Editors:
Nithikul Nimkulrat
Ulla Ræbild
Anna Piper

CUMULUS THINK TANK
Publication No 3 of Cumulus International Association of Universities and Colleges in Art, Design and Media

Cumulus
creative linking

Soft Landing

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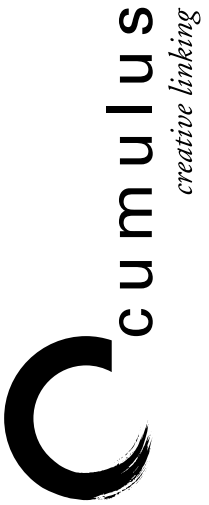

Soft Landing

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Table

Contributors

Paola Bertola

Paola Bertola graduated in Architecture, Ph.D. in Industrial Design and Multimedia Communication at Politecnico di Milano (Polimi). Previously a scholar researcher at the IIT Chicago, Paola is now Full Professor at Polimi, where she teaches Design Processes and Methods. She is also the coordinator of the Ph.D. Program in Design and a deputy for the School of Design's international programs with northern American countries (e.g., FIT New York and Philadelphia University). She is a co-founder of the research collective "Fashion in Process". She is expert in creative processes and design management within culture intensive industries, with a specific focus on fashion. She has authored more than 80 publications including books, essays, articles, and exhibition catalogues. In 2011, she was awarded the ADI Compasso d'Oro Prize for Research.

Vandana Bhandari

Vandana Bhandari is a Professor at the National Institute of Fashion Technology (NIFT), India, and is the Institute's former Dean of Academics. Extensively published in journals and magazines, Dr. Bhandari has also authored and compiled books on Fashion and Textiles. Her work includes *Celebrating Dreams: Weddings in India* (1998); *Textiles and Crafts of India: Arunachal Pradesh, Assam and Manipur* (1998); the NIFT Millennium Document titled *Evolving Trends in Fashion* (2000); *Costume, Textiles and Jewellery of India: Traditions in Rajasthan* (2005); and *Jewelled Textiles: Gold and Silver embellished Cloth of India* (2015). Along with teaching and research, Dr. Bhandari has been involved in the development of curricula, professional design projects for Industry, and craft-based projects, such as SGSY and Languishing Crafts of India. Currently, she is Project Coordinator of a national project titled "USTTAD."

Carole Collet

Carole Collet is a Professor in Design for Sustainable Futures at Central Saint Martins, University of the Arts London where she has recently been appointed CSM-LVMH Director of Sustainable Innovation to grow creative-led sustainable intelligence across the partnership. She is also Director of the Design & Living Systems Lab, a research initiative that explores the interface of biological sciences and design to propose new sustainable models of biofabrication.

Delia Dumitrescu

Delia Dumitrescu is a Professor in Textile Design at The Swedish School of Textiles. With a background in architecture and textile design, her research focuses on the development of cross-disciplinary design methods for smart materials and surfaces. Using practice-based methodology, her research explores how textile design methodology can be translated to the related design fields, e.g., product design, interiors, and architecture. Central notions of her research are patterns and transformability as a method to design interactive textile surfaces for body and space. Delia teaches courses in form and material, research methodology, and supervises at the graduate level.

Icaro Ibanez-Arricivita

www.icaroibanez.com

Icaro Ibanez-Arricivita is a fashion designer and academic. His studies and industry work have expanded to Barcelona, Buenos Aires, Antwerp, Brussels, Berlin, and Paris. His work has been showcased in prestigious publications such as British Vogue. Since 2015, he has relocated to Australia to work as a practitioner and a design lecturer at Queensland University of Technology in Brisbane. Despite being "design oriented," Icaro embraces practical and theoretical research as a way to enrich both his design and teaching methodologies. Some of his research interests are, but not limited to, cross-cultural collaboration with fashion as a language, industry & community engagement.

Marjan Kooroshnia

Marjan Kooroshnia is a textile designer and Senior Lecturer at The Swedish School of Textiles, University of Borås. Much of her time as a master's student in Textile Design was spent at the printing lab, learning about thermochromic inks behavior when printed on textiles and designing dynamic surface patterns. In her Ph.D. research, Marjan explored the design properties and potentials of leuco dye-based thermochromic inks when printed on textiles, in order to expand the range of color-changing effects offered by thermochromic inks on textiles and to facilitate communication regarding the understanding of, and design with, thermochromic inks. Marjan teaches the basic textile printing courses and color theory; she also supervises at undergraduate and graduate levels.

Kristi Kuusk

www.kristikuusk.com

Kristi Kuusk is a designer-researcher working on the direction of crafting sustainable smart textile services. She is looking for new ways for textiles and fashion to be more sustainable through the implementation of technology. In 2016, Kristi defended her Ph.D. project (part of CRISP) on craft and sustainability qualities in smart textile services at Eindhoven University of Technology. Her related collaborative design work has been presented in various international exhibitions, shows, and conferences. Since 2016, she has worked as Associate Professor (0.5) in Textile Futures at Estonian Academy of Arts.

Pirjo Kääriäinen

Pirjo Kääriäinen is a Finnish textile specialist and practitioner, currently developing interdisciplinary collaboration between design and science at Aalto University, where she worked as Professor in Textile Art and Design and Head of Textile and Fashion degree programs (2008–2014). Pirjo has actively developed higher education studies in Finland in the field of textiles and design towards new frontiers including materials research, wearable electronics, and novel production methods. Before her career in academia, she worked 18 years in the Scandinavian textile industry and also gained experience as an entrepreneur and consultant.

Hanna Landin

Hanna Landin is a Senior Lecturer in Interaction Design at The Swedish School of Textiles and has been Program Leader of M.A. in Fashion and Textile Design since 2011. She is Chair of the Board of Artistic Research and Education at the University of Borås, Sweden. Hanna teaches design methods and defended her Ph.D. thesis on anxiety and trust on form and aesthetics within interaction design at Chalmers University of Technology in 2009. She is interested in how people are led to interact with things and how their perception of themselves, others, and the world is affected by such interaction.

Kirsi Niinimäki

Kirsi Niinimäki is Associate Professor in Design, especially Fashion Research, at Aalto University School of Arts, Design and Architecture. Her research focuses on a holistic understanding of sustainable fashion and textile fields and connections between design, manufacturing, business models, and consumption. Currently, she is building new knowledge for design strategies in the circular economy and systems thinking. She runs the Fashion/Textile Futures research group. Kirsi has gained significant expertise in the textile industry as an in-house textile designer and further as entrepreneur in Designstudio TRIARTE. She has been working internationally as a designer, teacher, and researcher.

Nithikul Nimkulrat

is a practitioner-researcher who intertwines research with textile practice, focusing on experiential knowledge in craft processes in the context of design research. Nithikul has worked at Aalto University (FI, 2004–2010), where she earned a doctorate in 2009, and Loughborough University (UK, 2011–2013), and is currently Professor and Head of Department of Textile Design at Estonian Academy of Arts (EE, 2013–present). Nithikul is an editor of *Crafting Textiles in the Digital Age* (Bloomsbury, 2016). She is an elected council member of Design Research Society (DRS) and Convener of DRS Special Interest Group on Experiential Knowledge.

Katya Oicherman

Katya Oicherman is a textile lecturer, researcher, and artist, currently living in the United States. She studied Textile Design and Art in Israel and the UK, and Modern Jewish Culture in Leeds, UK. Her practice-based Ph.D. dealing with Jewish ceremonial textiles was completed at Goldsmiths College, London. She is interested in craft and identity politics, more recently she explores the link of textiles and architecture in Islamic art. She worked in the textile industry, and produced conceptual textile work and mixed-media installations. Katya taught textile practice and history of craft at Shenkar College of Engineering, Design and Art in Israel, where she was also Head of the Department of Textile Design.

Thomai Papathanasiou

Thomai Papathanasiou studied Accounting and Finance at Athens University of Economics and Business. She obtained her Master of Science in International Fashion Marketing from Heriot-Watt University in Edinburgh, Scotland. She has also taken classes in Fashion Illustration and Fashion Styling at Istituto di Moda Burgo and Fashion Journalism at London College of Fashion. Since 2013, she has been a full-time Professor of Textile and Fashion Design at University of Monterrey, teaching Fashion Marketing, Visual Merchandising, Fashion Strategy, Fashion Buying, and Merchandising and supervising thesis projects. In Spring 2017, she was a guest lecturer at Lahti University of Applied Sciences in Finland.

Laura Pavilonytė-Ežerskienė

Laura Pavilonytė-Ežerskienė, as a member of the artists group “Baltos Kandys” [White Moths] (1998–present) and as an independent artist, participates actively in the organization of exhibitions, symposiums, and educational initiatives, helping to create the image of the innovative and interdisciplinary Lithuanian textile scene for worldwide audiences. Laura has gained an Art Licentiate Diploma from Vilnius Academy of Arts in 2009 with her thesis titled *Textile Art School in Lithuania: Traditions and Transformations (1940–2005)*. She is currently Associate Professor and Head of Department of Textile Art and Design at Vilnius Academy of Arts (2011–present) and a member of Lithuanian Artists Association (2002–present).

Alice Payne

Alice Payne is a designer and Senior Lecturer in Fashion in the School of Design, Queensland University of Technology (QUT). Her research interests include the fashion design process, the Australian mass-market fashion industry, and the problem of design for sustainability within the fashion context. Alice is an award-winning designer and has exhibited in Australia and overseas.

Lydia Pearson

Lydia Pearson in 1989 after a decade of independent design, founded the eponymous Easton Pearson label. Over 25 years, it became an international brand, known for artisanal, original, and highly detailed clothing, sold in prestigious stores including Browns London, Bergdorf Goodman NYC, and Lane Crawford Hong Kong. When the label closed in 2016, the Easton Pearson Archive of over 3,000 garments was donated to the Museum of Brisbane to be turned into a teaching archive. Lydia is now a lecturer in Fashion at Queensland University of Technology in Brisbane, and consultant curator at Museum of Brisbane, working on innovative ways to teach modern collaborative artisanal practice.

