# LEICESTER WARMING STRIPES: A LOCAL VISUAL RESPONSE TO CLIMATE CHANGE

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**ABSTRACT**

This paper considers a case study of a co-created local climate related response by students and academics at De Montfort University to the temperature warming stripes framework created by Professor Ed Hawkins at the University of Reading in 2018, (Hawkins, E. 2018).

Using the warming stripe temperature data for Leicester, the project created an exhibition to represent the temperature change in the city from 1860 through to the present day, using pre-loved clothes and textiles in blues and oranges. Long time thinking was encouraged through the additional challenge to contemplate the future decades and predict the nature of the warming stripes through to the year 2040.

Project participants were allocated a year in the time frame and agreed to donate a pre-loved piece of clothing or textile in the appropriate colour for their year. These pieces were curated across a number of rails and displaced in a showcase setting at the University.

Through the challenge to predict warming stripe trends to 2040 provided the opportunity to considering a situation beyond the immediate time frame. In this case it provided design and buying students with the opportunity to think about the long-time impact on the environment of overconsumption and their potential to influence change, encouraging positive environmental choices to create change.

Giving climate change a local context provides participants and viewers with an additional motivation to consider the impact of over consumption of fashion and textiles. Through examining the certainty of rising temperatures, this project offers an opportunity for the next generation of creative professionals to consider the value of long-time contingency planning.

## 1. INTRODUCTION

This paper starts by outlining the context for the Leicester warming stripes project and covers the following aspects:

• The current environmental context and corresponding impacts of the fashion and textiles industries to the current climate emergency.

• The importance of education for sustainable development as a means of combating climate change.

• The Carbon Literacy education programme and associated pledges.

• The impact of visual representations.

• The use of long time thinking to create sustained impact,

The paper, then focuses on a case study of a specific Carbon Literacy pledge (The Carbon Literacy Project, 2021) to create an educational response to global warming. This pledge, involved creating an exhibition that presented a visual statement to depict local climate change through the use of pre-loved clothing and textiles, making a statement about the warming climate and the polluting effects of the current fashion and textiles industries. It also looks forward and makes predictions for the future, providing the opportunity for contingency planning.

The paper concludes by considering the impact of the project. It considers how opportunities to co-create and reflect can prompt a change of behaviour and how the use of long-time thinking can provide positive future facing responses to global climate challenges.

## 2. CONTEXT

### 2.1 Environmental challenges

The global fashion and textile industry has historically been recognised for its significant global economic impacts as a major employer within a $2.5 trillion industry (McKinsey 2022), and for its creativity in producing desirable products with key performance features that enhance human experience and perform technical functions.

However, over the last 20 years, the industry has become increasingly characterised as encouraging overconsumption of lower-priced, low-quality 'fast fashion' with clothing production doubling in the years 2000-2014 (Remy et al, 2016). Globally, in the current linear model of 'take-make-dump,' an excess of 100 billion garments is produced annually (Fashion Revolution, 2021), with fewer than 1% of these recycled at the end of life. Each year 92 million tonnes of clothing and textiles end up in landfill. (Earth.org, 2023).

The environmental context is summarised in figure 1.

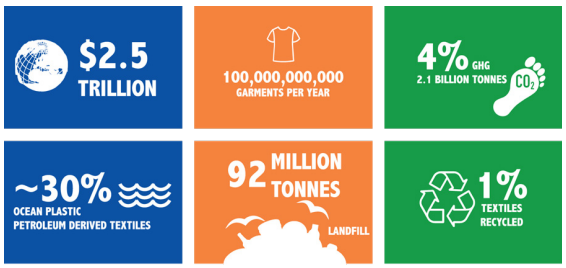


Fig. 1 Environmental impact of the global fashion and textile industry.
(Image credit: De Montfort University)

As the climate emergency gathers pace and the need to meet the net zero targets set out in the Glasgow Climate Pact, (United Nations, 2022) are of utmost importance, the transition of the fashion and textiles economy towards a circular model, which is 'regenerative by nature' is crucial (Ellen MacArthur Foundation, 2017).

