \sqrt{0.09} = 0.31$

T-value Calculation

$t = (M - \mu) / S_M = (0.87 - 0) / 0.31 = 2.83$

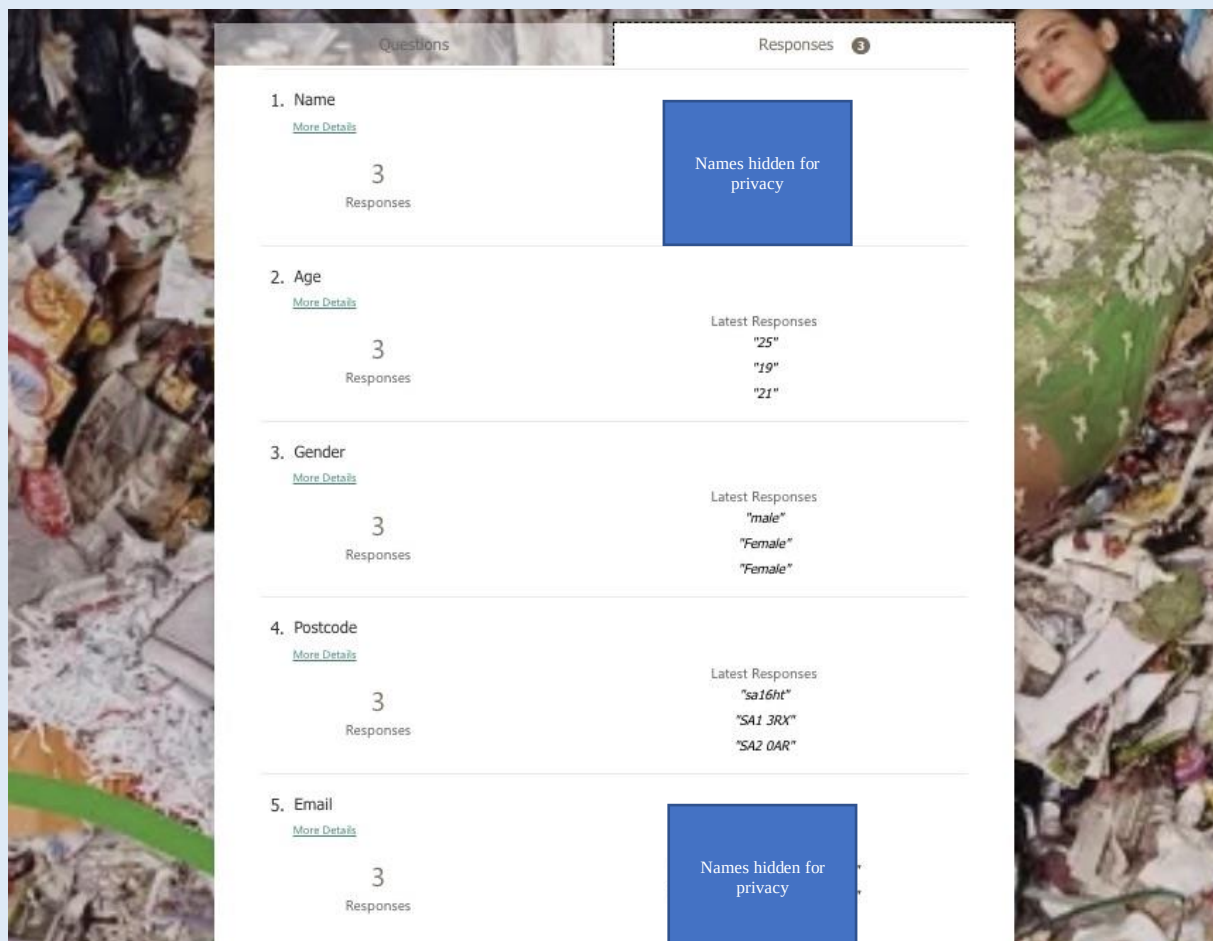
The value of t is 2.827232. The value of p is .01344. The result is significant at $p < .05$.