Alessandra Perlatti

Alessandra Perlatti is a fashion designer, specializing in Marketing and Fashion Business with a postgraduate degree in Fashion Retail Management. She worked as a designer for several brands in Brazil for more than 10 years. As an educator, Alessandra has worked at Istituto Europeo di Design (IED) in São Paulo, Brazil, and CEDIM in Monterrey, Mexico, where she directs the Fashion Program. Since 2015, she has been Head of Textiles and Fashion Design Department at University of Monterrey in Mexico. She is also Brazil's and Mexico's Deputy Director for Strategy and Development of the Arts of Fashion Foundation.

Anna Piper

Anna Piper is a postgraduate researcher, textile designer, and lecturer. She is currently undertaking practice-led Ph.D. research into 3D and composite garment weaving, integrating hand and digital weaving technologies, at Nottingham Trent University (NTU). Her research and design interests include traditional hand weaving practices, digital weaving techniques, sustainable and zero-waste design, functional textiles, embodied knowledge, and design innovation. Anna is a lecturer at NTU teaching textile design, specializing in weave and CAD. She is an associate lecturer at Sheffield Hallam University teaching contextual studies for fashion design at undergraduate level. In addition, Anna has collaborated with NTU's Advanced Textiles Research Group and has experience of delivering smart and e-textiles workshops

Ulla Ræbild

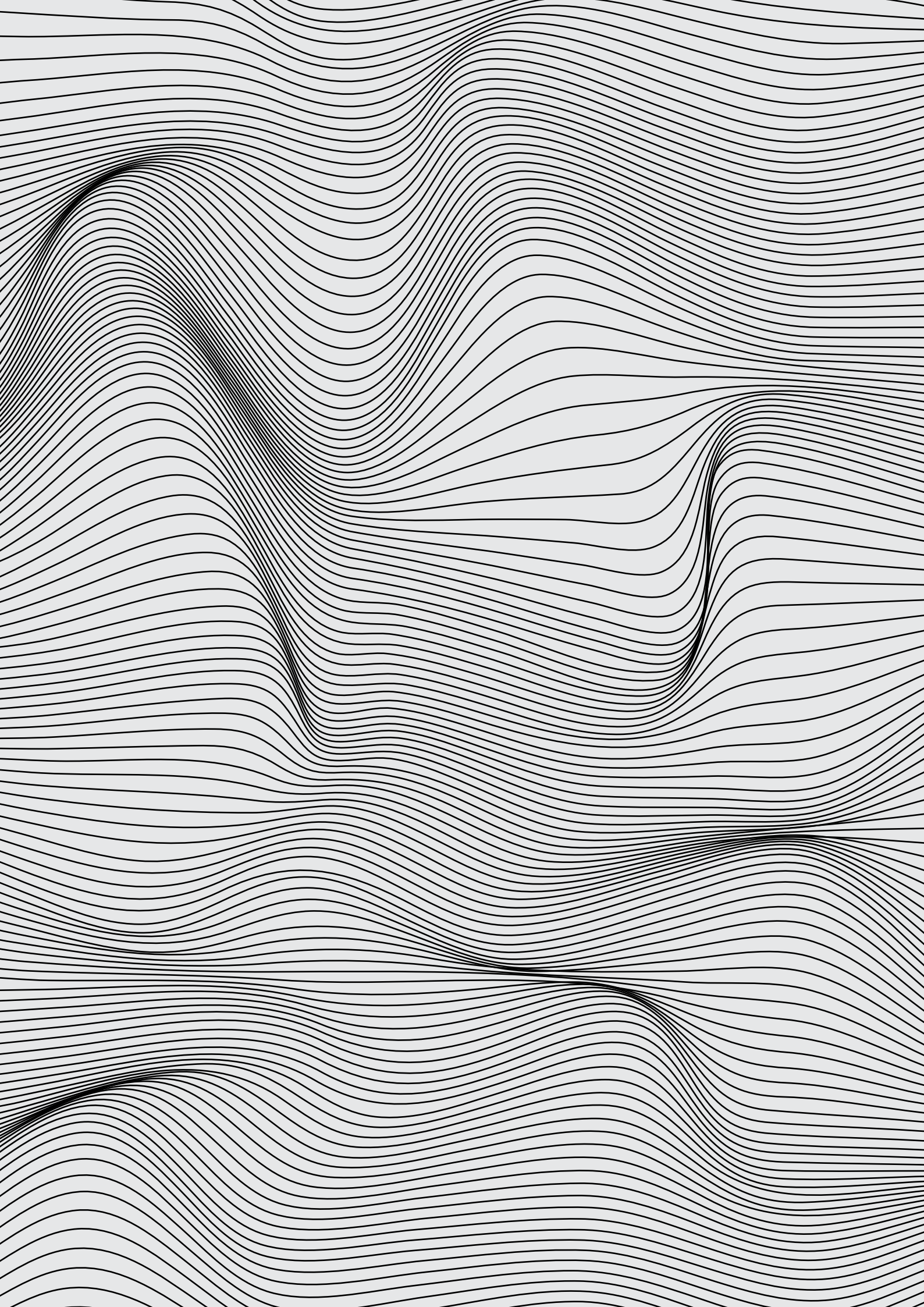
Ulla Ræbild is Assistant Professor and Head of MA Program PLANET – design for sustainable development at Design School Kolding. She has a background in fashion design and began working with fashion educational development in 1999. She earned a Ph.D. degree in 2015 with the thesis *Uncovering Fashion Design Method Practice—The Influence of Body, Time and Collection*. Her research interests lie at the intersection between fashion design practice and methodology, sustainability, and design pedagogy. Ulla has been a practical and theoretical supervisor at B.A. and M.A. levels for the past 10 years.

Maarit Salolainen

Maarit Salolainen is Adjunct Professor for 3D Surface Design and Textile Design at Aalto University. She is an experienced international textile design professional with a passion for bringing textile knowledge to multidisciplinary platforms. Maarit has developed higher education in the field of textile and surface design, focusing on renewing textile studio pedagogy and linking textile studies to fashion education. She has expanded experimental pedagogy for multidisciplinary courses exposing engineering students to design processes. In addition to her academic work, she works globally as a creative director advising textile manufacturers and interior textile editors.

Riikka Talman

Riikka Talman is a Ph.D. student in Textile Design at Smart Textiles Design Lab at The Swedish School of Textiles in Borås, Sweden. With a background in textile design, she has an interest in how different materials can be combined with textile structures to create expressions that evolve over time. Her research focuses on how inherent changeable qualities could be embedded into textiles to create materials that change irreversibly over different time spans, and how these changes could look like. Riikka teaches form and material, and weaving courses; she also supervises at undergraduate level.



Preface

Soft Landing is the first publication of the Fashion and Textile Working Group of the Cumulus International Association of Universities and Colleges in Art, Design and Media and the third volume of the Cumulus Think Tank publication series. The Fashion and Textile Working Group has been established and led by Estonian Academy of Arts (EAA) since 2010. *Soft Landing* was initiated in 2015, by EAA's Department of Fashion Design—Prof. Vilve Unt and Assoc. Prof. Marit Ahven—and International Affairs Office—Sandra Mell, with the purpose of providing the members of the Fashion and Textile Working Group and Cumulus Association in general with a debate on the future of fashion and textile education and research.

This publication is a compilation of essays written by experienced educators and researchers from member institutions of the Cumulus Association spanning 11 countries and 4 continents. The chapters address critical questions for fashion and textiles through the reflection and discussion of student projects, curricula, and research. They suggest various approaches that fashion and textile education may take to develop the fields for a better future. I hope this publication will be useful for readers who are interested in the future trajectory and evolution of fashion and textile education and research.

My grateful thanks go to all authors contributing to this publication for sharing their views on fashion and textile education and to my co-editors, Ulla Ræbild (Design School Kolding, Denmark) and Anna Piper (Nottingham Trent University, UK), for smooth co-operation during the preparation of the manuscript. Without their assistance, this book could never have been completed.

I would also like to express my gratitude to Eija Salmi, Cumulus Secretary General, and Justyna Molik, Cumulus Coordinator, for their endless patience and generous support throughout the process of preparing this publication; not least to Prof. Signe Kivi, EAA's former rector, who championed the publication in the Cumulus Executive Board. My sincere gratitude to the Cumulus President and Executive Board for giving the Fashion and Textile Working Group the opportunity and financial support to make this book come into being.

