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Design Cultures of Making: Fashion thinking as creative process and pedagogy .

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Abstract |This paper shares research being developed through an Art and Humanities Research Council, Creative Industries Cluster funded 5-year project, the aim of which is to transform the competitiveness, agility and creative output of the UK's fashion industry. Its focus is to develop innovative , multidisciplinary STEAM+D based fashion designers, industry facing training , and education for post graduates fashion students, breaking down traditional fashion and technology silos .
Through their work a group of researchers at the Royal College of Art attached to the Future Fashion Factory Project (FFF) propose fashion thinking as a new rational for fashion education that has three distinct strands – fashion thinking for social-change, fashion thinking for applied specialisation and fashion thinking through advanced manufacturing. Fashion thinking through advanced manufacturing is discussed here highlighting Discourse ,a tool developed to enable investigation into current pedagogic models, and revealing the importance of developing new language competencies for fashion.

KEYWORDS | FASHION THINKING, DESIGN THINKING, INDUSTRY 4.0, DESIGN ANTHROPOLOGY, PRACTICE BASED, PRACTICE LED, STEAM+D.

1. Introduction. The Creative Industries and Manufacturing Landscape in the UK.

In the Executive Summary 2020 ,Manufacturing the Future Workforce, The High Value Manufacturing Catapult recognised that the overall contribution manufacturing made to the UK economy was in decline but the government wanted to make the UK more competitive in this field. The counter narrative developed through the Creative Industries Federation, the independent body which claims to represents, champion and support the UK's creative industries, stated that the creative industries were growing at more than twice the rate of the UK economy. However, there was a recognition that UK creative industries were under-capitalised, suffered from skills shortages and were hampered by a lack of diversity and unequal access to opportunities. Agility, new skill sets and a younger workforce were seen as imperatives to greater success . The Creative Industries Manifesto (Creative Industries Federation Report 2020) proposed equipping the next generation of the workforce through returning creative education to the heart of the curriculum. Countering this, the Longitudinal Education Outcomes data (LEO,2019) suggested studying for an arts and humanities degree did not enable graduates to earn significant salaries by age 29 when compared to economics or science graduates , with a sub narrative that undergraduate courses in art and design do not contribute significantly to GDP. The Creative Industries Manifesto suggested that metrics beyond salary were urgently needed to capture the true value of creative education. Wider measures such as social value, creative achievements, and civic contribution must be recognised they claimed.
A complex narrative and counter narrative are still developing in UK politics involving the creative industries, manufacturing and higher education. Post the UK leaving the European Union many policies will be rewritten and new strategies developed that will impact all 3 sectors and their relationship to each other. Recently published reports commissioned by the UK Government suggest a confusing picture of claim and counter claim focusing on the value of an arts and humanities education and its contribution to the UK economy. These include a new industrial strategy document and the Ten Point Plan for a Green Industrial Revolution Building back better, supporting green jobs, and accelerating our path to net zero (2020). The tide may even be turning, back in favour of the creative industries due to the devastation caused it in the UK by the pandemic. It is within this fraught landscape that UK art and design schools are being challenged for their relevance and may need redesigning for a more agile future.

2. Creative Industries Clusters Programme. Future Fashion Factory.

In 2018 the Creative Industries Clusters Programme funded by the Arts and Humanities Research Council invested £80m in eight new creative research & development partnerships bringing together the UK's creative industries with the university sector. This programme was proposed as a catalyst to further grow the creative economy unlocking emerging fields and adapting new technologies. Part of the UK Government's Industrial Strategy Challenge Fund, the programme proposes to drive economic growth through the development of new products and services to address some of the problems of skill shortage, an aging workforce, lack of agility and so on.

The 5 year project funded through this programme and jointly held by RCA, the University of Huddersfield and the University of Leeds focuses on industry-led challenges in which designers are at the fore front of the creative process, applying, co- developing and implementing new textile and industrial digital technologies in collaboration with supply chain manufacturers and other technology experts, in the high value luxury textile and fashion sectors. Developing a new skillset for designers is central to the project as the research focuses on developing two key themes: Digitally Connected and Sustainable Processes and Digital Communication Systems. The RCA is tasked with developing research from both themes to address the identified skills gap in the industry where multidisciplinary designers trained in a unique combination of art, design, science and technology competencies linked to the STEAM+D agenda might answer the need for a newly skilled workforce.