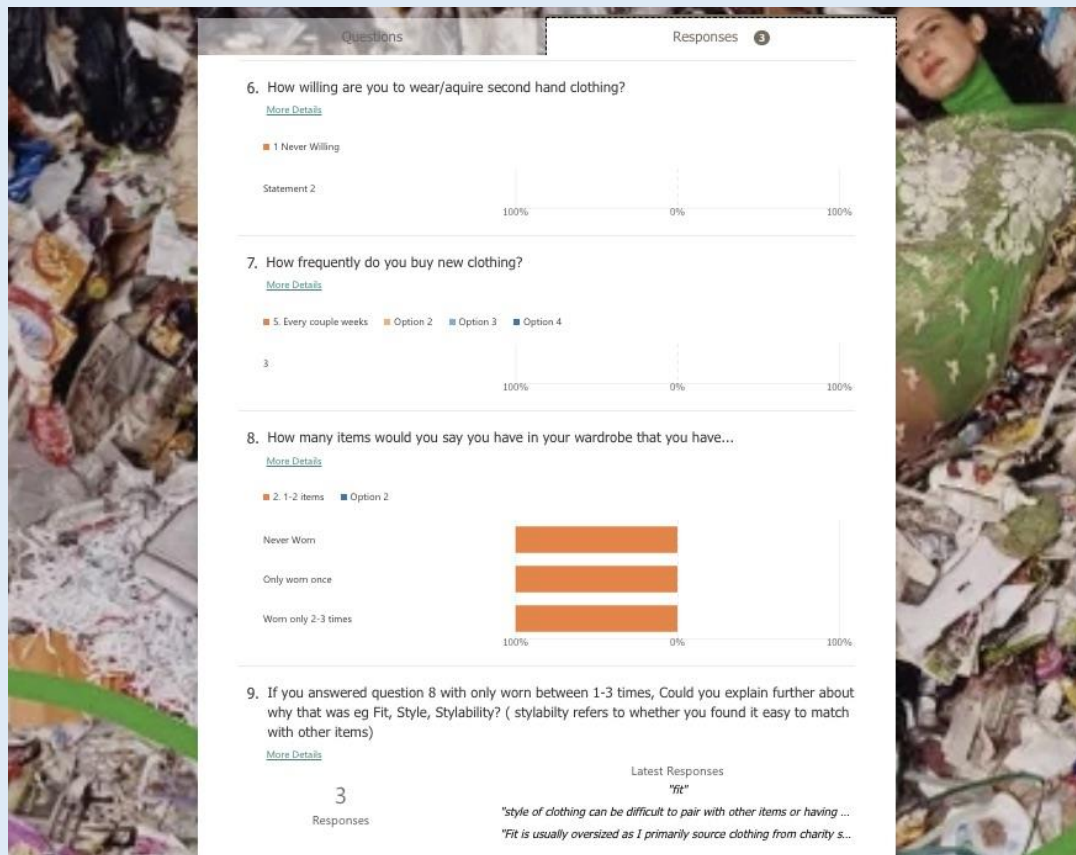
Excel Calculation using Data analysis package