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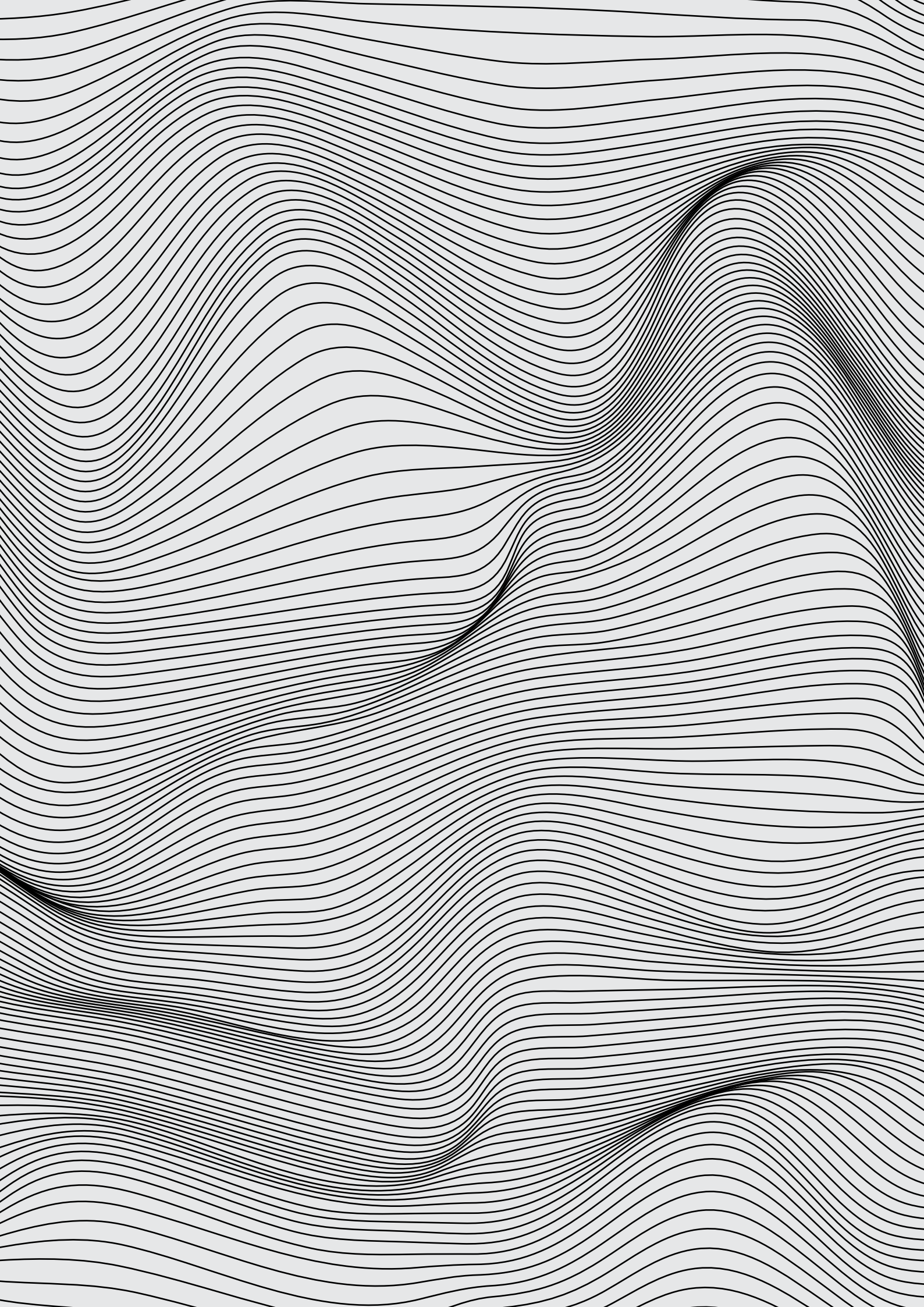

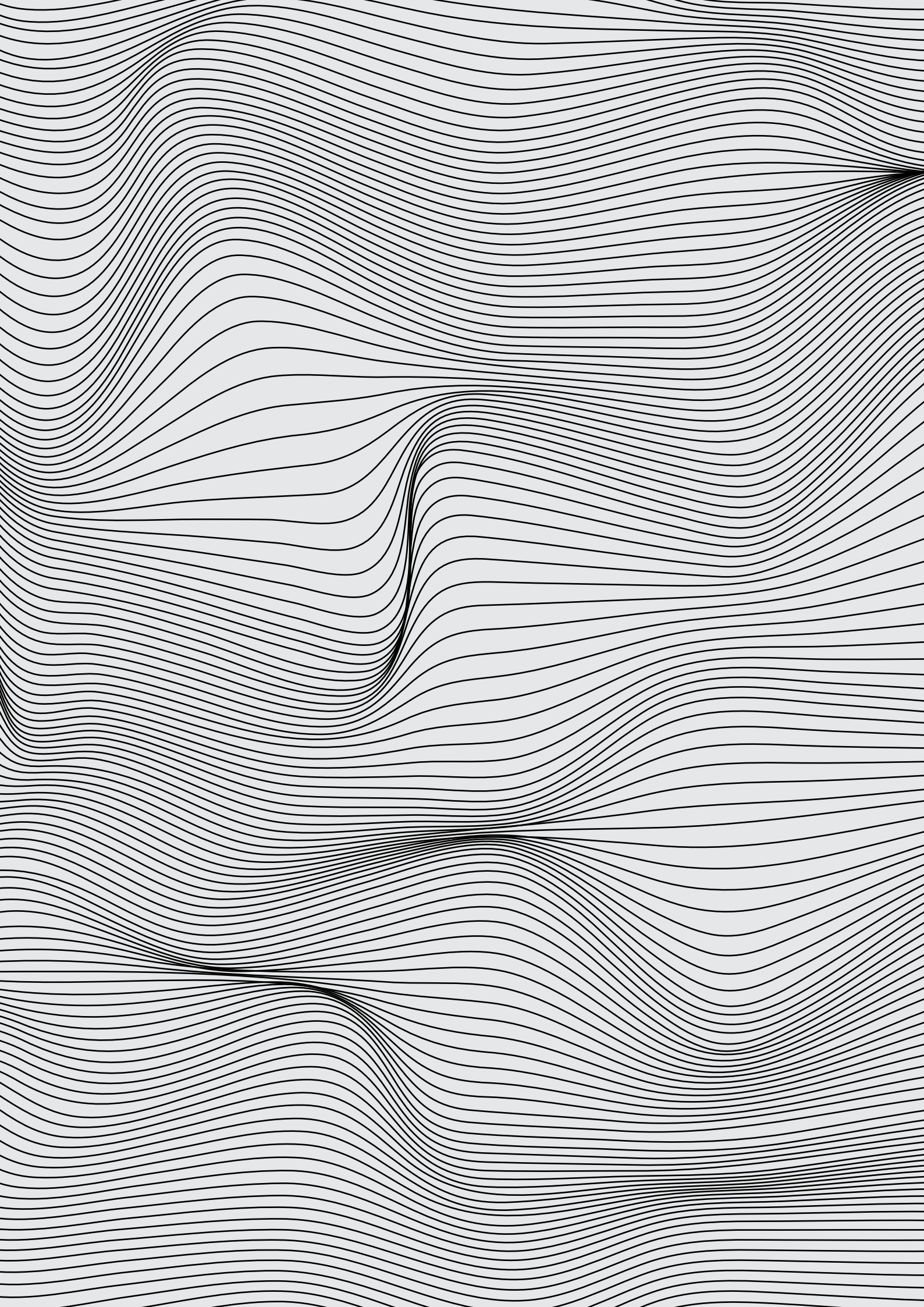

1 Introduction: Soft Landing of Fashion and Textile Education

Nithikul Nimkulrat, Ulla Ræbild, and Anna Piper

Fashion design and textile design have been subject areas provided in higher education institutions around the world for nearly a century. Recently, these subject areas have evolved rapidly in response to the demand for better solutions to local and global concerns, such as environmental and social sustainability. As a result, a number of art universities and design schools are developing programs of study and projects to provide opportunities for students to become future "agents of change" through interaction with business, civic, and social organizations. This is an important objective for design schools in the current climate in order to cultivate "a new generation of designer-citizens: productive, engaged, inventive businesspeople, policy makers, and community activists, many of whom also make beautiful and useful things" (Wolff & Rhee, 2011, p. 12).

Fashion or textiles are no longer the isolated disciplines/industries they once were. They have a significant impact on the environment and local/global economies. Innovative technology, philosophy, ethics, and an intensifying consideration of environment, social, and cultural differences are therefore increasingly influential in the design and development of higher education curricula, leading educators to question how academia can prepare students for the ever-changing and unpredictable professional landscape.

Aim and Approach of *Soft Landing*

Soft Landing, as a collection of essays, attempts to pinpoint where fashion and textile education is today and where it may shift in the future. Initiated by Cumulus's Fashion and Textile Working Group, the collection considers the future of these two connected fields with the aim of sharing the outcomes of the enquiry with the whole Cumulus family. The essays in this volume address critical questions for fashion and textiles. They shed light on different ideas, approaches, problems, and solutions from teaching and research, as well as contemplating the future trajectory and evolution of fashion and textile education. *Will the landing be soft or with turbulence?*

Experienced educators and researchers from member institutions of the Cumulus Association spanning 11 countries and 4 continents were invited to contribute their views. The 11 chapters selected for inclusion in *Soft Landing* reflect on and discuss student projects, curricula, and research conducted in institutions and/or collaboratively with industry or other local stakeholders, as well as direct experiences of the authors as educators in fashion and textiles. The chapters suggest various approaches that fashion and

textile education may take to develop the fields for a better future.

Whilst most chapters are based on the current situation in fashion and textile education in a particular institution, and reflect the unique characteristics of courses and programs based on their geographical location, and the social, cultural, and economic values of their country, they also highlight shared perspectives, experiences, and challenges.

The publication opens with a chapter entitled "Reshaping Fashion Education for the 21st Century World" by Paola Bertola from Politecnico Milano. Bertola envisages future generations of designers participating in the transition of business models, from focusing on "products and designers" to "values and design process." She proposes a new framework for fashion education with the aim of producing professionals for the 21st century who are able to reshape and direct design processes within a reformed fashion business model, thus nurturing relevant culture-intensive industry and its globalized organization towards more coherent, sustainable, and efficient products and processes. However, Bertola recognizes that such a framework can only be implemented within the context of a multidisciplinary and project-based education system that extensively involves non-design disciplines and non-academic actors (e.g., industry and government). In this system, universities are no longer producers of knowledge to be passed on to industry and governments, but active agents of innovation, interconnected with all other actors in a constant exchange.

While Bertola looks at fashion education in a global context, Vandana Bhandari, from the National Institute of Fashion Technology in India, examines it within a national context. "Future of Fashion Education in India—Focus and Emerging Scenarios" brings together the author's own experience and the reflections of other Indian fashion educators and experts. The chapter not only traces the historical evolution of fashion education in India, but also envisages how fashion education may progress to keep pace with the fast changing world. Five key scenarios are proposed for fashion educators to consider: (a) an agile curriculum that promotes collaborative learning, incorporates demands for industry in a timely manner, and interacts with rich culture and heritage of Indian textiles; (b) integration of technology in the teaching and learning process; (c) a focus on environment and issues related to sustainability; (d) an implementation of online education, and (e) connection with industry for academic requirements along with the training of faculty. Bhandari emphasizes that it is crucial for universities to educate future generations of fashion designers to understand and respond to the social, psychological, economic, and political issues around the world, and to recognize that sustainability and social development are equally as important as technology and speed.

