

DESIGN, MATERIALS AND MAKING FOR SOCIAL CHANGE

Edited by Rebecca Earley and Rosie Hornbuckle

DESIGN RESEARCH FOR CHANGE



Endorsements

“Design, Materials and Making for Social Change wonderfully demonstrates why textile design is about world making through and through. It showcases a new breed of material designers engaged in social change at the interface between the material, the ecological and the social. By bridging research and practice through collaborative approaches across continents, the authors demonstrate why a circular approach underscoring the agency and aliveness of materials can yield workable answers to the social and ecological challenges of the industry. From “material drafts” and literacy in the North to decolonizing materials and vernacular circularity in the South, this volume illustrates paths for transitions from object-oriented designing to design as a relational praxis of repair, care, and regeneration of the web of life.”

Arturo Escobar, author of *Designs for the Pluriverse: Radical Interdependence and the Making of Worlds* (2018) and *Pluriversal Politics: The Real and the Possible* (2020).

“Making in the context of a planetary emergency should not be guilt-ridden, but rather a means to prototype how creative knowledge can reconnect us to the natural world. This book will help grounding design research and textile making in a rigorous yet hopeful journey towards a circular future.”

Carole Collet, Professor in Design for Sustainable Futures, Central Saint Martins UAL

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Cover image: Embroidery samples from different women in the Syrian Stitch pilot project, Helen Storey, November 2021. Photograph by Helen Storey.

Design, Materials & Making for Social Change: From Materials We Explore to Materials We Wear

Edited by Rebecca Earley & Rosie Hornbuckle

Design Materials and Making for Social Change spans the two interconnected worlds of the material and the social, at different scales and in different contexts, and explores the value of the knowledge, skills and methods that emerge when design researchers work directly with materials and hold making central to their practice.

Through the social entanglements of addressing material impacts, the contributors to this edited volume examine: homelessness, diaspora, migration, the erosion of craft skills and communities, dignity in work and family life, the impacts of colonialism, climate crisis, education, mental health and the shifting complexities in collaborating with and across diverse disciplines and stakeholders. The book celebrates the role of materials and making in design research by demonstrating the diverse and complex interplay between disciplines and the cultures it enables, when in search of alternative futures.

Design Materials and Making for Social Change will be of interest to scholars in materials design, textile design, product design, fashion design, maker culture, systemic design, social design, design for sustainability and circular design.

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About the Editors

Rebecca Earley is UAL Chair of Circular Design Futures and co-founder of Centre for Circular Design at Chelsea College of Arts, University of the Arts London. Her practice research encompasses making materials and prototypes, exhibition curation and writing. She is also a highly skilled workshop facilitator and communicator, specialising in the translation of cross disciplinary design-led research for sustainable and circular fashion textiles and other fields. Her creative practice has been widely exhibited over the last twenty-five years. In 2007 she was nominated as a Morgan Stanley Great Briton for her contribution to sustainable fashion textiles in the UK. From 2010 she was Director of the Textile Futures Research Centre at Central Saint Martins; in 2017 she set up Centre for Circular Design. In 2019 she completed two large Swedish-based projects with Research Institutes of Sweden – Mistra Future Fashion and Trash-2-Cash (EU H2020). She is currently leading the circular, local, bio-design fashion textile research for the Herewear project and is an advisor for the She Makes project which explores gender equity issues and actively supports young girls and women in the industry.

Rosie Hornbuckle is Senior Researcher in Complex Design Collaborations at Centre for Circular Design at Chelsea College of Arts, and Associate at the Service Futures Design Research Lab at London College of Communication, University of the Arts London. Since completing her PhD thesis at Kingston University in 2010, Rosie has been evolving ‘translational design practice’ as a theoretical framing for how designers instinctively respond to value discovery when faced with multiple perspectives. Rosie has introduced and established design methodologies in large-scale collaborative projects funded by the European Commission’s H2020 programme, in the field of circular economy and healthcare. She has taught on the subject of sustainable design, critical theory, relating critical theory to practice, and design with systems. Rosie’s current research focuses on design methodologies for supporting complex collaborations, with materiality and prototyping central to her systemic approach. Her aim is to help build the design and design research community’s capacity for applying collaborative methodologies to some of the most challenging and pressing concerns of today, through teaching, CPD and knowledge exchange projects.