2.2 Education for Sustainable Development

The United Nations Conference on Environment and Development in Rio, 1992 set out a legal framework of the 195 countries who ratified the convention, to combat climate change. This became the United Nations Framework Convention on Climate Change (UNFCCC) and defined,

> "Climate change" means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. (United Nations, 1992)

Article 6 of the Convention stated:

> Parties shall promote and cooperate in education, training and public awareness related to climate change and encourage the widest participation in this process

At Rio 1992 summit, Agenda 21 was an agreement of 178 countries to work towards a sustainable future. These were defined as the United Nation (UN) Sustainable Development Goals (SDG) and agreed at the UN Sustainable Development Summit in New York 2015. SDG 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2030.

The United Nations 2012 Higher Education Sustainability Initiative (HESI, 2012) action groups promote inclusion of sustainability within the curriculum. This recognition of the importance of education to help people make informed decisions and therefore change behaviour to become more sustainable in their actions has led to initiatives from the UK's AdvanceHE, a charity that works to improve higher education for staff, students and society globally, and the Quality Assurance Agency (QAA). AdvanceHE advocates evidence-based teaching and supports excellence through professional recognition. QAA is The Quality Assurance Agency for Higher Education to maintain standards. These organisations have published guidance on immersing sustainability within everyday teaching activities.

In 2018, De Montfort University (DMU) became the education Global Hub SDG 16 to promote peace, justice and strong institutions. This has led to De Montfort University's strategic aim to embed the UN SDG in all aspects of university life, publishing a Sustainability Report each year since 2015. DMU aims to support students, academics and professional services to understand positive actions they can make in work and home life to combat climate change.

2.3 Carbon Literacy

The idea for Carbon Literacy started in 2009 as an idea at Manchester's Town Hall event to create an action plan to address climate change in the city which aimed to reduce carbon and create 'low-carbon culture change'. The project was driven by Cooler Projects CIC and evolved into a formal definition of 'Carbon Literacy' (Richards & Simmons, 2022). The plan was to deliver training in climate change so that people could become 'carbon literate', understand the implications and therefore make changes to everyday activities, decisions and most importantly individual and group pledges. This led to Carbon Literacy Training starting as a pilot plan in 2012. In 2015 at COP21, it was recognised as one of 100 worldwide Transformative Action Programs. Today Carbon Literacy training is growing, The Carbon Literacy Project 2021 Impact Report, notes growth across all statistics tracked, number of citizens trained, number of pledges made, number of organisations engaging. De Montfort University now offers staff and students training in Carbon Literacy.

In their study 'Lights off, Spot on: Carbon literacy training crossing boundaries in the television industry', Chapple, W. et al. (2019) showed how Carbon Literacy training changed attitudes, both personal and as a professional group, across the diverse community that produced the popular soap opera, 'Coronation Street'.

Findings also highlight the role of "self" in the process of social learning and organizational change. Distinct patterns emerged in the relationship between self-identity, social learning and change across a range of boundary objects, practices and communities both in the Carbon Literacy Training and Community of Practice. (Chapple, W. et al., 2019)

Srkoc et al, (2021) note the importance of education to promote understanding and alter behaviours, also reflected in UN SDG Goal 13, 'Take urgent action to combat climate change and its impacts'. They argue that teaching climate science must also focus on 'climate change mitigation education' and that projects, in particular, the Carbon Literacy training, "has successfully managed to train very diverse audiences and could be upscaled and implemented in all walks of life."

2.4 The impact of visual representations

The visual depiction of climate change affecting the world has been used by activists, news agencies and eminent biologists and UK broadcaster David Attenborough. These show the effect of climate change so that the public can understand that their actions and decisions are affecting the planet. Culloty et al,(2019) argue that creating a body of images depicting climate change could create research opportunities for which type of image is most effective for different audiences in creating an understanding of climate change, however,

> the research area is currently impeded by the absence of agreed procedures for applying visual methodologies. (Culloty, E. et al.,2019)

O'Neill and Nicholson-Cole, (2009) argue that fear- inducing images may even be counterproductive to encourage the public's engagement with climate change and that the research around such images lacks clarity. They recommend "constructively engaging individuals."

2.5 Long time approach

Environmental activist, Greta Thunberg featured the concept of long time thinking in her speech to the World Economic Forum in 2019 (The Guardian, 2019). She made the point that it is the responsibility of current generations to act now to develop solutions to the climate emergency for the benefit of future generations. Her speech emphasised the need for cathedral thinking, a method whereby a problem is considered over and beyond the life span of a human being. This is the crux of the long-time approach. Another advocate Krznaric, 2020, adds, "By making wise—and long—choices as we emerge from this crisis, we could well become the good ancestors that future generations deserve".