The recognition of national culture and heritage is also discussed in "Textile Traditions and Fashion Education in Mexico" by Thomai Thessalia Papathanasiou and Alessandra Perlatti from University of Monterrey. The chapter provides a detailed account of how Mexican textile tradition has been introduced to students of contemporary fashion through a frame-loom weaving workshop, delivered by an expert artisan from the region as part of the fashion design curriculum. The reflections of workshop participants reveals a change in perception of their cultural roots and the value of artisanal work, resulting in an increased appreciation of indigenous craftsmanship of traditional textiles that are often perceived as trivial in Mexico. The authors consider the preservation of traditional techniques fundamental for establishing the foundation of contemporary Mexican style in future fashion designers in the country. In their view, it is one way to make Mexican fashion stand out whilst sustaining the country's cultural heritage.

In their chapter "New Materiality: "Making Do" and Making Connections," Alice Payne, Icaro Ibanez, and Lydia Pearson, from Queensland University of Technology, express their view on the future of fashion and textile design that relies on entrepreneurial and artisanal approaches to making in locations with limited local marketing and production networks. The idea of the "local within the global" is examined in the chapter, especially how the local, or in their case subtropical Brisbane in Australia, shapes the fashion culture and the approach to materiality and sustainability. Students on their fashion course are exposed to the complexity of fashion's production and consumption systems, and are provoked to respond to it through creative interventions. The selected examples of students' work show an innovative use of unusual and self-made materials that are inspired by bushwear, surfwear, and swimwear, as well as indigenous motifs found only in Australia. The artisanal approach is integrated into the fashion design course by introducing traditional textiles from neighboring countries. This facilitates experimentation and encourages students to design and make new textiles for use in their fashion collections. These examples demonstrate that an institution's geographical location can uniquely influence the way students expand their fashion and textile design capabilities.

The role and continued relevance of textiles within the fashion industry is the focus of "Opening up

New Textile Futures through Collaborative Rethinking and Remaking" by Kirsi Niinimäki, Maarit Salolainen, and Pirjo Kääriäinen from Aalto University in Finland. The chapter describes the transformation of fashion and textile education that has taken place at their institution over the last decade. Through selected examples of student work and academic research, the authors highlight the importance of cross-disciplinary collaboration. They suggest that collaboration between design, science, and engineering is key to making the field of textiles stronger and relevant in a broader context. The chapter advocates creative dialog between research and education whereby education is driven by new knowledge generated through research.

In Delia Dumitrescu, Marjan Kooroshnia, Hanna Landin, and Riikka Talman's chapter "On Researching and Teaching Textile Design: Examples at The Swedish School of Textiles," the relationship between research and pedagogy is also discussed. The authors reveal how smart textiles research, carried out at The Swedish School of Textiles, has informed the development of the textile design curriculum at the institution. They propose three approaches to textile interaction design education that focus on teaching: (a) transformable materials; (b) changeable colors; and (c) dynamic and interactive forms. Workshops facilitate these approaches, using various materials from the Smart Textiles Sample Collection chosen for their various transformable qualities. Therefore, new knowledge generated in research is transferred to students, creating a synergy between research and education. The chapter suggests that an active critical view of what textile design is can be maintained with assistance from other fields, including architecture, interaction design, product design, fine arts, and computer science. Textile design is therefore again situated in a multidisciplinary arena.

Cross-disciplinary approaches to textile design education and research are evident in "Biotextiles: Evolving Textile Design Practices for the Bioeconomy and the Emerging Organism Industry" by Carole Collet from Central Saint Martins, University of the Arts London. Through a lens of sustainability, the chapter explores the value of emerging textile practices in the field of biodesign. It presents a number of innovative biotextile projects (including the author's own research) to highlight unorthodox creative thinking, new ways of making and a vision of the biomateriality of future sustainable textiles within circular and biological models of production. Although biotextiles can offer alternative sustainable material choices for designers, Collet points out that the bioeconomy can only provide environmental benefits if it respects the balance and circularity of our ecosystems, incorporates intrinsic sustainable practices and is coupled with changes in our consumption behaviors.

Moving on from environmental sustainability, Kristi Kuusk and Nithikul Nimkulrat's chapter "Opportunities of Interactive Textile-Based Design for Education Tools for Children with Various Spectrums of Alertness Sensitivities" deals with the application of textile design for social sustainability. The chapter focuses on a collaborative project between students from the Estonian Academy of Arts and a local children's hospital. By adopting a problem-centered approach and combining textile skills with electronic textile technologies, the students developed interactive learning and therapy tools for use in the hospital's mental health center's multisensory room. It evidences how textile design has its contextual application beyond the traditional use of textiles, thus expanding the students' view of their future opportunities and contribution to society.

"From Fashion Pusher to Garment Usher? How Fashion Design students at Design School Kolding Currently Explore Their Future Role in Society" by Ulla Ræbild continues to illustrate how future generations of fashion designers may contribute to societal change and a more sustainable society. Through a selection of projects undertaken by students at the Design School Kolding, the author examines how tangible fashion design practice can arise from, and be affected by a general sustainability agenda. The chapter scrutinizes the various roles, positions, and sustainability perspectives that a fashion designer can adopt in order to push the boundaries of fashion design. Although this shifting direction shows the new potential of fashion design to contribute to a sustainable society, transferring it from an academic to an industry setting may be a real challenge for new graduates. Even so, Ræbild points out that it is the role of education to expand and optimize the students' future opportunities by building portfolios of internship places outside the fashion industry and establishing collaboration with companies through hands-on projects.

In "The Fate of Textiles," Laura Pavilonytė-Ežerskien, from the Vilnius Academy of Arts, discusses the survival and relevance of artistic textiles in contemporary academic and artistic contexts in Lithuania. In order to maintain and develop textile art curricula that foster the future generations of textile artists, the author proposes an emphasis on "textile thinking," with value placed on relevance, originality, and creative freedom. This value is derived from the students' abilities to understand and reflect upon problems in a cultural context, to initiate and expand individual artistic

ideas, and to employ knowledge, practical, and technological skills in a broad domain of textile culture, arts, crafts, and design.

The volume is closed with Katya Oicherman's "Across the Melodies of Change." The chapter presents the author's collection of notes, including terms, citations, stories, and questions, that reflect her experience of textile design education while she served as Head of Textile Design Department at Shenkar College of Engineering and Design in Israel. Although it is not the author's intention to offer a comprehensive summary of what textile design is or to point out problems the field is facing in the current academic setting, textile design educators may recognize in the notes some common dilemmas that they confront when teaching or developing a curriculum.

Conclusion

Due to the rapid and highly unpredictable changes occurring in the fashion and textile industry, fashion and textile designers can no longer remain isolated within their own disciplines; they are expected to engage in previously unrelated activities. Design schools and art universities are reinterpreting the future of fashion and textile design education in order to prepare their graduates for the changing professional landscape. From the viewpoints of experienced fashion and textile educators contributing to this volume, it is evident that curricula are being developed to provide students with greater interdisciplinary opportunities. They attempt to expand students' awareness of local and global issues and equip them with hands-on making skills and the ability to think conceptually. This seems to be fundamental in creating and contextualizing innovative textile and fashion design, and improving industry and/or social systems. Challenges for education lie in the definition of key areas of knowledge and the setting of boundaries that may differ greatly from the traditional approach.

In order to encourage this type of creative development in students who will be able to innovate products for our society that are shaped by media, technology, economy, and environmental awareness, higher education institutions need to encourage interaction with other subject areas such as science and business (Palomo-Lovinski & Faerm, 2009). The main challenge for students lies in how they can obtain, within a relatively short time, the necessary skills, interdisciplinary experiences, and conceptual development that will allow them to thrive in industry and reshape the future marketplace. Therefore, it is important for educators to be sensitive to the development of intertwined skills and collaboration in the next generations of designers (Kane, Nimkulrat, & Walton, 2016). Curricula must be designed and developed to effectively balance creativity and technical skills, with business insight through internship and placement (Palomo-Lovinski & Faerm, 2009). This is indeed a challenge, but it is our responsibility as educators in these subject areas to make the landing of graduates in the world outside university as soft and smooth as possible.

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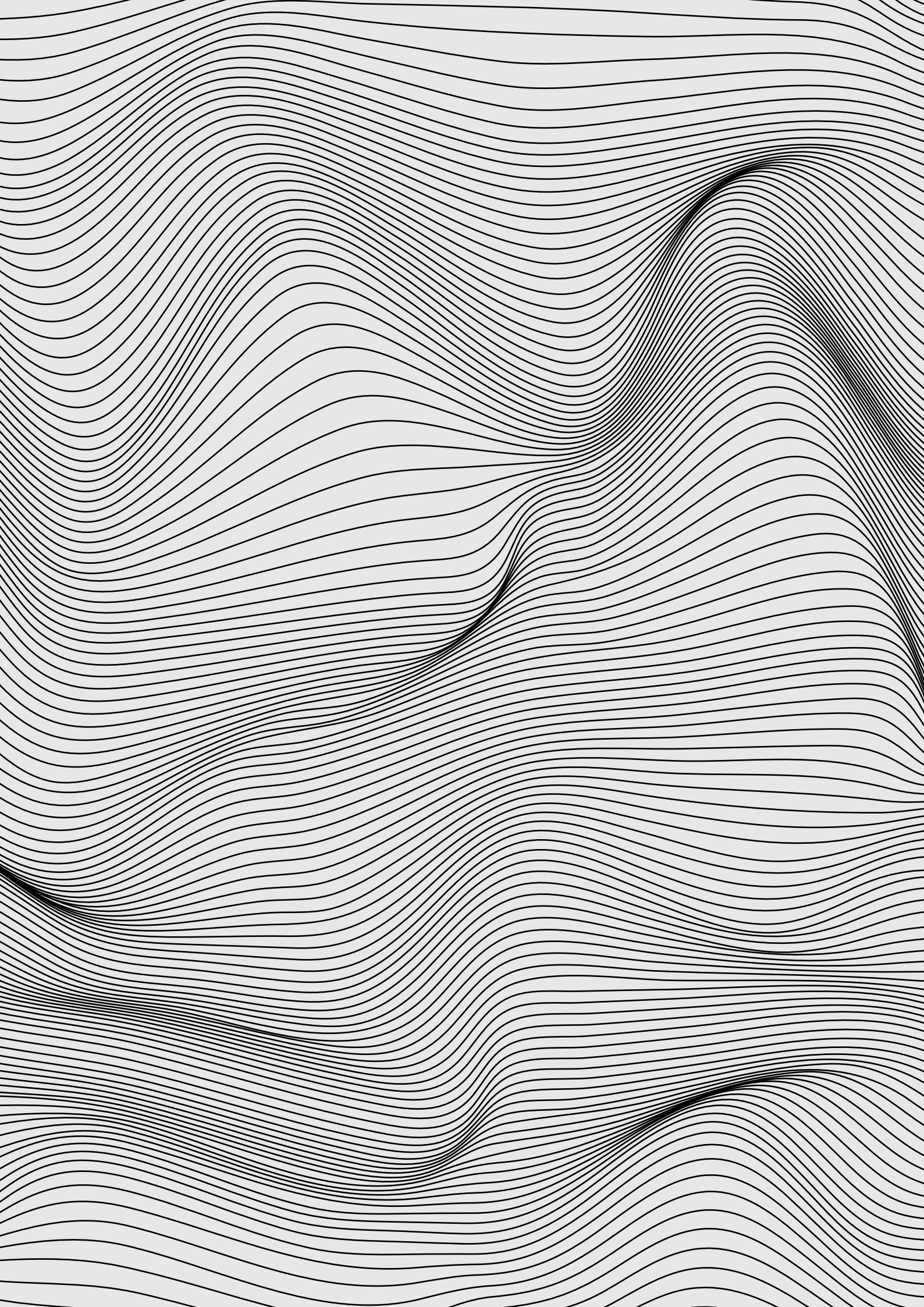