List of Contributors

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Jen Ballie currently has a dual appointment to lead on Design Research working across DJCAD, University of Dundee and the V&A Dundee. She is passionate about the role and responsibilities of the design professional and through her research and actions seeks to explore and understand how we can add value to our everyday lives through design.

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Sophie Tendai Christiaens is an interdisciplinary researcher with interests that lie at the intersection of decolonisation, circular economy, design thinking and practice. She is a research partner and board member for Fashion Revolution Zimbabwe and co-founder of SEWN Africa, which explores smarter material sourcing and regenerative and circular design practices for textiles and apparel.

Katherine Townsend is Professor of Fashion and Textile Practice, Nottingham Trent University and focuses on emotionally durable, environment-centred design methodologies. Recent projects have been supported by the Global Challenges Research Fund (GCRF 2018-2022), NHS and AHRC (2021-2023). She is co-editor of *Crafting Anatomies* (Bloomsbury 2020) and the journal of *Craft Research* (Intellect).

Sarah Wilkes is a social scientist with a background in anthropology, materials research and object-centred learning. Sarah's postdoctoral research includes user-centred materials selection for healthcare design; the development of hands-on educational programmes that promote STEAM participation amongst underrepresented young people and the development of methodologies to help designers and materials scientists work together successfully.

Foreword

Jessica Hemmings

Writing in 1944 the weaver Anni Albers observed, “Life today is very bewildering. We have no picture of it which is all-inclusive”.ⁱ Part of the challenge, Albers determined, lay in the fact that “we have to make a choice between concepts of great diversity. And as a common ground is wanting, we are baffled by them.”ⁱⁱ She went on to link mental health with daily creative outletsⁱⁱⁱ before establishing the crucial role direct work with materials can provide:

Civilization seems in general to estrange [wo]men from materials, from materials in their original form. The process of shaping these is so divided into separate steps that one person is rarely involved in the whole course of manufacture, often knowing only the finished product. But if we want to get from materials the sense of directness, the adventure of being close to the stuff the world is made of, we have to go back to the material itself, to its original state, and from there partake in its stages of change.^{iv}

Albers text appeared during the devastation of the Second World War, the culmination of a global crisis that had irrevocably changed the course of her own life. While her call to return to “material itself” was written for different times, our current lives undeniably face contemporary versions of Albers’ bewildering challenges.

It is our contemporary versions of Albers bewildering challenges that the contributors to *Design, Materials and Making for Social Change* astutely tackle. In various ways, contributors seek the lessons material knowledge can teach us in the face of ongoing environmental damage and social fragmentation. Their breadth of responses confirm that while the term circular design has, in recent years, moved beyond niche vocabulary, just what circular design entails has no one fixed vision. In fact, one of the distinctions of circular design is an active disinterest in the false hopes raised by one-size-fits-all solutions. As editors Rebecca Earley and Rosie Hornbuckle recognise, each of the contributors are, in their own ways, “in search of alternative futures.”^v

Alternatives require the tenacity to ask beyond the familiar, even set aside the well regarded, to allow space for more uncomfortable and less heroic research. This requires replacing what have arguably become a small stock of repetitive sustainability references with research from contexts and perspectives that pose different challenges answered through different alternatives. Newness, for example, often over-sold as the sole definition of *contribution to knowledge*, is refreshingly not a prerequisite here. As Sophie Tendai Christiaens recognises: “many designers on the [African] continent, particularly in the fashion industry, have inherited, developed, and deployed circular practices for years”.^{vi} Their observation offers a sobering reality that academic conventions are typically ill suited to celebrate.

Rather than research being formed by the conventions it is expected to operate within, *Design, Materials and Making for Social Change* recognises that it is the conventions themselves that need to change. Contributors ground themselves, as Albers encouraged, in material itself. This stance is far from as simple as it may first sound. Hornbuckle and Earley note the sustainability discourse has raised concern over the volume of unneeded “stuff” designed for the world, but “intentionally or not, embedded a sense of shame and guilt

amongst designers and researchers for whom materials and making is their passion, their literacy, their expertise and their research currency.”^{vii} Welcoming material knowledge in the face of material excess, and from perspectives beyond the tried and tested also requires the considerable effort and desire, undertaken by this publication’s editors, “to circumnavigate the ‘closed’ academic infrastructure” that contributes to “systemically exclude many voices from design research discussions.”^{viii}

Holly McQuillan offers a caution against an oversimplified approach to material prototyping when she insightfully warns “prototypes that are the result of a linear way of thinking reinforce linear processes.”^{ix} But it is only when we actually try to set aside linear thinking that we learn of its dominance in many of the educational systems that have formed us as researchers today. Participatory strategies offer one way to break linear research traditions. But less conventional research methods often remain subject to conventional measurement. As many of the contributors touch upon, placing trust in alternative methods requires advocating different forms of “measurement” that value entirely different types of information.

