

Establishing a Skills Baseline for Sustainable and Circular Fashion and Textiles Design in UK Higher Education

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ABSTRACT

The ongoing transition towards sustainability in the fashion and textiles (F&T) industry has demonstrated the need for educators teaching the next generation of designers to adopt sustainable and circular design strategies within course content. Circular F&T design considers environmental impacts at every product lifecycle stage and end of life options, therefore experts propose that designers require in-depth technical knowledge of materials and manufacturing processes, and the skills to collaborate within multi-disciplinary teams to develop circular solutions. However, in practice, F&T designers often play a passive role in sustainability decisions, tending to be directed in material choices and manufacturing routes by technologists, and sustainability experts.

The NERC funded 'Back to Baselines' project aims to map the UK F&T industry to provide a baseline of current sustainability and circularity practice, including an assessment of skills gaps. This paper discusses research undertaken to assess the alignment of UK HE course provision with industry needs for sustainable and circular F&T design skills. A pilot focus group comprising HE educators explored perceptions of best practice in learning and teaching (L&T) for sustainable and circular F&T design, the perceived alignment of intended graduate skills with industry needs, and the challenges involved in the design, delivery and assessment of course content and assignments. A mapping exercise of F&T design job advertisements assessed the level of demand for sustainability and circularity skills.

The findings demonstrated that creative circular L&T practices related to waste reduction solutions were more common in student project work than more technical material-based approaches. Tutors also discussed the challenges of keeping up to date with developments in best practice for circular design, and gaps in their own knowledge. The analysis of F&T design job advertisements demonstrated very low demand for sustainability and circularity skills, pointing to a disconnect between the perception and current reality of the designer's potential contribution to sustainability.

INTRODUCTION

The circular economy is proposed by governments, practitioners and academics as a more sustainable model for the F&T industry to address negative environmental impacts, with multi-stakeholder initiatives such as WRAP's Textiles 2030 responding to planned legislation that will require companies to meet mandatory environmental and carbon reduction targets (WRAP, 2021; BFC, 2022). Circular F&T design is more complex than traditional linear approaches, as environmental impacts at every product lifecycle stage, and post-consumer use options must be considered (Ellams and Goldsworthy, 2019). Inevitably, skills gaps are emerging, with industry and academics identifying the need for enhanced scientific and technical skills for designers (Postlethwaite, 2022), and / or the ability to innovate and collaborate with interdisciplinary stakeholders across functional silos (Goworek et al, 2020).

Universities increasingly incorporate sustainable and ethical principles into their research agendas and curricula (Burns et al, 2019) with a recent survey of UK academics teaching on creative F&T degree courses finding that 79% were 'mainstreaming' circular design principles (BFC, 2022, p24). However, circularity is not yet widespread as a fully functioning system within the F&T industry (Buchel et al, 2022). potentially leading to variations in understanding and interpretation by educators in HE, and a mismatch between intended graduate skills and those that industry currently demands (Junestrand et al, 2024). Our research within the Back to Baselines project seeks to establish a greater understanding of how knowledge and skills for sustainable and circular F&T are being addressed at all levels of education in the UK, and to assess the alignment with current and future industry skills needs. This paper focuses specifically on F&T design education in HE and discusses the findings from a pilot focus group of educators. The following sections summarise the existing literature on the topic, the research approach, preliminary insights, and next steps for the study.

LITERATURE REVIEW

Industry Context for Sustainable and Circular Fashion and Textile Design

The Circular Economy represents a paradigm shift in sustainability thinking, providing a framework for the F&T industry defined by the Ellen MacArthur Foundation as 'building an industry that designs products to be used more, made to be made again, and made from safe and recycled or renewable inputs' (EMF, 2023). Circularity is complex, involving a systemic approach that encompasses the whole product lifecycle, and moves away from the prevailing 'take, make, dispose' linear model currently employed by most of the F&T industry (Niinimäki, 2018). There is no universal standard or definition for the Circular Economy (Cumming, 2018) however it continues to gain traction as the preferred model by which to transition to sustainability in F&T, with a growing number of multi-stakeholder circular initiatives whose membership

includes businesses, NGOs, policymakers and HEIs being established.