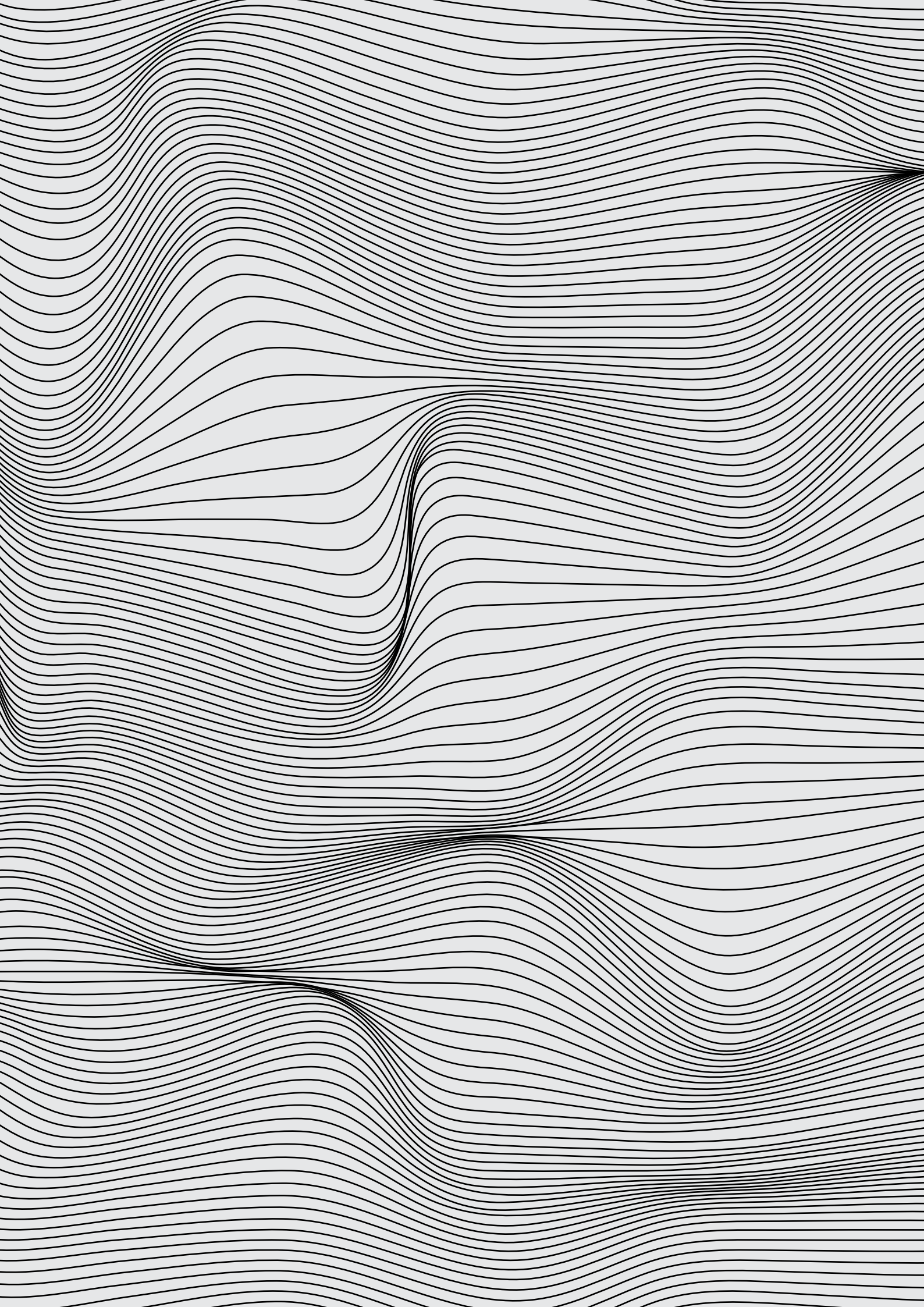

2 Reshaping Fashion Education for the 21st Century World

Paola Bertola

Introduction

Universities are among the oldest and most enduring institutions in Western history. They belong to the vision of opening knowledge to a community—*universitas* in the Latin term—through open lessons and lectures in churches and cloisters during the early 11th century. In fact, they were originally medieval institutions, but were reimagined during the Enlightenment to serve the industrial era to come. While the industrial revolution has passed and our current world is dramatically different from that time, what we know today is that higher education is still informed by that concept. Therefore, attempts to transform its model to better answer our present scientific, cultural, and societal challenges are increasingly growing, and signs of change are already in place. Within this perspective, design education has been at the very center of this transformation, where design thinking skills have been identified as one of the key attributes of millennial leaders. In spite of this, by purpose or by lack of interest, fashion has always been a peripheral subject within design scientific debate. Fashion design education itself has been a small self-referential niche within the whole system. This isolation is possibly coming to an end, given the acknowledged impact of fashion on global economies and society, and the need for it to engage, as for all other sectors, in supporting a consistent transition of our world towards more sustainable paradigms.

Starting from this assumption and looking at the evolution of fashion and at the opportunities and threats it is facing, the following sections will try to show some guidelines to shape fashion design education for the 21st century.

Fashion Industry Between Opportunities and Threats

Fashion is one of the most relevant phenomena to describe contemporary cultures and societies. It was rooted in the history of humankind within the search for identity and personal development, whereby costumes were a fundamental brick of any social system. Since then, weaving and clothing habits have followed our evolution. They played a crucial role within the transition into modernity, where the textile industry was one of the major engines of the first industrial revolution. More recently, fashion has been at the

very center of mass production and globalization as a fully mature industrial field, globally spreading both in advanced and emerging countries. For these reasons, it has been going through a process of turbulent transformation, affected by endogenous and exogenous factors, which present both opportunities and threats for the future of the fashion industry.

It started from an original designer-centered business model, where creativity was the leading engine for the establishment of the first brands. This peculiar path began its development in the late 19th century, around the role of the fashion designer, and ended with a very specific governance system, which still characterizes the fashion industry: a dual leadership of management and design, embodied by the CEO and Creative Director couple. This is, in fact, the unique formula of the fashion business which, for a long time, has been looked at as an eccentric attribute of a sector in-between industry and cultural production, but is today a real opportunity for its future survival (Saviolo & Testa, 2001; Bertola & Colombi, 2014; Bertola, Vacca, Colombi, Iannilli, & Augello, 2016). This hybridization between organizational and creative competences found an ideal context in fashion and is now reflected across the processes and functions of brands and companies. In fact, those able to survive the recurrent economic crisis found an answer for transforming themselves in this recipe. The old concentration of responsibility and tasks on a few professionals was left in favor of a wider spread of functions and activities without losing the integration of processes. Many connecting roles were created, such as brand managers, fashion coordinators, merchandisers, product managers, and line builders, with the aim of guaranteeing the typical interaction between management and creativity.

Therefore, the fashion organizational model appears to be already advanced, given the current debate on organizational change management, where multidisciplinarity is drawn as a key attribute for leaders of the new millennium. The shift from industrial economy to knowledge economy already underlines the necessity for a new vision of organizations' hierarchy and process management (Rifkin, 1995; 2011). More and more parallel, transversal and open processes are characterizing the most innovative companies that offer opportunities to new professionals holding multidisciplinary competences, often merging technical and design skills with managerial skills (Luski, 2001; Florida & Goodnight, 2005). Reorganizational processes occurring in big companies to foster innovation have often reshaped relationships among different roles and functions, promoting design activities to a strategic level. Once seen only as a technical function, design has become a key factor in a decision making process, scaling the hierarchy of companies and often becoming a shared attribute among top leaders (Souter, 2007). This is demonstrated by the growing debate on "design thinking" as a major requirement in innovation management. It is intended as a creative and proactive attitude to filter, transfer, and connect different bodies of knowledge in order to shape innovative solutions (Brown, 2009; Martin, 2009; Kolko, 2015). Given this premise, fashion and its dual leadership model with creative professionals at the top of the organizational hierarchy could be possibly considered an advanced context informed by "design thinking."

Despite this potential opportunity of being already design-centered, as a mature and historical context, fashion has also been deeply transformed by the impact of globalization processes. Looking at its present organization, it is one of the most internationalized sectors, both on the side of supply chain networks and target markets. It has generated multiple systems of different organizational models and approaches to markets and has culminated in the rise of the fast-fashion paradigm that has deeply affected the whole sector, pushing all companies, from luxury and premium to mass market, to reengineer their design management and product development processes.