The creative and cultural thinkers, Saltmarshe and Pembroke, (2018) have encouraged policy makers from all disciplines to join their Long Time Project, believing that:

> Art and culture will be crucial to cultivating long-term attitudes and behaviours. They are foundational in shaping our collective direction of travel, from the kinds of laws we make, to the technology we develop, to the way we think about our role in shaping the future. (Saltmarshe & Pembroke, 2018)

This concept has resonated with the authors who have developed several projects that use long time thinking, including the development of the umbrella term T-Extinction (Hardaker et al, 2023) for long time projects run within the School of Fashion and Textiles.

> Named T-Extinction, the project was launched in 2019 as a provocation to think ahead to the year 2090, a time when the current students would be in their elder years and able to reflect on their careers. The first iteration involved Fashion Buying academics and students who set themselves the challenge to identify products or processes that would be extinct or taboo by 2090. (Hardaker et al, 2023)

## 3. CASE STUDY: CARBON LITERACY PLEDGE

The following details the personal pledge made by Sally Gaukrodger-Cowan following the completion of the Carbon Literacy course. It involved a re-creation of a visual representation of climate stripes created by Professor Ed Hawkins, University of Reading (Hawkins, 2018) which are featured in the Carbon Literacy course. The warming stripes show visually the relative temperature of a geographical area with each year having a stripe. A blue stripe shows the year is colder than expected and an orange stripe shows that the year is warmer than expected. Figure 2 shows the warming stripes for Leicester from 1860–2018.


Fig. 2 Leicester warming stripes (image credit: Hawkins, 2018)

The pledge was to create an artwork that could be exhibited and promoted on social media, where others would be encouraged to get involved, co-creating to develop a community response. Using the Leicester based warming stripe data was a crucial part of this project to highlight climate change from a local perspective and engage a local response. The proposed group activity was open to the School of Fashion and Textiles staff and student community. Staff and students were invited to:

• Pick a stripe colour.

• Submit a waste /surplus garment matched to the stripe colour chosen.

• Complete a form to register involvement and agree to being contacted, 6 months after the exhibition to feedback on the experience of participating and how the project has affected your thinking.

• Follow the Instagram T-Extinction account for updates and information

A total of 172 garments were collected with 30 contributors from across the staff and student body. These were displayed across 6 rails, with each rail representing 30 years in the time span from 1860 to the current year. This connects well with Leicester's textile manufacturing heritage and the formation of Leicester School of Art in 1870 (first predecessor of De Montfort University). Figure 3 shows the rails being prepared ready for the exhibition with a large variety of garments from across the decades.

Fig. 3 Prepared rails (image credit: De Montfort University)

These rails were showcased in a prominent window centrally on the De Montfort University as part of the main entrance to the Art and Design Building on campus along with a concise explanation about the exhibitions concept. The display area was approximately 16 metres long by 4 metres in height. Being located on a thoroughfare across the University, it is estimated that there were typically 50 passers-by per hour.


Fig. 4 Physical exhibition (image credit: De Montfort University)

A corresponding social media campaign, via @textinction complemented the physical exhibition.

An additional rail was included to enable contributors to consider a long-time approach with a range of predictions for 2040. The authors developed a range of provocations based on student responses, as shown in figure 5, with each provocation being in the window for two weeks.

Fig. 5 Predictions for 2040 (left to right, hot with a hint of blue for hope

This changing final rail kept the exhibition fresh and prompted reflection on the current trajectory of the fashion and textile's industries as they fuel clothing overconsumption.

The exhibition was in the window for 4 months from October 2023 through to January 2024 and provided the opportunity for students and the local community to engage over a sustained period of time.

## 4. DISCUSSION

This local visual response to a global problem using Fashion and Textile waste to highlight the emergency and comment on fast fashion was an effective way to raise awareness of over consumption and product being sent to landfill or incineration which contributes to global warming. The exhibition prompted the participant to make small changes to everyday activities and through this grass root activity achieve a meaningful impact.