Through FFF the RCA is working with multiple industry partners assessing, from a designer's perspective, how new technologies might be configured and implemented as they are developed. The disruptive influence on the way that business in fashion design is done is being explored by RCA researchers who have received additional funding through the AHRC to be trained in design anthropology and ethnographic methods. Design Anthropology takes the future oriented nature of design and marries it to participant observation as a key component of anthropology, setting itself the challenge of developing tools and practices for collaborative future making. Design Anthropology integrates anthropology's rich tradition of contextualisation and interpretation into the tasks of design, emphasising the generative role of theory in developing design concepts and critically examining existing, often implicit conceptual frameworks. (Ton, Otto and Smith 2013). This approach , married to an examination of Design Thinking and Textile Thinking, an engagement with Transition Design theory, Theory of Change protocols, practise based and practice led research methods will be developed over the course of 2021 and shared through a book sprint and podcast.

3. Fashion Education: Old & New Models of Pedagogy

Traditionally focused on training students in conceptualising, designing and making of their own collections, most undergraduate and postgraduate fashion courses in the UK have not significantly evolved over the past 25 years. They appear to be increasingly unsuccessful in training students to enter a world of advanced manufacturing, relying on machinery and manufacturing processes that have not changed significantly in over 100 years. Design students are not trained to work with digital tools, leading manufacturing systems or engineering technologies or in the development of new models of entrepreneurship or circular economic models that now make up the fashion industry landscape. Nor are the students being equipped to address societal and environmental concerns in the rigorously informed way demanded by both industry and consumers.
Reports from Fashion Industry Journal Business of Fashion (State of the Industry Report *McKinsey & Company/ Business of Fashion* 2016) showed that students entering the jobs market were lacking knowledge specific to new technologies resulting in impaired ability to challenge current practice or develop new design-led roles. The future of the UK Fashion Design School may depend on these new insights. Multi-disciplinary universities in the UK have already understood *design thinking, speculative design, and critical design methods (Rogers and Bremner 2019. p.5)* as useful approaches to innovation and are leading the way in research for new economic models of values led entrepreneurialism and the design of 'volume to value' business models that are profitable without growth. As Rogers and Bremner (2019 p 4-5) suggest any repositioning of design education 'must first acknowledge that it has been complicit in creating a world that nobody wants any more'. They recognise a shift in UK Design School approaches in a journey from an emphasis on design, to a desire to 'gain academic legitimacy' establishing dialogues with history and scientific and philosophical theory, then a 'search for legitimacy through design science' and finally a push towards interdisciplinarity 'in an allegiance with technology'.

4. STEAM+D

STEAM as a new industry facing pedagogic model originated from Rhode Island School of Design (RISD). Researched over the course of 4 years from 2011, and driven by an understanding that design education fosters critical thinking and comfort with risk taking , RISD's ambition was "to reach consensus among disciplines on the requirements of the 21st Century workforce" (Allina, 2019.pp 32). In the United States the understanding of the value of design to advanced

manufacture is well established, where RSDI considers design to be a literacy, a capability and a specialism. The Design Council Report *Designing a Future Economy-Developing Skills for Productivity and Innovation 2018* suggests that design skills are the fusion of creativity with technical ability and interpersonal competencies. They highlight moving from STEM to STEAM+D - that is, Science, Technology, Engineering, Art and Maths, to include D, the Design element, to ensure a resilient economy in the longer term. The report encourages policy makers and education providers to consider how they will develop the complex problem solving, critical and creative thinking abilities that are essential to innovation (Design Council 2018).