During the first decades of the new century, major fashion companies have adopted outsourcing and delocalization strategies that follow the supposed advantages of globalization and looking for low-cost production. Despite the expected short-term advantages, this process is now seen as very controversial for many different reasons. Facing the impossibility of controlling product quality and reliability, many luxury and premium product companies have already started extensive and complex reshoring operations. In the meantime, the Western regions, originally expert in fashion and textile manufacturing, have been impoverished and disconnected from their traditional material and industrial culture. In many cases, all types of companies, with a major involvement of mass market ones, have faced dramatic environmental and social costs in the countries of their operations, for example, the incident of Rana Plaza in Bangladesh in 2013 which shocked the public. This is feeding a general change in the attitudes of customers, who are increasingly looking for "authentic quality," intended as a transparent perception not only of tangible qualities of goods, but also of their intangible attributes, such as being informed of the context, the people, and the process behind them.

Given the scenario described above, fashion carries both opportunities and threats that should be carefully considered in reshaping education to fit into emerging professional profiles and to face future challenges.

The New Challenges for Universities' Education Model

The start of the new millennium has been accompanied by a growing focus on universities and the need to reshape their role and nature. This is observed in all Western countries, both in the North American system where highly expensive private education is no longer paid back by professional achievements and knowledge advancements, and in European countries where the heritage and bureaucratization of university institutions have slowed down any process of reform. Today, dramatic transformation happens in global economies and societies. The consequent changes that characterize organizations and companies and the complexity of problems from a social and environmental point of view put education in the need for a transformation itself. In fact, a large majority of universities around the globe are still based on educational models developed under the Enlightenment, where an efficient and rational organization of bodies of knowledge into distinguished silos is the red thread that rules academies. They emphasize the machine age's ideals such as efficiency, hierarchy, standardization, punctuality, quantitatively measurable productivity, scientific management, and the compartmentalization of knowledge.

Between the late 19th century and the first quarter of the 20th century, functions were specifically created to serve this model and were institutionalized in higher education: templates for research universities, standardized rules for accreditation, schools serving clearly delineated professions recognized by associations and governments, rigid systems of grading and multiple-choice tests, the unit of credits and the quantitative measurement of the "work" of students and professors, and highly structured degree requirements (Davidson, 2011, Bertola, Hillen, & Swearer, 2016).

Therefore, a rich debate on how to drive academia into new paradigms has been fed with the aim of giving universities the capacity to train new generations to be able to face the complexity of future problems and challenges. Within this discussion, multidisciplinarity is at the very center as a key requirement for future leaders who should be able to embrace complexity as the inner nature of our world. The concept of multidisciplinary study and research was first approached in the context of sciences such as medicine and microbiology. Within these fields, the traditional scientific methods of simplifying problems into sub-problems and systems into sub-systems failed, not giving the capacity of envisioning the impacts of actions into the full "organism". This awareness is now spreading to all fields of knowledge and contemporary problems at all scales. Social communities, companies, and institutions are too broad to be faced by a single discipline or profession (Hübenthal, 1994; Klein & Newell, 1997; Newell, 2001). Acknowledging this evidence, the traditional Western approach of organizing knowledge into bounded silos is showing its inefficacy, and we are in need of a new holistic vision of cognitive processes (Stember, 1991).

Many scholars have been working on studying processes of exchanging knowledge, trying to codify frameworks and practice to support multidisciplinary cooperation (Pirrie et al., 1998; Graybill, Dooling, Vivek, & John, 2006; Lotrecchiano, 2011). But even more challenging is to understand how to teach future professionals to be able to apply those practices and become "agents" of innovation (Banerjee & Ceri, 2016; Bertola, Ceri, & Vacca, 2016). They need to be trained to create bridges between different disciplines, and to understand any problem from their expertise perspective and at the same time be able to connect it in a dialogue with other skills and competences.

Overcoming Disciplinary Boundaries Within a New University Paradigm

The most recent pedagogical studies are challenging the traditional educational model based on vertical specialization in favor of new hybrid paths of education that can merge vertical focus together with horizontal skills. A metaphor of the "T Shaped" professional given by Tim Brown (2005), the CEO of IDEO, a global leading design firm based in Silicon Valley, perfectly describes this direction to educational institutions.

> We look for people who are so inquisitive about the world [...]. We call them T-shaped people. They have a principal skill that describes the vertical leg of the T—they're mechanical engineers or industrial designers. But they are so empathetic that they can branch out into other skills, such as anthropology, and do them as well. They

are able to explore insights from many different perspectives and recognize patterns of behavior that point to a universal human need.

But beyond promoting new multidisciplinary organizational models and learning processes, a second big challenge is emerging for universities. Looking at the Silicon Valley as an excellent example, academic institutions have to not only break their own boundaries, within disciplines, schools, and departments, but also open up their external borders to all actors of economy, culture, and the civil society. This push comes from the evidence that contemporary contexts are too complex to be faced by a single discipline and that innovation can no longer be isolated within the R&D departments of companies or university laboratories. The nature of innovation is radically different from the past; innovation today arises from actors interacting with one another in their knowledge networks, which are open and broadly accessible, hence breaking the paradigm of the "black box" (Rosenberg, 1984; Flichy, 2008; Rifkin, 2001). This peculiarity of our interconnected world is finally enabling external users and experts to take part in innovation processes, often driving them in a more effective way and blurring the boundaries between companies, institutions, and their environment. Therefore, "open innovation" is a goal currently pursued by organizations in search for effective models to react to the maturity and turbulences of contemporary markets, and to increase awareness of their impact on a larger social, cultural, and environmental scale (Peters, 1999; Weik, 1995; Chesbrough, 2005). With reference to this transformation, many studies have been focusing on the impacts of universities on their surrounding contexts, showing the relevance and positive feedback on the growth of regional and even national systems, whereby academies are able to build connections and interact with their external environment (Saxenian, 1995). A vision is clearly emerging underlining the need for:

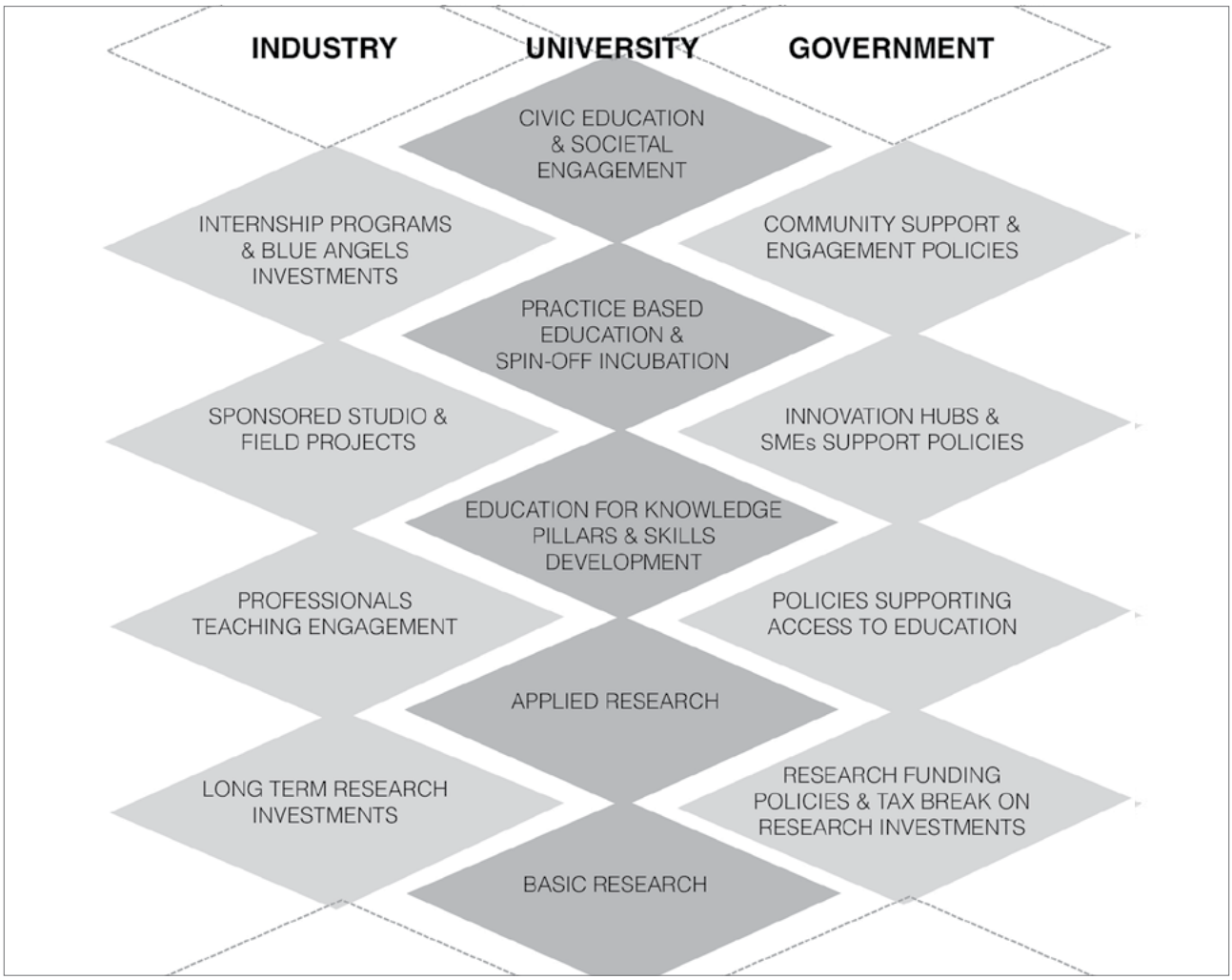

Figure 2.1. The diagram is inspired by the "Triple Helix" concept introduced by Etzkowitz and Leydesdorff (2000), as an effective model for reshaping universities. It consists of three strands representing university, industry, and government. Diagram: Paola Bertola. © Paola Bertola.