Design in its broadest sense is proposed as the foundation of sustainable and circular F&T, and academic research has emphasised its potential to extend and enrich the designer’s role, perhaps increasing the status of designers. Studies have progressed from the investigation of ‘stand-alone’ solutions focused on lower impact raw materials and manufacturing processes, to more integrated design-led circular approaches which consider the whole product lifecycle within the context of planetary boundaries and aim to address social and commercial challenges (Earley, 2017). As the discourse on sustainable and circular F&T has developed, many toolkits and guidelines have been produced by academic and industry experts to educate businesses, designers and new product development (NPD) teams. For example, WRAP’s Circular Design Toolkit (WRAP n/d) proposes 4 circular design pillars and 11 principles, each linked to a product lifecycle stage (table 1). Each principle is considered at the start, or design stage of the product lifecycle in a systematic way, ensuring that actors and stakeholders with relevant expertise and control over the different supply chain stages are involved to achieve development of appropriate sustainable and circular solutions. However, in practice, the extent to which the designer leads or contributes to this process varies depending on the size, organisational structure, and level of sustainability engagement of a focal company (retailer or brand) (Dan and Østergaard, 2021).

Table 1. The Circular Design Pillars and Principles (WRAP, n/d)

Lifecycle Stage	Circular Design Pillars	Circular Design Principles
Raw Materials	Reduce Material Impacts	1. Recycled materials 2. Existing materials 3. Next generation materials 4. Preferred renewable materials
Production	Optimise Resources	5. Lower impact processes 6. Minimise material waste 7. Remake
In Use	Design for Longevity	8. Design for durability 9. Design for versatility
After Use	Design for Recovery	10. Design for recyclability 11. Design for disassembly

Circular initiatives related to ‘raw materials’ and ‘production’ are already well established within the mainstream F&T industry, tending to be led by experts in sustainability, sourcing and textile technology working in cross functional NPD teams, directing designers in material choices and manufacturing routes. The more creative approaches such as design for zero waste and remake (related to the ‘production’ lifecycle stage) and design for physical and emotional durability, versatility and disassembly (related to the ‘in use’ and ‘after use’ lifecycle stages) have more potential to be led by designers (Claxton and Kent, 2020) but are not yet widely established due

to the need for fundamental changes to the F&T industry business model to achieve circularity, and a shift in consumer mindsets to circular consumption practices to support the business case (Buchel et al, 2022).

Higher Education Context for Sustainable and Circular Fashion and Textile Design

The content of university degrees in F&T design, and the intended graduate skills and attributes are shaped by several factors and stakeholders, including the ongoing globalisation and shifting of supply chains, the rise of e-commerce and digital marketing, and the growing discourse on sustainability in response to the negative environmental and societal impacts caused by significant growth in global clothing consumption (Bednall, 2022). Employability is an important consideration in HE course design, with the UK government assessing the value of degree courses through the Graduate Outcomes Survey which maps graduate employment routes and salaries (Shea, 2024). Academic and industry experts have highlighted the need to anticipate how job roles and skills needs will develop as sustainability and circularity becomes more widespread. Experts suggest that F&T designers require knowledge of circular design principles, technical knowledge of sustainable materials and manufacturing processes, and the skills to apply them in practice and / or to collaborate with interdisciplinary stakeholders across functional silos to enable knowledge sharing and the development of solutions (Ellams and Goldsworthy, 2019; Bicho et al, 2024). In the longer term, more fundamental change is proposed in F&T designer education in response to the shift towards circularity, and advances in digital technology, material innovation and automation which may disrupt traditional F&T design roles. Postlethwaite (2022) advocates that design students should have access to new technologies, develop enhanced research skills, and critically challenge current thinking and practice in F&T design, supported by new modes of delivery which foster transdisciplinary working and closer relationships with industry.