In their *Leading Business by Design: High Value Manufacturing* report the Design Council (2015) the policy recommendation was that young people at all stages of education require exposure to the multidisciplinary mix of science, technology, arts, humanities and enterprise that should underpin both creative and manufacturing success in the UK. They go on to say that government should provide incentives to universities to deliver an increased range of multidisciplinary design courses in partnership with expert bodies to enable engagement with *the fourth industrial revolution*. The RCA introduced the STEAM approach to its programme delivery in 2016 as part of its strategic plan announced in the Vice Chancellor's report 2016/17. The report stated that developing new models of postgraduate, research- led design education are key to the delivery of a distinctive STEAM education at the RCA. The evolving pedagogical model adds research-driven enquiry, applied through knowledge exchange with industry and through dynamic and 'live' curriculum developments. This research is frequently inter- or multidisciplinary in character, the RCA being the UK's most research-intensive art and design university.

The RCA's 2016–21 Strategic Plan outlines the roadmap for the development of the university's taught programmes. Over the planning period, it is developing new programmes to ensure that it remains at the forefront of art and design education. The RCA is supporting design development through an interface with three core scientific disciplines: computer science, materials science and robotics. Around 11% of the students hold a first degree in fields beyond art and design, for example medicine, finance, law or engineering. These students bring knowledge and expertise from previous careers, and find new, creative applications and solutions through studying at the RCA. The LEO data (2019) supports the proposition that it is through a mixed and interdisciplinary training, particularly an undergraduate degree in science and engineering, married to a post graduate design degree that enables graduate earnings to substantially increase. The Fashion Programme at RCA has seen many more students apply with first degrees in maths, biological sciences, architecture, and computing.

The basic principal of Industry 4.0 is that by connecting machines, work practices and systems, businesses are creating intelligent networks along the entire value chain that can control each other autonomously. UK fashion students have been trained to become micro businesses and then Small to Medium size Enterprises (SME's) and UK Government research funding has targeted small-scale enterprises through research with UK universities like the Creative Clusters Programme. This strategy looks as if it may pay significant dividends in the new post pandemic business environment . *McKinsey & Company/ Business of Fashion* (2019) recognised a new role for small players where they might support R &D for larger brands in in-house labs, or attached to universities as Learning Factories designed as a simulation to enable experiential learning as happens in European technical universities. It is proposed this is where the RCA could lead the way, embracing new technical, economic and sustainable challenges. The linking of small designer business to offshored volume producers had been developing at speed through designers' bench and desktop factory technologies - pattern cutting tools that enable digital development of pattern files that can be sent anywhere in the world via digital networks. An example of how fashion designers are needed to engage with these new industry paradigms can be demonstrated by the fact that these tools do not currently serve the industry well. They do not provide accurate enough fit, that is, how the pattern fits together and then fits on the body. The systems have been designed by engineers, excluding fashion designers from the initial design process, and in the workplace, where the technology needs to be operated by a skilled technician. The systems serve lowest common denominator manufacturers where speed and cost over pattern accuracy had become the dominant metric over design and fit. This had led, it is argued, to the huge problem of too cheap, undervalued clothing ending up in land fill. Challenging a mindset that proposes "just about accurate" as good enough is where the designer/ researcher's value lies.

5. Fashion Thinking – A New Model

Initial FFF/ RCA research reveals the necessity for training a new type of multidisciplinary fashion student/researcher/designer who can rise above existing "siloed" training structures and who has the intellectual capacity to question, hold to account, and design within, emerging and evolving new industrial models. RCA Future Fashion Factory researchers have proposed and are developing three new directions which can be viewed as distinct, but also linked and coupled, to co generate knowledge and form new propositions for designer led research and practice. Beyond Skov and Melchior's (2010) identification of an object based

/culture based /practice based and production-based approach this research supports the following positions:

Fashion thinking for social change proposes following a humanities trajectory, looking at systems for sustainability and bio design as well as user experience, informed by psychology and new economic models. The future of meaningful work, infrastructure change and workers' rights fall within this remit. Neo colonialist perspectives are challenged.

Fashion thinking for applied speculation develops criticality, assessing movements within the industry to test fields of application contextualised by new textile and digital technologies, aesthetics, philosophy and science. Circular economic models, their 'complex web of logistics' and scalability problems (BoF 2020) are explored for long term solutions. The ethics of new technologies are also challenged within this paradigm.