> a shift from innovation sources confined to a single institutional sphere, whether new product development in industry, policy making in government or the creation and dissemination of knowledge in academia, to the interaction among these three institutional spheres as the source of new and innovative organizational designs and social interactions. (Ranga & Etzkowitz, 2013, p. 238)

Etzkowitz and Leydesdorff (2000) offer an effective model for reshaping university as a dynamic protagonist of a larger ecosystem. They propose a metaphor coming from biology to draw their Triple Helix scheme, which resembles the form of DNA molecules, to carry genetic instructions used in the growth, development, functioning, and reproduction of all known living organisms. In their Triple Helix, university is the third additional strand to the common form of DNA, where the other two represent industry and government (Figure 2.1). In this way, they reject the traditional path followed by Western modernization in separating applied and unapplied forms of knowledge (Etzkowitz & Leydesdorff, 2000; Etzkowitz et al., 2008). The model aims to encourage higher education institutions to incorporate multidisciplinary research questions and problems coming from the real world, interacting in a dynamic balance with all external actors, such as companies, policy makers, and the social community as a whole. The rich business and research relationship that interlaces Stanford University with the surrounding Silicon Valley and the Boston-Cambridge region with Harvard and MIT are excellent examples of Triple Helix ecosystems. They already represent universities repositioning themselves within a system where they are no longer producers of knowledge to be passed to industry and governments to be applied, but active agents of innovation, interlinked with all other actors in a continuous exchange.

It is clear that future generations of professionals need to be exposed to different disciplinary domains, through learning processes and environments which overcome the boundaries of academies themselves to become nodes of large constellations of knowledge and innovation centers. Higher education institutions in post-industrial economies are therefore experiencing a general crisis, expressed in their lack of flexibility to address these needs. But the most advanced among them are clearly engaging in facing two major challenges related firstly to support a shift towards the integration of traditional disciplinary fields, and secondly to reshape their organizational model to interact with a larger system of actors (Bertola, Harfoush, & Vacca, 2016).

Transforming the Fashion Education System

In consideration of what is explained above, a deep transformation of education is needed. This transformation is actually already in place in some advanced institutions, and it can be described as a process of transition (Bertola, Hillen, & Swearer, 2016; Bertola, Ceri, & Vacca, 2016):

- *From educating experts to growing knowledge brokers*. Higher education should embrace the goal of growing individuals intended not as "experts" within a specific context, but as "knowledge brokers" able to promote knowledge exchange, interacting with other functions in a multidisciplinary context and the external eco-system.
- *From being knowledge centered to becoming problem centered*. Higher education should be pushed to loosen disciplinary boundaries to be able to face systemic, complex, and super wicked problems characterizing the contemporary societies.
- *From "hard" body of knowledge to "soft" skills*. Traditional knowledge domains are openly accessible by alternative sources (i.e., MOOCs) and can be increasingly taken for granted while higher education institutions should additionally provide soft/horizontal skills, exploring trans-disciplinary domains of knowledge (e.g., decision making, systemic thinking, team-working, and management, etc.), and feeding new cognitive approaches.
- *From passive teaching and learning to active interaction*. Universities are increasingly meant to shift from "teaching centered processes" to "learning centered processes" designed by students themselves within a context of open-source knowledge resources and interactive/enabling learning environments and experiences.
- *From producing knowledge to becoming learning organization*s. Universities should become learning organisms themselves, building a new balance with companies, governments, and civil communities to continuously adapt in a homeostatic equilibrium to the need of society.

This dramatic paradigmatic shift does not seem to be reflected in fashion education practices, where institutions and universities are still anchored to obsolete models, and anachronistic approaches are widely

diffused. A large majority of design and applied art institutions, in fact, focus on the old concept of product-centered education, feeding an enduring demand in prospective students, who are usually fascinated by fashion for its media and social impact, driven by individualism and not pragmatically informed by the professional context of designing and developing real products in a dramatically changing world.

But given the depicted scenario for the evolution of fashion and its opportunities and threats, we can start to reshape curricula from two important assumptions. Firstly, fashion is a complex and multi-layered phenomenon, connecting Western traditional material culture with its contemporary identity, as well as its social and economic organization. It has an inner complex nature that needs to be addressed within a multidisciplinary teaching and learning environment. Secondly, design is a complex process not isolated in its own creative attitude but partaking of brands and companies strategic planning, and being involved at all levels of organization. It can enable the whole cycle of research, creation, and distribution of fashion products, fully considering its potential cultural, social, and economic impact within a design thinking vision. This means that design should be strongly integrated with all key processes and functions into reshaped models of design management and planning.

Within this cultural model, design education should be oriented towards growing professionals who are able to guide fashion into a new paradigm, centered on principles harmonized with the collective aim of pursuing a sustainable development, on a social, cultural, and economic point of view. That is to say, future generations of designers should participate in a transition into new business models, shifting from being centered on "products and designer" to focusing on "values and design process," where the phenomenon of the "mythopoeia of the designer" leaves place to the concept of a system of creative professionals. They should be able to promote design process innovation, re-linking creative and implementation phases into a new value chain. They should pursue processes' transparency, supported by new corporate social responsibility policies, in which design could play a strategic role. They should consider products' authenticity as a central value, intended as the clear and perceived connection among artifacts, the processes underneath their development, and the socio-cultural context that enabled their creation.

Such vision can only be implemented within the context of a multidisciplinary and project-based education system, with an extensive involvement of non-design disciplines and non-academic actors, as well as novel pedagogical approaches and environments. It will aim to train highly qualified professionals who are capable of reshaping and leading design processes within a reformed fashion business model. These highly qualified profiles should be able to:

- integrate socially responsible principles and practices into design and product development strategies and processes;
- plan and perform advanced and creative research activities, sourced from a multidisciplinary set of disciplines, from social science to forecasting, to visual and stylistic research;
- synthesize research outcomes into visual and material artifacts, mix different tools and technologies, and clearly define possible innovation scenarios and creative products/services development guidelines;
- synthesize design strategies and objectives (short, medium, and long terms) into brief charts and multimedia artifacts, merging qualitative and quantitative requirements and goals;
- understand brands/labels portfolio strategies reaching different customers groups and be able to translate brand identity into an appropriate product portfolio;
- plan and manage design processes coherently with product development phases, fulfill strict timing and balance daily market-driven processes with research oriented ones, and feed future innovation trajectories;
- plan and manage product portfolio strategies to enhance markets' potential while properly dimensioning the brand offer;
- link design and product development processes with production management and enable supply chain innovation through innovative solution, such as finding new ways of integrating craft and advanced manufacturing;
- be able to connect design processes with all key functions of the organization such as production, retail, and communication; and
- investigate and apply advanced technologies such as 3D manufacturing, PLM systems, social media, etc. to innovate and to lean the design process.

The new complexity of knowledge, skills, and soft attributes required by future professionals gives rise to the need to reconsider different cycles of education and their reciprocal roles. Given its traditional "product-designer" focus, fashion design education has been for too long bachelor-centered, without real innovation developed in the few M.A. and M.Sc. curricula, offering a very poor attention to postgraduate

education. These will probably be the ideal contexts to experiment and implement ideas for the future of teaching and learning where design can be applied as a strategic function integrated across the cycle of research, design, development, and distribution. Moreover, the efforts in improving and innovating our models and approaches will result in better integrating fashion education, from its peripheral positioning, into the most advanced experiences of design education.

Only within this framework can fashion education succeed in growing professionals for the 21st century, nurturing this relevant culture-intensive industry and its highly globalized organization with rich contributions, to foster its potential evolution towards more consistent, sustainable, and efficient products and processes.

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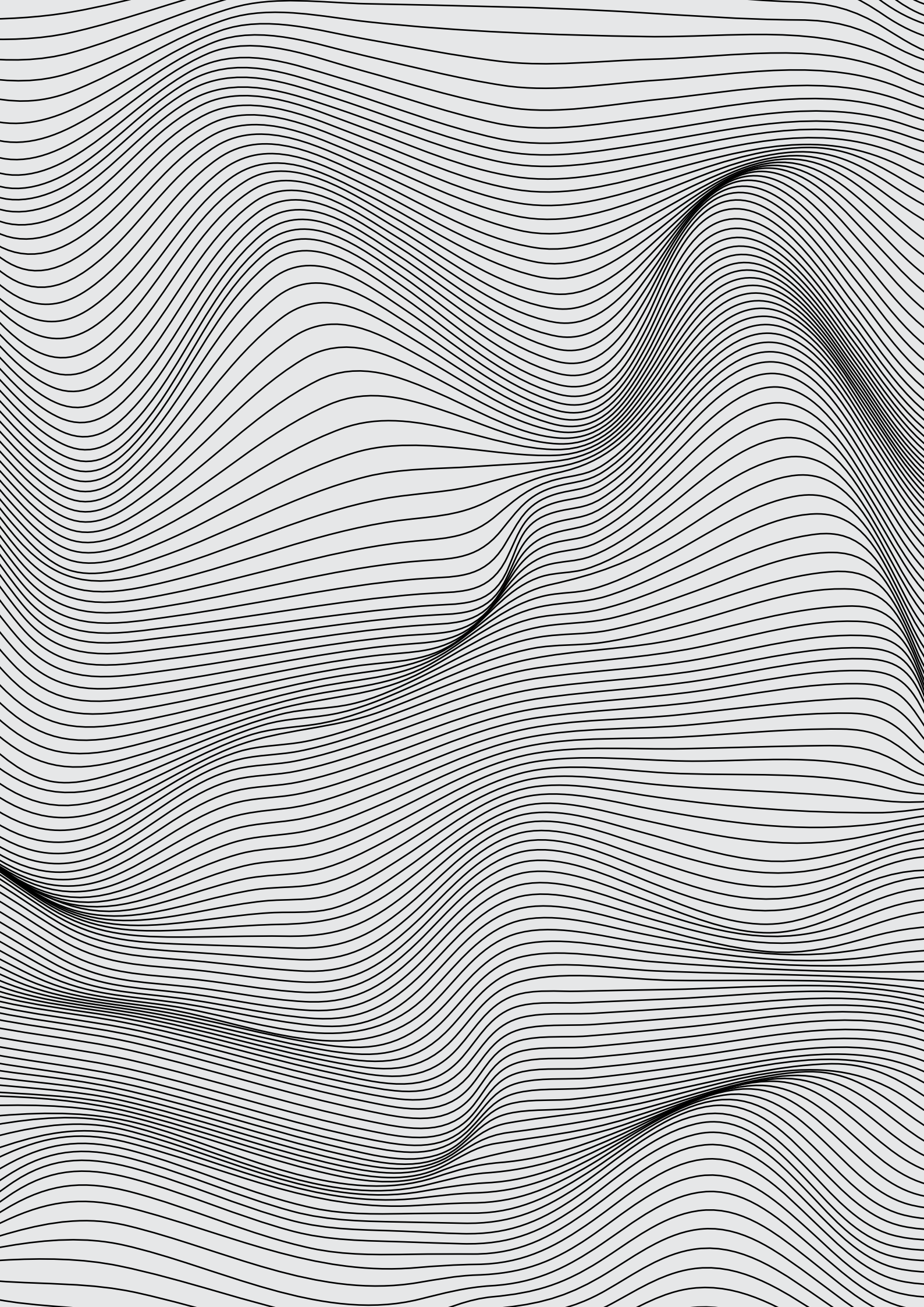