University F&T degree courses increasingly incorporate L&T approaches related to sustainable and circular F&T design into course content and assessment strategies (BFC, 2022), while still addressing the skills and knowledge needed to work within the prevailing linear model, where designers are primarily focused on rapid turnover of new products driven by fast changing, digitally driven trends (Dan and Østergaard, 2021). The discrepancy between the current and potential role of designers is further evidenced by an online search of 60 job advertisements for F&T design roles undertaken in October 2024, which found that only two asked for sustainability and/or circularity knowledge or skills, pointing to design practitioners having low involvement in sustainability, and a disconnect between intended graduate outcomes and those desired by the F&T industry.

METHODOLOGY

This paper discusses qualitative research in the form of a pilot focus group comprising HE educators teaching on F&T design undergraduate degree courses at a UK institution. The research forms an element of the ‘Skills’ theme within the ‘Back to Baselines’ project and aims to assess the alignment of intended graduate skills with F&T industry needs. The focus group format was selected as a suitable approach to promote an environment where participants selected for their expertise and knowledge of a topic of can share their ideas, experiences, and attitudes (Kreuger and Casey, 2014). The participants all had at least two years’ experience teaching at HE level and represented three F&T courses (table 2).

Table 2. Focus Group Participants

Participant A	Senior Lecturer BA Textile Design
Participant B	Senior Lecturer BA Textile Design
Participant C	Senior Lecturer BA Fashion Design
Participant D	Senior Lecturer, BA Knitwear Design
Participant E	Professor in Fashion and Textile Practice

The following research questions arising from the literature review were explored:

RQ1: What sustainability and circularity frameworks and approaches inform L&T strategies?

RQ2: What sustainable / circular F&T design skills are addressed within L&T approaches and assessment, and how do they align with perceived industry needs?

RQ3: What challenges exist in addressing sustainable and circular skills requirements for graduates studying on F&T design courses?

The focus group discussion was recorded and transcribed, and the findings were analysed thematically in relation to the research questions.

RESULTS AND DISCUSSIONS

RQ1: What sustainability and circularity frameworks and approaches inform L&T strategies?

Established frameworks were employed in L&T to contextualise sustainability concepts, covering the full breadth of environment, social and economic impacts, including the UN’s Sustainable Development Goals (SDGs) and the circular economy. Across all F&T design courses, students were encouraged to take the University’s optional ‘Sustainability in Practice’ certificate. L&T also included concepts that challenge established F&T industry practice, including ‘Degrowth’, which is concerned with reducing economic activity rather than pursuing growth, and prioritising social and environmental wellbeing (Raworth, 2017) and ‘Fashion Fictions’, an educational initiative to generate fictional concepts of alternative fashion systems and cultures (Aspinall and Twigger-Holroyd, 2024)

At a product level, F&T design students were introduced to materials in first year via recorded lectures, and in first and second year would undertake internally or externally briefed design projects with a sustainability dimension. Sustainable design tools and frameworks supporting these projects include TED's Ten, a set of prompts for individual sustainable design approaches (Earley, 2017), and the Durability Dozen, a toolkit comprising product development strategies to extend clothing lifetimes (Cooper et al., 2021). The most common sustainable L&T approaches were related to waste reduction (for example, zero-waste pattern cutting, and live external projects to creatively repurpose pre-and post-consumer waste garments), aligning with WRAP's circular design principles in the 'production' and 'after use' garment lifecycle stages (WRAP, n/d). However, although circularity was taught as an overarching framework, these were applied as stand-alone approaches rather than being considered within a full product lifecycle. Circular F&T was explored in more depth in a 2nd year 20-credit optional module from both an industry and consumer behaviour perspective, but with no practical design-based activities. In the final year, students could choose to base their creative major projects and dissertations on sustainable and circular F&T concepts.