A “responsive, relational place that gives value to the measurable and immeasurable in equal form, the recognisable and the yet to be recognised”^x is how Sandy Black describes Helen Storey’s ongoing work with the Zaatari Refugee Camp in Jordan. It is precisely this “yet to be recognised” that can be so extraordinarily difficult to convey to others. Despite best intentions, understanding and recognition tends to cluster around the familiar and close-to-familiar. Breaking deeply engrained habits and behaviours, as Earley reflects, requires an acceptance not only of risk but the accompanying emotions of confusion, uncertainty and potential misunderstanding. But when emotional intelligence is allowed to move from the academic periphery where it, at best, is begrudgingly allowed to exist today, to a more meaningful position the presence of empathy, intuition and play – words recurring across this book – move from being outliers to the very heart of things.

Albers may not have anticipated the full weight of research culture today, but she certainly understood the importance of the real when offering the suggestion: “we must come down to earth from the clouds where we live in vagueness and experience the most real thing that there is: material.”^{xi} As an astute set of responses to Albers prescient call, the timely contributors to this book have exchanged clouds of vagueness for materials, real life scenarios and the insights of knowledge long overlooked.

Preface

Imagine a room full of researchers, presenting their findings to the general public. On the right side of the room, researchers stand by a series of posters that explain their work using words and graphics, photos and diagrams. On left side of the room, a row of researchers stand beside tables on which materials and objects are placed. Both sides of the room are busy – people are looking at the work, trying to take the ideas in. They are interested, and want to know about the future, about what might be possible, what we might be able to do to solve pressing and urgent issues.

On the right side, the audience listen to the researchers, and ask questions. They engage. They try to keep up with all the new information being offered to them. On the left side, the noise level is much greater. People are handling the materials and objects, touching stroking and feeling the textures and qualities with their fingers. They giggle nervously at soft and squidgy materials; they gasp and then drop sharp and cold ones. They hand the materials to each other and tell each other what they just learned. They hold things against their skin to feel the sensations that the material brings about, deciding for themselves whether they could comfortably wear it or not.

Materials speak to people. They draw people in, and they engage them, especially if this means they get to touch them. As a researcher, starting a process which involves materials will mean that your audience may connect with you in a way that a slide talk or poster cannot. As material researchers, we have known this for a good while. Materials and materiality provide a level of relatability that can be useful. Whether it's to do with the way people behave with their clothes, or whether it's to do with how they feel about themselves, it's a very powerful mode of working and therefore we must find ways of harnessing it and understand it better.

For design researchers working with materials and making, the act of turning visual thinking into words can be quite challenging. The very act of making things – of exploring and thinking through touch and manipulation – can feel like a kind of magic in the moment. Yet writing down what happened afterwards can seem inadequate and stilted. As researchers we must write our ideas up. But how can we do this without losing the magic? How can we convey in words, the golden thread that binds people when they are on that left side of the room, touching, feeling and experiencing new ideas, in their hands?

This book was very much about trying to find the words for both our material and visual knowledge, and the magic that happens when we are interacting with other people. Through our approach to design research, we bring meaning, insights and ideas for action to people in a tangible way. At a time when our lives are full of factory-produced consumer goods, design researchers working with materials create a proximity for people, enabling them to engage, understand and then change things for themselves. If the problems that the design researchers are working with are material and social, then this way of working presents itself as a logical starting point to begin to address them.

In editing this book, we sought to support a community of researchers in articulating their visual and material thinking. We wanted to bring to life some of our most recent experiences with materials and making, to explore this emergent quality or realisation that making and working with materials was amplifying and progressing our efforts as we seek to bring about

both material and social change. We intuited and observed that there are many design researchers treading a similar path and so our aim was to invite them in, to reflect on the methodological aspect of their experiences with materials and making, thereby formalising the discourse and giving it a shape and agency.