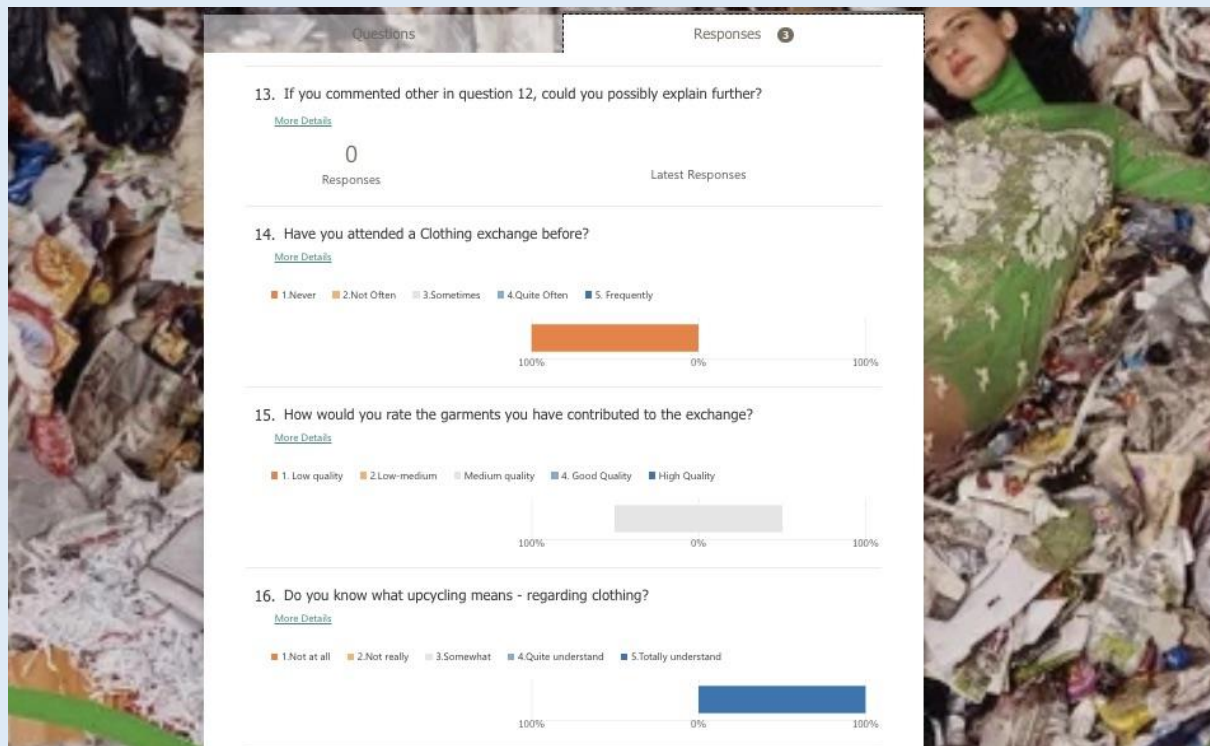
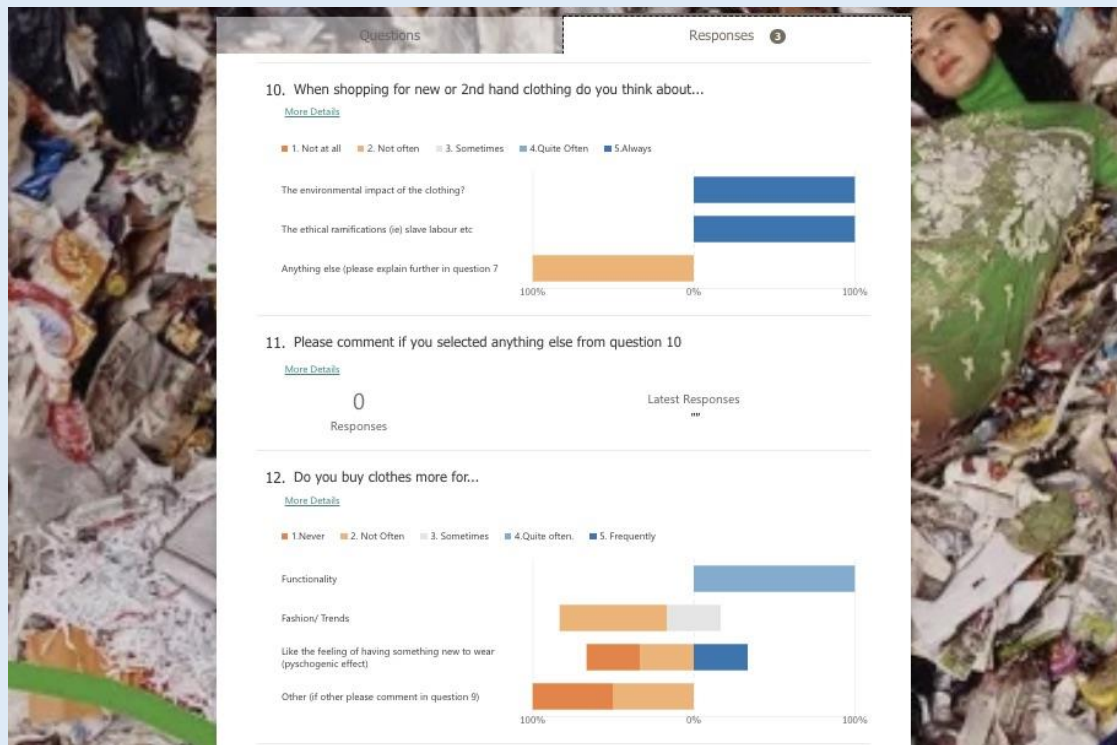
t-Test: Paired Two Sample for Means		
	<i>Variable 1</i>	<i>Variable 2</i>
Mean	3.46666667	4.33333333
Variance	1.26666667	0.80952381
Observations	15	15
Pearson Corre	0.32917948	
Hypothesized	0	
df	14	
t Stat	-2.82723244	
P(T<=t) one-ta	0.00671992	
t Critical one-t	1.76131014	
P(T<=t) two-ta	0.01343985	
t Critical two-t	2.14478669	