Fashion thinking for advanced manufacturing encourages work that radically reimagines making processes, machines and systems from a designer led perspective within the context of Industry 4.0. Degrowth and just in time economic models, agility in manufacturing, scalability and adaptability, R technologies (Stahel 2017) and reverse logistics are developed here.

A series of 'platforms' designed to support engagement with these new perspectives were introduced by Zowie Broach, Head of the Fashion Programme at RCA in 2016. The platforms, Bio Design, Sports, Digital and Future Systems were developed and led by Helen Steiner Graeme Raeburn, Kath McGee, and myself and supported by scientists, engineers, and digital technologists during students' first year at the RCA. The agile structuring of the platforms has evolved year on year and the content is developed to be future facing and provocative. The groups are taught in parallel with an understanding that there are shared rationales, areas of interest and synergies. Collaborations across Platforms are encouraged. This work is supported by a lecture series and a Work in Progress show.

Each of the platforms has proved to be positioned in exactly the right place to respond to the Covid crisis. According to BoF-McKinsey State of Fashion 2021 Survey (2020), the most fertile ground for new opportunities will be in the areas of digital technologies and sustainability. The casualisation trend that was already in motion before the pandemic is likely to emerge as a ' dominant force' in fashion in 2021. By October 2020, sportswear company stocks had exceeded their pre-crisis-levels by 7 percent according to BoF, while the non-sportswear clothing was down 18 percent and designers are experimenting with a pre-order selling and zero stock models.

Strand 3, Fashion Thinking through Advanced Manufacturing is being further developed in the context of the FFF research investigating the potential for reshoring UK manufacturing in Industry 4.0. In order to equip masters' students with research skills for them to explore and critically examine Industry 4.0 it is

proposed they will need both hard and soft skills. Skills that include an understanding of technologies, digital tools and engineering, married to critical thinking, collaboration and interdisciplinary working.
Vaughan (2017) claims that underpinning practitioner research is the understanding that the practitioner–researcher has the skills and expertise in the actions of the field to be able to undertake research within it. Citing Schon, Vaughan points to the transition from designer- practitioner to designer-practitioner–researcher in the course of academic study, as a shift from being able to understand and articulate the value or challenges of technical acts, to being able to place these in broader socio-cultural, technical and economic contexts.
Beyond Nixon and Blakely's notion of Fashion Thinking as "adding meaning and value to the functional and experiential spheres of products and services," (Nixon and Blakely 2012) that hints at the commercialisation of Fashion Thinking for use in business, just as criticism of Design Thinking proposed it as a branding exercise for a set of concepts (Curdale 2013, p 14) RCA research builds on the idea of Fashion Thinking as a "paradigm of critical thought and creative agency". However, rather than proposing Fashion Thinking as a methodology to be incorporated by organizations beyond fashion, its first function as a mixed methods approach to designer led research can be to serve a new generation of leaders *within* the fashion industry. Fashion Thinking as a methodology draws from perspectives developed in *Design Thinking*, Textile Thinking and STEAM +D approaches in its collaborative methods and iterative prototyping . However, RCA FFF researchers propose that through training at Masters level students can take on the complexity of the wicked problems the fashion industry has generated. This also aligns fashion thinking with parts of Transition Design. The *fashion thinker* will be better able to critically appraise complex situations and propose new approaches, systems and economic models through design. Led by, and in combination with, a newly developing confidence in practice based and practice led research, and inclusive of a more traditional and well- established humanities/consumption focused research , I propose engagement with, and designing of, new technological advances can lead to a more environmentally conscious fashion and textiles industry. The possibility to foster this change is through joint industry/academic/ engineering engagement that is more investigative, critical and reflexive on both sides.

6. Discourse as provocation

Discourse: A Tool to Debate the Future of Fashion AS Design , designed by RCA Fashion graduate and Future Fashion Factory Research Associate Chelsea Franklin in 2018, was a card-based tool aimed at encouraging debate among fashion students on wider developments in education and industry and the scope of their

responsibility. Franklin developed the tool over the course of two years with the support of Zowie Broach, the Future Systems Platform and the wider fashion team at RCA in response to her observation that the type of engagement seen in other design disciplines had not been fully represented in fashion education. Her background was as a designer for an international brand. *Student* engagement should, she proposed, include research around bottle necks in commercial opportunities ,an in-depth understanding of material choices, understanding global context, competition, and collaboration in industry 4.0. Her design research included investigating design tools and games such as those produced by IDEO. The aim of the initial prototype was a means for Franklin to illustrate her place and intention amongst the fashion cohort.