However, we hadn't anticipated the challenges we would face in finding practitioners who were already articulating this aspect of their work, or even acknowledging that this was something they were engaged in through their research. The focus, of materials exploration and making approaches, as well as theoretical approaches to sustainability, are (understandably) still on the outcome and the change itself, rather than the 'HOW'. This discovery only reinforced our purpose; how might we encourage and support design researchers to reflect on and communicate the HOW of what they do? One implication is that educational and academic establishments might find more inclusive and accessible formats and forums for developing methodology discourses, both in 'Global North' academies and in the diverse design research and practice communities in Asia, Africa and South America.

Like many design research centres operating primarily in Europe, we have come (far too late) to the realisation of how our knowledge, methods and the systems we interact with are products of colonial attitudes and norms. This volume is the beginning of our journey towards changing this attitude and framing, and so we actively searched for authors who might challenge this perspective. This was not without difficulty. We discovered that although practitioners in previously colonised regions are doing incredible materials and making exploration, this is rarely framed as 'design research' or an academic setting. We found that these critical and reflective explorers are keen to be included in academic debate around circularity and sustainability. We therefore had to take a creative approach to ensuring that these voices were represented in this volume, to circumnavigate the 'closed' academic infrastructure by welcoming these authors into the Centre for Circular Design as associates, finding alternative means of remuneration, value and participation within our community in exchange for their valuable participation in this volume. The point here, is to highlight the deep inequality in the academic structures that systemically exclude many voices from design research discussions. We have found this process to be deeply humbling and we have learnt hugely from all contributors to this volume, who have held a mirror up to Eurocentric assumptions, conceptual frameworks and shown a glimpse of worlds and innovation approaches we would otherwise have not encountered. The HOW is what unites the global design research communities and is also where we must open our minds, share and collaborate more openly to move forward with the change we want to see. There is a wealth of experiences that are not yet widely represented and communicated.

Rebecca Earley and Rosie Hornbuckle, October 2022

Introduction

Rosie Hornbuckle & Rebecca Earley

Abstract

Within sustainability discourse, the notion that ‘we don’t need to make more stuff’ has, whether intentionally or not, embedded a sense of shame and guilt amongst designers and researchers for whom materials and making is their passion, their literacy, their expertise and their research currency. It has forced design researchers, makers and materials experimenters to reflect and rethink the value of their practice. This introductory editorial explores how, through the social entanglements of addressing material impacts, the contributors to *Design Materials and Making for Social Change* also encounter and interact with: homelessness, diaspora, migration, the erosion of craft skills and communities, dignity in work and family life, the impacts of colonialism, climate crisis, education, mental health and the shifting complexities in collaborating with and across diverse disciplines and stakeholders. The authors reflect on how the increasing complexity of environmental and social challenges has fostered a new era of materials and making in design research, as part of a collaborative, relational, and dialogic practice, which can bring about diverse forms of environmental and social change.

Beginning with materials and making

Our first encounter with a material other than our mother, is the swaddling wrapped around us at birth. This simple muslin cloth often becomes the transitional object that helps us become independent, but inevitably is a part of our mother, a substitute for the comfort her skin gave us as a new-born. What could be more personal, more affective in the world that the materials we wear close to our skin, that we wrap around ourselves? It is perhaps this direct, physical connection we have with worn materials that engages people on a transformative level.

Design, materials and making for social change as a publishing idea has been a long time coming, inspired by mentor, guide and founder of our textiles design research community, Professor Kay Politowicz. The making of this book has itself been an act of discovery and knowledge co-creation with the contributors. Here is a community of design researchers that feel instinctively that starting with materials and making is important for bringing about diverse forms of change; this volume aims to build a collective shape for that feeling. Craftspeople, makers, artists, hobbyists, designer-makers, and more recently material curators and material designers: these are people who hold materials ‘in their hands’ and their hearts. In this community materials are valued for their dialogic nature: they live, have affordances and give agency through their tactility, shape-giving and tangibility. Even the natural language that has emerged around novel materials implies life: materials have ‘personalities’ and ‘characteristics’; they are ‘smart’, they can ‘grow’, ‘sense’, ‘move’ and ‘react’¹. Materials are (for better or worse) a tangible leverage point in systems when seeking change or transition, a touchpoint by which we engage with systems of production, and they are increasingly our collaborators, our mediators and our communicators in new and challenging

¹ Mark Miodownik brilliantly demonstrates the personification of materials in *Stuff Matters* (Penguin: 2013)

contexts². Material prototypes can be our allies when we seek to engage with people, and they mobilise knowledge where words and images have failed to grant access. The increasing complexity of environmental and social challenges has forced design research to reassess its relationship with materials, and what has emerged is a new era of materials and making as part of a collaborative, relational, and dialogic practice.