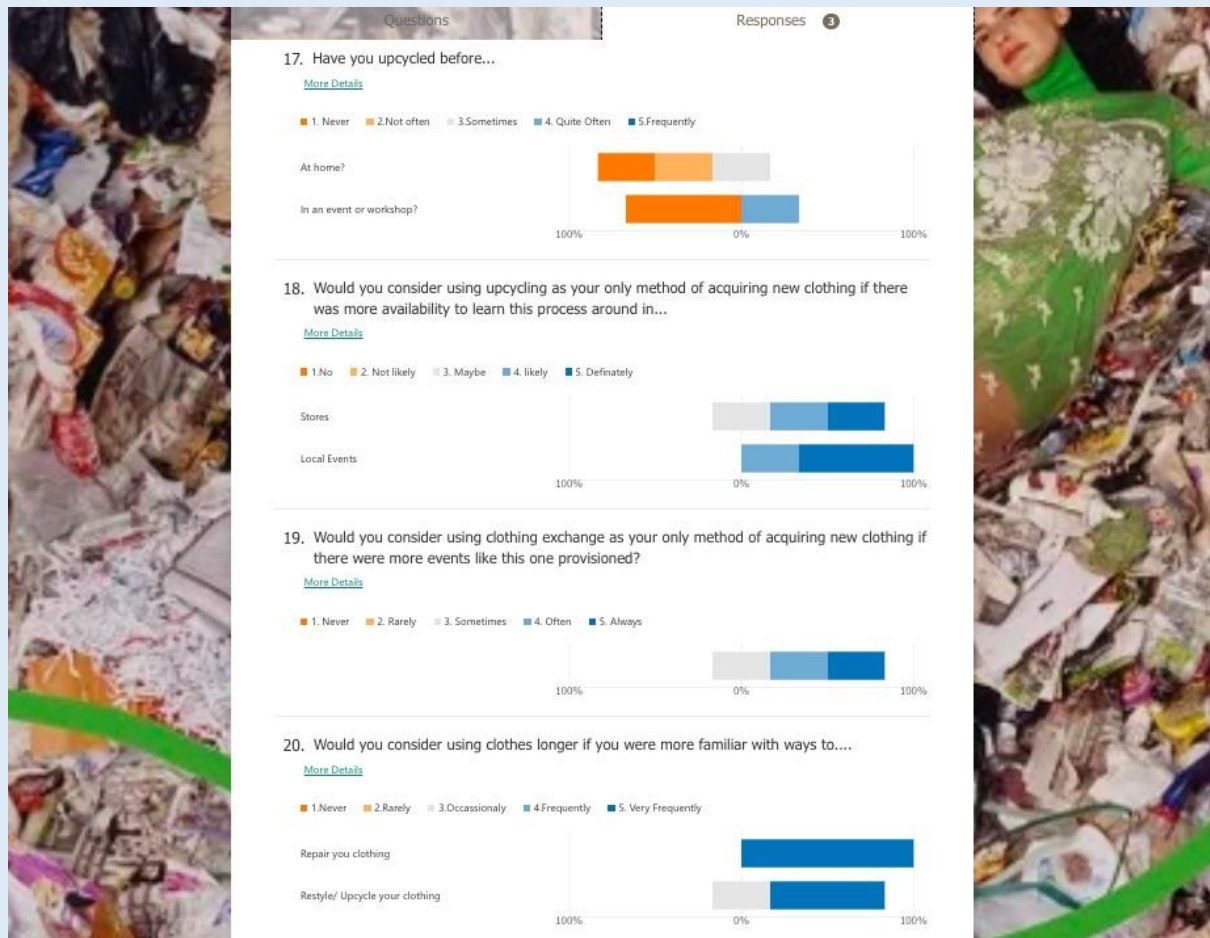
Appendix 3

Survey 1 – Pre Event









Survey 2 – Post Event