Discourse was created in response to a perceived disconnect between the value systems within fashion education and industry. Franklin suggested that the fashion system struggles to produce value. Responsible for both fuelling and exploiting a growing consumer demand for a faster and cheaper product, she believed the fashion industry had educated consumers to understand that fashion had very little value. The workshop developed through *Discourse* began with the objective of generating dialogue and supporting debate on aspects of the fashion system. This was tested by Franklin with her graduating cohort and at her degree show and then as an FFF researcher in two key settings. The first was the International Association of Societies of Design Research conference(IASDR 2019) in Manchester titled Design Revolutions. The workshops were premised on the idea that other design disciplines have much to teach fashion through open dialogue around shared problem spaces. It was observed that participants were able to engage with *Discourse* at a high level, and given levels of expertise in a range of fields, the responses were often delivered using examples from disciplines outside fashion as well as personal (consumer) experience and opinion.

The second workshop setting was at RCA in a series of workshops with first year and second year Fashion MA students. Though the aim was to encourage debate, analysis from data collected (sound recordings, survey-based feedback ,interviews) revealed that this was problematic for many participants due to lack of knowledge of specific industry terminology, conscious feelings of courteousness with peers and self-reported concern about ability to understand the probing language of the questions. Although *Discourse* was designed to enable dialogue, interacting with it in a range of controlled settings revealed the wider challenges fashion students face in articulating and responding to the themes presented. Data collected from *Discourse* sessions with fashion students point to two major findings. Firstly, they appear to imply a lack of knowledge in certain aspects of the fashion system, in particular production and new technologies. Even if students had worked as designers, claims of being kept away from sites of production still persisted (Tham2008) Few if any students had worked in manufacturing settings. On the RCA

fashion program, establishing means for language and skills acquisition through industry exposure, engaging in research projects as well as formal learning opportunities to develop meta- competencies aims to enable fashion students to critique, disrupt and innovate in the making, designing and fabrication processes, through and with the design of machines, new tools and systems.
Testing *Discourse* three sets of value were expressed: - students' value to industry, industry's value systems and consumers' understanding of the value of fashion. The findings show that students can sometimes feel ill equipped to tackle the complexities for the fashion industry. It is proposed that until students understand existing systems, they will be unable to challenge them and this becomes crucial for a post pandemic industry where returning to old ways is not possible or desirable. The absence of industry, engineering and science from fashion education can mean insufficient specific insights of the field graduates are about to enter. This is a historic problem in the UK which will see a dramatic change in fortunes in the coming years as the UK Government is faced with the new economic landscape facing fashion design. Meanwhile the reshoring the UK fashion industry looks like a more and more viable option.

Conclusion

The situation for Art and Design training at undergraduate and post graduate level in the UK remains complex and uncertain particularly in light of the UK 's withdrawal from the European Union. If the UK government continues to support the development of an advanced manufacturing sector and the reshoring of UK manufacturing industry then UK fashion education can rise to meet this challenge developing the way fashion is taught to engage more fully with Industry 4.0. At RCA the STEAM+D focus aims to give masters students a critical advantage, shifting towards becoming designer-practitioner-researchers. Through industry facing projects, collaboration with science and engineering they will able to engage more fully with industry partners both nationally and internationally, co-developing industry facing projects and placements, initiating collaborative industry PhD studentships and MA business sponsorship, and the establishment of research labs, co-situated within academia and commercial settings, to foster radical change. The development of fashion thinking is predicated on this engagement with industry. Within the context of post graduate fashion education, engineering and industry collaborations can enable acquisition of Discourse, where the role of the university will be to provide space for learning - establishing meta knowledge, criticism and reflection through academic research channels.

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