With this book there is also an underlying motivation, to provide a counter to the erosion of making and materials, as a legitimate form of design research and practice for bringing about change, that has prevailed for too long in sustainability discourses. The notion that ‘we don’t need to make more stuff’³ has, whether intentionally or not, embedded a sense of shame and guilt amongst designers and researchers for whom materials and making is their passion, their literacy, their expertise and their research currency. It has forced design researchers, makers and materials experimenters to reflect and rethink the value of their practice. In response, these chapters chime: *we must keep making and encouraging others to make*, we can harness the relatability of materials to invite participation, to demonstrate and to enable dialogue, to re-wire and develop new behaviours and attitudes. As a means of value creation, making is the most meaningful way we connect to and understand the physical world, and our ever-increasing distance from it diminishes our ability to act ethically, our agency, and our choices, with devastating consequences for people and planet⁴. Materials and making are an important part of our past, our present and the future of design research for change.

Material and social entanglements

The authors and collaborators in this book are addressing a range of challenges through their research and dealing with the interactions and interconnections between the material and social dimensions in a variety of contexts. Many focus on the wastefulness of conventional, linear systems of production, with the associated environmental impacts, and therefore speak to the principles of circularity. However, through the social entanglements of addressing material impacts, these researchers also encounter and interact with: homelessness, diaspora, migration, the erosion of craft skills and communities, dignity in work and family life, the impacts of colonialism, climate crisis, education, mental health and the shifting complexities in collaborating with and across diverse disciplines and stakeholders.

Material change begins a chain reaction which, once initiated, impacts the social dimension of the system. It is commonly accepted that behaviour change is an important factor in countering environmental damage and erosion, similarly, environmental impacts have been detrimental to the health and wellbeing of individuals and communities with great disparity and injustice. Co-dependencies in ‘sociomaterial systems’⁵ means that to seek either material or social change, inevitably requires encountering and interacting with both. The design research approaches and methodologies presented in this volume fully embrace and acknowledge this reality, demonstrating through their research that the materials we make, make with, wear, and then ‘make us’, have the characteristic of speaking to both

² Explored in Hornbuckle, R. (2020) Mobilizing Materials Knowledge: exploring the Role of Samples for Supporting Multidisciplinary Collaborative Design for Materials Development. *The Design Journal*. 24:2, 277-297, DOI: [10.1080/14606925.2020.1849963](https://doi.org/10.1080/14606925.2020.1849963)

³ In the late 1990’s ‘dematerialisation’ was introduced as a core aim for sustainability and while this was debated in Industrial Ecology and Economics, for example in Cleveland, C. J. & Ruth, M. (1998) Indicators of Dematerialization and the Materials Intensity of Use, *Journal of Industrial Ecology* 2,3 15-50, the general implication behind dematerialisation arguably (and anecdotally) has downplayed the role of materials and artefacts in all areas of design.

⁴ Manzini, E. (1986) *The Material of Invention: Materials and Design*. Milano : Arcadia

⁵ Nold, C. (n.d.) Working Paper 2: Towards a Sociomaterial Framework for Systems in Design. Social Design Institute, University of the Arts London. Available here: arts.ac.uk/_data/assets/pdf_file/0034/286369/SDI_Working.Paper_2_Towards_a-Socio-material_Framework_Nold_tagged.pdf (accessed 16/03/22)

environmental and social dimensions. This has provided a narrative for the volume, which starts from materials design with Valentina Ragnoli, Barbara Pollini & Luca Alessandrini's focus on 'material drafts' and transformation techniques for making materials from food waste. Sarah Wilkes & Caitlin McMullen provide a pivot-point in the volume: still with a material focus, they explore how focussing on user perceptions of materials could have a powerful impact on the lived experiences of those who wear prosthetics. The volume concludes with Sandy Black & Helen Storey's chapter which explores the social dimension of materiality when making garments in the Zaatari refugee camp. The chapters in between deal with these common elements – materials, the environment, making, wearing, and social change - in different measures.