### 4.1 The Carbon Literacy context

This project inspired by a pledge as part of Carbon Literacy training provides evidence of the effectiveness of this training. The Carbon Literacy Project (2021) Impact Report, notes that there have been 153,704 pledges made since the initiative started, which given the example here points to a positive impact. Through a programme of Carbon Literacy training within the School of Fashion and Textiles, there are now approximately 25% of academics who have undertaken the training and are acting on their pledges. As a result of this particular pledge the staff and student community engaged in a positive way through their interaction with the project which involved them considering their own impact in terms of clothing consumption. It is interesting to note that the power of a pledge, is very much the current zeitgeist, with WGSN featuring this in their recent October Key points bulletin, (Palmer and Yeung, 2023).

### 4.2 Being part of a creative community

Formulating the exhibition itself, has enabled individuals, staff and students to be part of a co-creation community that provided a constructive positive engagement with environmental issues. The project was promoted as a positive pro-active activity, focussing on individual contributions to create a synergistic effect, through working with others for a common purpose. The organisation and ethos of the exhibition uses the elements outlined by MacMillan and Chavis, (1986), in what defines a community. By being a member of a group, the sense of community is created by working together to solve problems which achieves better results. Everyone can contribute in an equal way and the activities benefit the members through friendships and improving their environment.

### 4.3 Visual impact

The exhibition used scale to present a representation of the warming stripes. Being in a prominent a prominent public space this enabled many members of the University and the public in the community to engage with environmental art with a view to encouraging them to consider their own response to climate change.

The authors have received a number of qualitative comments.

“The T-Extinction window installation spoke of fashions impact on climate change through a form of visual language. For me this artistic stimulus transcends in a more effective way the usual words used within traditional forms of activism. This presentation style created more mental processing to work out what’s going on - and that makes you think”.

Artist

“Inspired by the fabulous exhibition at #dmu organised by #sallygaukrodgercowan I have been looking at the #biodiversity stripes and it is dispiriting, but an excellent visualisation of the loss of biodiversity”.

Senior Lecturer

These comments relate to the value of a visual statement in achieving impact through the creation of a positive outcome. This connects well with O’Neill and Nicholson-Cole (2009) who argue that fear- inducing images may even be counterproductive to encourage the public’s engagement with climate change and that the research around such images lacks clarity. They recommend “constructively engaging individuals”. There are many examples of fear inducing imagery in documentaries, articles in the media such as those of the garment mountains in the Atacama Desert (Barlett, 2023). These depict the scale and enormity of the environmental impact of fashion and textiles and according to O’Neill and Nicholson-Cole (2009), “fear is generally an ineffective tool for motivating genuine personal engagement. This project aims to enable engagement through small individual actions which can create a volume of response that is positive.

4.4 Long time thinking

The premise of this project is to look forward and in doing so encourages staff and students to consider the future and how their actions now have influence on the future. This is very different to the typical student project brief which tend to be focussed on the present day.

This project invited predictions for 2040 from the student body. These predictions showed the application of sustainability knowledge from the students, with predictions highlighting changes that are already being made through the design process, such as the use of 3D digital prototyping and also a growing awareness of the impact of overconsumption.

Further feedback on the experience of participating in the exhibition and how the project has affected thinking is planned to be collected in Spring 2024 to assess impact. Participants will be asked in a 6-month impact questionnaire, the following questions:

• what was the motivation for participating?

• what was their emotional reaction to the installation?

• did being involved alter their behaviour in response to climate change?

• did they notice any impact on friends and colleagues who saw the project?

• would they be interested in being involved in another piece of collaborative artwork in the future?

This will be analysed and disseminated to inform future collaborative projects.

Finally, the exhibition is based on a simple concept and can be set up in another venue very easily. The concept is also straightforward to recreate for a different geographical location in a different venue, and in different settings for example as a secondary school project.

## 5. CONCLUSION

The project provoked multifaceted thinking, from considering the climate of the past, to the current day and through to predictions for the future.

There are a number of key conclusions to draw from the project:

1. The Carbon Literacy training provided an effective catalyst for action via an academic pledge.

2. The positive approach of the project was engaging and inclusive. Garment contributions were received from academic and professional services staff and the student body.

3. The exhibition provided a visual statement at scale on campus with a social media profile which made an impact beyond the physical exhibition.

4. The exhibition prompted the participant to make small changes to everyday activities and through this grass root activity achieve a meaningful impact.

5. Members of different groups across the university came together as a creative community, which created a sense of belonging.

There is the opportunity to collect feedback to see if there has been a long-term impact and this will be analysed and disseminated to inform future collaborative projects.

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