RQ2: What sustainable / circular F&T design skills are addressed within L&T approaches and assessment, and how do they align with perceived industry needs?

Participants stated that F&T design students undertake L&T based on a range of learning outcomes designed to support the development of desired graduate knowledge and skills. Subject specific knowledge and skills include the practical ability to ideate, design, make and visually communicate fashion products. Student work should also reflect professional practice in the discipline, demonstrating commercial awareness, and the influence of global macro trends, including the transition to sustainability. Generic graduate knowledge and skills include self-management, critical analysis, team working and social skills, communication, presentation, and research.

Participants noted that subject specific learning outcomes related to sustainable and circular F&T design are written using broad terminology, for example the term 'design responsibility' can encompass additional ethical approaches such as design for inclusivity and design for social justice. This allows students to have a degree of choice in self-directed project briefs but may lead to them not addressing sustainable and circular F&T specifically in a meaningful way. Participant D suggested that some students pay lip service to sustainability learning outcomes by highlighting uncontextualized design practices:

'...you'll have some that do it really well, and they've really got it. And then other students, it's 'I've used some scrap yarn'. That's it, and it's really hard to mark.'

Participant B agreed, stating that it was difficult for many students to locate the sustainability aspects of their work in a broader industry context; Participant E suggested that learning outcomes relating to sustainable and circular skills should be more distinct, explicit and easier to assess.

All participants felt that the required generic skills to support sustainable and circular F&T design were already written into module learning outcomes, stating that all project briefs required an element of research, analysis and resolution. They also cited examples of team-based projects to foster collaborative working, and optional 2nd year modules that were open to all art and design students, encouraging transdisciplinary working.

The F&T design courses addressed employability through specialised careers support, and engagement with the industry through placement and work experience opportunities, and live projects which sometimes had a sustainability dimension. However, participant D noted that sustainable and circular F&T design skills were never included on placement advertisements for design jobs and suggested that the F&T industry is not prioritising those skills for designers.

RQ2: What challenges exist in addressing sustainable and circular skills requirements for graduates studying on F&T design courses?

The focus group participants raised a series of challenges related to embedding sustainable and circular F&T design within the curriculum:

1. Several factors have led to more content being added to the F&T curriculum, resulting in increased pressure on time and resources for staff to deliver it, and on students to learn and apply it within their design projects; this includes the need to address critical industry trends such as sustainability, and the growth in digital design processes, within course provision.
2. Changes to the A level textiles curriculum have resulted in students entering F&T design degrees with a lower level of technical skills, leading to educators having to allocate more time to upskilling in the first year. Materials are a fundamental building block for sustainable and circular F&T but participants felt that student engagement with the technical content on materials delivered in first year was low, and that some prioritised creative over technical skills. Participant E suggested it should be revisited in second and final years in a more integrated and meaningful way, to underpin design approaches and solutions.
3. Those participants with academic research experience in sustainable and circular F&T were more knowledgeable and had introduced a wider range of tools and frameworks to guide students in their projects. Participants discussed gaps in their own knowledge of sustainability and circularity, particularly in relation to the 'after use' lifecycle stage where circularity is less established within the industry. They noted that it was challenging finding time to research

the different debates on sustainable and circular F&T to inform L&T, which needs to both reflect and critically challenge the current industry system and trajectory.

CONCLUSION

To summarise, the challenge for educators in HE is to address the skills required for current design roles within the F&T industry while preparing for future skills needs. The potential implications include the time and cost incurred to develop and implement new sustainable and circular L&T approaches, the need to support the development of educators' skills and knowledge and to engage with industry to anticipate and influence changing skills requirements. Our next steps will include undertaking further qualitative research with F&T design educators based at different UK institutions, aiming to reach a consensus of best practice in L&T. We will also investigate the industry perspective, seeking to more accurately predict the future skills demands for F&T designers as the industry transitions to circularity.

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