The eleven chapters are written by researchers from the UK, Italy, India, New Zealand, and Zimbabwe and references collaborative research which has taken place across three continents. The search for diverse voices has opened up a dialogue around decolonial perspectives on the value of materials and making for social change that had previously been underrepresented in these discourses.

In this regard, SophieTendai Christiaens' chapter firmly challenges the Eurocentric view of circularity and shines a light on a resourcefulness that is embedded in African culture in her review of the state of the art in Zimbabwean Circular Fashion Design. Tendai Christiaens provides a window onto a world where garment design is in close proximity to the realities of resource limitations, with frequent power cuts, water shortages, fabric scarcity, and limited infrastructure and innovation funding. Highlighting the material approaches of a range of Zimbabwean designers, the author shows us how circular innovation can be meaningfully framed within the real material constraints we are currently oblivious to in the Global North, but that will surely soon find us.

With her case study of decentralised textile production in Govindgah village, Bhaavya Goenka presents an inspiring example of how an Indian textile designer and entrepreneur might support rural artisan communities with a circular design business model, a consideration for cultural history and behaviours, and by recognising the importance of family life. This chapter is at once a reaction against the legacy of harm imposed by the British and a critique of how materials have been a political vehicle for colonial oppression and more recently for civil politics. Goenka tells a powerful story of how a focus on materials and making has had wide-ranging impacts on individuals within the village.

New spaces for materials and making for change

There is a recognition within these chapters that change requires researchers to explore new spaces and places for materials and making which invite participation, collaboration, and engagement in different contexts. Whether that's an anthropologist collaborating with an amputee in the case of Wilkes & McMullen's chapter, or a design researcher working with a digital technician in Holly McQuillan's chapter, these authors have pushed the usual boundaries of their research to try to change things beyond the accepted influence of the design researcher. Ragnoli, Pollini & Alessandrini's chapter demonstrates how the role of the design researcher is changing, and the engagement with abundant resources such as food waste requires a new set of physical interactions with the materials in order to understand and transform their affordances: '*peeling, skinning, grinding, cutting, sorting, collecting, scutching, washing...*'. This brings into focus the changing space for materials and making that responds to environmental and social crises, and the evolution of methods to reorient design research towards these new challenges and the opportunities therein.

Design researchers in this volume build proximity to materials, making, their collaborators and participants by taking an ethnographic or autoethnographic approach. Rather than inviting participants into the academy, these researchers are taking materials and making to real-world contexts. Sometimes this requires a new skillset from design researchers, and bravery in exploring beyond the confines of their disciplinary training into new and uneasy territories, where their value may not be fully understood. Here the relatability of materials and making, and of wearing, again provides valuable currency, a role and an approach that can be articulated in the simple language of the senses, a needle and thread in Jen Ballie, Meredith More & Becca Clark's chapter, a material sample in the hand for Wilkes & McMullan, or a 'clicking press tool' in the case of Francesco Mazzarella's chapter. However, there is also a sense of authenticity when researchers are already embedded in a community and therefore have an easy rapport and common ground with participants. For example, Mazzarella resides in the locality of his research, Rebecca Earley speaks about the significance of being part of the parent community in her overlapping roles as practitioner, mother, researcher, and Goenka sees her embeddedness in the artisan community of Rajasthan as central to her approach.

Katherine Townsend, Emma Prince, Alison Escott & Gill Barker's chapter puts user participation at the centre of their methodology with transformative impacts on collaborators. Their work steps into an educational space within the context of the design school, looking at how experiential learning through engaging with materials and making can facilitate meaningful and life-altering learning. Along with Ballie, More & Clark, and Wilkes & McMullan, this chapter extends this blurring of conventional boundaries through the co-production and democratisation of knowledge by co-writing with their non-academic partners. Furthering the educational discussion, Earley's chapter focusses on the learning-through-making that can be achieved in a primary school setting, where exposing children to the materiality of their clothing and its impacts at a young age is seen as hugely important in raising a new generation of materials-literate young adults. The hope is to seed a generation who are considerate in their relationship with clothes and other material things, as they try to act responsibly in the over-produced material world they have inherited. However, Earley also notes the gendering of materials in education proliferates, demonstrating how materials provide (and take away) agency, and are often politicised.

These chapters reflect on the value of materials and making as a pedagogic tool in different learning environments. From the museum to the school, to the science lab and the consortium project workshop, in the refugee camp, in the artisan's workshop and in the home. In pursuit of change, the site for making and materials exploration in design research has also changed.

Materials we wear

Drawing insights from an in-depth interview, Black guides us through Storey's experiences as a design researcher in residence in the Zaatari refugee camp in Jordan. Together they take the reader on a journey which starts with humble engagements through mending and embellishing clothing, but soon expands into art, community, experience, and enterprise, towards real political change. Together the authors explore how the most basic of human needs – to be clothed, and in the absence of identity due to displacement – making can provide a sense of worth and agency, which later becomes an opportunity to share and trade, having a wider impact on the community. Storey's experiences are testimony not only to the power of handling and making with materials, but also the importance of the unique knowledge and approach of the designer-maker-researcher in realising seemingly impossible social and systemic transformation, by starting with the simple act of material manipulation

with another. Also taking the theme of mending and embellishing, Ballie, Moore & Clark demonstrate how focusing on worn materials can be powerfully affective with participant groups in the active museum setting, not only reviving the act of mending textiles but also bringing people together at times of extreme isolation.

Albeit in a very different context, Wilkes & McMullan demonstrate the overlooked material experiences of prosthetics wearers, who comment on the impact of material choice for both practicalities – the comfort and ‘clamminess’ – and identity afforded through aesthetics of different material choices. This is deeply personal – a part of the body – yet as the authors highlight, user perspective is not currently taken into consideration in the design of prosthetic limbs in the same way as we might expect in the design of garments. Cross-over themes between this use of materials in engineering and the worn materials of circular clothing design are evident in this chapter. The authors report that identity is important in determining the long-term success of prosthetics similarly to the way longevity of style is considered important in preventing clothing waste⁶. Moreover, the prosthetic materials interact with the textiles worn over them, making holes and forcing wearers to mend or replace damaged garments.

Materials, making and systems

When beginning from the level of materials and making, a design researcher may first seek material change. However, as their practice encounters the real context of the challenges they seek to address, they inevitably travel through the orders of design from ‘symbolic and visual communications’ and ‘material objects’, to ‘services’ and ‘complex systems or environments’ (Buchanan⁷, Wahl & Baxter⁸) and find themselves ‘dancing’ higher up the system hierarchy (Meadows 2008⁹). More intuitively perhaps than other types of research, designers who focus on making while seeking change, find themselves travelling up and down, in and out of system elements, subsystems and hierarchical levels in a typically ‘creative’, ‘messy’ and iterative manner. McQuillan’s chapter describes this dance and explores how collaboration with different disciplines and stakeholders enables dynamic movement through the system hierarchy to inform design decisions and research. Importantly McQuillan draws attention to the prototype as a boundary object between different discourses and forms of knowledge to enable progression in the research. In McQuillan’s work, also echoed in many of the other chapters, a provocation is enabled through prototyping, not as fantastical as the artefacts and contexts created in Dunne & Raby’s previous work¹⁰, but instead gently tethering participants to something relatable and tangible, anchoring different perspectives to something solid to understand and interact with the intended change.

Actively seeking to interact with system elements beyond the material and the body, requires different design research methods and approaches to engage with multiple partners with different expertise and with diverse stakeholders. Rosie Hornbuckle’s chapter seeks to address this challenge by exploring the relationship between ‘hands-on’ and ‘hands-off’ design research approaches to build proximity between materials and human actors in projects which aim at systemic materials innovation. Reviewing the approaches to

⁶ McNeill, L. S., Hamlin, R. P., McQueen, R. H., Degenstein, L., Wakes, S., Garrett, T. C., & Dunn, L. (2020). Waste not want not: Behavioural intentions toward garment life extension practices, the role of damage, brand and cost on textile disposal. *Journal of Cleaner Production*, 260, 121026.

⁷ Buchanan, R. (1992) Wicked Problems in Design Thinking. *Design Issues* 8(2) 5-21

⁸ Wahl, D.C. & Baxter, S. (2008) The Designer’s Role in Facilitating Sustainable Solutions. *Design Issues* 24(2), 72-83

⁹ Meadows, D. H. (2008) *Thinking in Systems: a primer*. Vermont: Chelsea Green Publishing.

¹⁰ For example: ‘United Micro Kingdoms’ Dunne & Raby, 2012-13 Available at: <http://dunneandraby.co.uk/content/projects/666/0> (accessed 19/07/22)

collaboration reported by design researchers and makers in the literature, as well as reflecting on the author's experiences in consortium research projects, the chapter considers the role of familiar methods such as site visits, residencies and workshops, reflecting on how these can maintain proximity to material and social system elements that may be geographically distributed or difficult to access because of cultural, cognitive or epistemological difference. Hornbuckle considers that when combined in a project eco-system, these approaches can enable designers in a variety of contexts (beyond materials development) to build and maintain proximity to the subject so that they can innovate meaning and value, whether that subject is a material, a community, a production facility, a police toolkit or something else.

What changes?

Much of what design research seeks to engage with in pursuit of 'change' seems out-of-reach. This is where materials and making will continue to be a powerful ally, shifting down the gears from the upper echelons of systems and culture to the place where dialogue happens, where people experience life, and each other, and are moved to act. Mazzarella's research is situated in the hyper-local, where engaging with artisans in the Waltham Forest area of London has had a multiplier effect on the small enterprises situated in the area and on the local community, reviving practices which may be lost. Unforeseen, this design research intervention laid the foundations for a new revenue stream and a renewed sense of self-worth for the artisan and learning opportunities for people in the local community, so that the skills could be kept alive. Many of the positive social interactions and influences observed in the chapters were unintentional outcomes of the materials and making process. Ballie, More & Clark for example, couldn't have foreseen that their participatory workshop would provide a safe haven for parents with young children who were vulnerable to isolation during the COVID-19 pandemic, or that the Sewing Box for the Future Toolkit would be taken home by 2000 visitors, or that it would be embraced by the local authority and used in remote workshops with 60 EU stakeholders. However, that doesn't undermine the importance of these outcomes: they highlight the emergent nature of design research and the unpredictable quality of material and making encounters, being personal and emotive, which must surely be harnessed and allowed to thrive. Concomitantly, researchers in this volume have noted the dualist nature of change, affecting both the participants and the researcher. The interaction between maternalistic sensitivities, doing research and making with textiles, surfaces a number of feminist issues, discussed variously in Earley, Ballie, More & Clark, and Goenka's chapters.

The common factor is that these happenstances took place because the researchers strongly believed in the power of their process to seed new impact pathways and bring about change. Now this research community also needs to build the confidence and the skills to scale these approaches across to new locations and new contexts to expand the impact. Through their reflections on what changed and how, the contributors to this volume have elevated materials and making as central to social change to build a strategic, purposeful, and increasingly mission-oriented, design research methodology. In these contexts, change is difficult to evaluate; impact pathways are set in motion; change is experienced and observed by researchers as it emerges. New appropriate methods of evaluating change achieved through design research are being shaped and tested¹¹, which take into consideration different notions of value¹² and the heterogenous nature of materials and making research as well as the

¹¹ For example: The Design Council's Design Value Framework https://www.designcouncil.org.uk/fileadmin/uploads/dc/Tools_and_Frameworks/DC_DE_Design_Value_Framework.pdf (accessed 23/09/22)

¹² Julier & Hodson (2021) Value, design, scale: towards a territories and temporalities approach'. *Nordes 2021: Matters of Scale*

impossibility of predicting long-term impacts. However, there is evidence in these chapters of immediate and tangible change: on student learning and attitude in the case of Earley's work, on policy in the case of Black & Storey's research, and on local maker communities in the case of Mazzarella's and Goenka's work. Becoming better at evaluating and communicating what changes, undoubtedly means making evaluation training and services within academies, more accessible and appropriate to design research involving materials and making.

ⁱ Anni Albers "Work with Material" *College Art Journal*, Jan. 1944, Vol. 3, No. 2, pp. 51, first published in Black Mountain Bulletin #5.

ⁱⁱ Ibid.

ⁱⁱⁱ Ibid.

^{iv} Ibid.

^v Abstract

^{vi} Sophie Tendai Christiaens, Chapter 10

^{vii} Rosie Hornbuckle & Rebecca Earley, Introduction

^{viii} Rosie Hornbuckle & Rebecca Earley, Introduction

^{ix} Holly McQuillan, Chapter 2

^x Helen Storey & Sandy Black, Chapter 11

^{xi} Anni Albers "Work with Material" pp. 52.