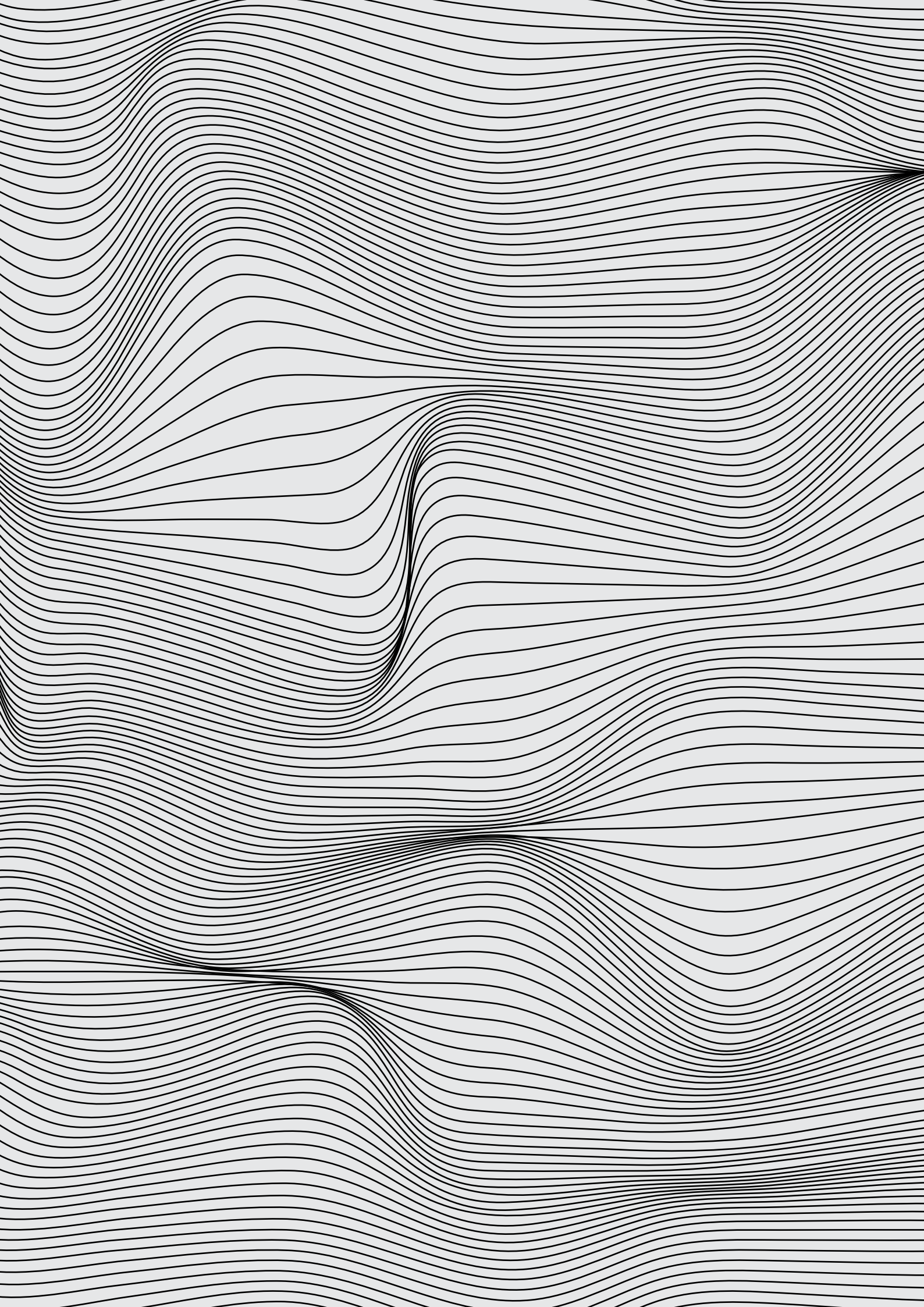

3 Future of Fashion Education in India—Focus and Emerging Scenarios

Vandana Bhandari

The fashion and textile industry globally and in India is at a stage of extraordinary political, social, environmental, and economic change. The incessantly dynamic industry has in the last few years been inundated with trends, which are evolving at an unmatched pace in the history of fashion. Some of these trends identified by The Business of Fashion (BOF) 2017 report (Amed et.al., 2016) talk of intensifying volatility leading to uncertainty in the global economy, instant gratification resulting in a faster pace for fashion, more sophisticated technology-driven consumer, disruptions in fashion cycles, and upstream technology among others. Fashion education must respond to these rapid transitions at an equal pace to stay relevant.

This chapter is not an all-inclusive account of fashion education in India. Rather, it is an attempt to bring together knowledge available from the personal experience of the author, and other educators and experts. Discussions presented in the chapter were held as personal communication with Indian fashion educators and experts to ascertain their views on the future of fashion education in the country. This account details the historical evolution of fashion education in India and gives some suggestions on how fashion education can keep pace with the fast-changing needs of the consumer. The chapter will propose the following five key points for fashion educators to consider: an agile curriculum with more engaging teaching methodologies; integration of technology in the teaching and learning process; a focus on environment and issues related to sustainability; an implementation of online education, and connection with industry for academic requirements along with training and retention of faculty.

Origin of Textile Education in India

India has an ancient knowledge of cotton, mordant dyeing, and printing of cloth, which dates to the Indus Valley Civilization, i.e., 3000 B.C.E. According to Chandra (1973), "in very ancient times fibers such as hemp, wool, and flax … were traded from India across the world. Cotton is mentioned for the first time in the Ashvalayan Shantasutra" (p. 11). Early literary and archaeological evidence illustrates that weaving techniques, science of dyeing, embellishment done using complicated printing, and embroidery techniques were historically practiced in the country. Block

printed fragments thought to be from India found from the site of al-Fustat in Egypt are comparable in style, technique, and dyes used in the current practice of block printing done in the states of Gujarat and Rajasthan. Similar examples can be found in other craft practices and dress traditions in the country. For example, styles of dresses from Mughal and Avadhi periods continue to be popular in Indian fashion today. This kind of continuous knowledge across millennia is testament to an omnipresent system of formal/informal methods for transmission of knowledge.

One of the ancient systems of education was the Guru-Shishya Parampara (i.e., teacher-student tradition). The Guru-Shishya Parampara prospered and developed over thousands of years though the exact origins are unclear. Through this system, knowledge of Indian tradition was transmitted across generations. There is some literary evidence pointing to early schools that existed and taught textiles and other crafts through apprenticeship: "Training in professions like those of the sculptor, the weaver, the carpenter, the miner, the goldsmith, etc. was usually given by the given apprenticeship method" (Altekar, 1934, p. 186).

Fashion Education Institutes

The tradition in the field of textiles and dress translates today into a fashion education system, which is training professionals for the global fashion industry. In India, among the earliest higher education programs, which offered formal education in the field of clothing and textiles, were home-science or home economics college degrees. The subjects delivered included textile science, traditional textiles, pattern-making, construction, and sociology of dress among others. Lady Irwin College, set up with an objective of women's empowerment, was the first college to offer home science as a discipline and a one-year diploma in needlework as early as 1936. The Department of Clothing and Textiles at MSU Vadodara was established in 1957 at undergraduate level and four years later a postgraduate program was introduced followed by a doctoral and M.Phil. program. Craft was taught in Sriniketan at Shantiniketan, West Bengal, in 1929. By 1930, fine arts colleges like JJ School of Art started offering textile design as a discipline. Banaras Hindu University and fine arts colleges in Baroda followed, and by 1950, they were offering textile design programs.

The technological aspects of textiles have been a focus of engineering programs with technical specialization in textiles, at the undergraduate, postgraduate, and doctoral levels, and among the well-known programs in the country are those taught at the Indian Institute of Technology. Other institutions, like polytechnics, have looked at fashion design and textile design as vocational streams and offered one-year and two-year diploma or certificate programs. The degree education produces middle and higher management level persons whereas the diploma education offered by polytechnics produces technical and supervisory level persons.

National Institute of Fashion Technology

National Institute of Fashion Technology (NIFT) was established in 1986 under the aegis of the Ministry of Textiles, Government of India, as a premier Institute of Design, Management, and Technology that trained professionals to take up leadership positions in the fashion industry. Today, its statutory status empowers the Institute to confer undergraduate, postgraduate, and doctoral degrees. The Institute was a pioneer in envisioning and evolving fashion business education currently taught through a network of sixteen professionally managed campuses across India.

The types of programs provided by NIFT are varied. It offers four-year undergraduate degree programs, two-year postgraduate degree programs, Ph.D. programs, and diploma and certificate programs under the broad umbrella of fashion technology. Undergraduate students undergo a common one-year foundation program and focus for three years on their respective disciplines. For example, the Bachelor of Design degree facilitates specialization in accessory design, fashion communication, fashion design, knitwear design, leather design, and textile design, while the Bachelor of Fashion Technology concentrates on apparel production as a discipline. The two-year master's program offers Master of Design, Master of Fashion Technology, and Master of Fashion Management. Diploma and certificate programs aim at people already working in the textile and fashion industry.

Students build connections with the industry through internships of a duration ranging from two to three months. Most students also undertake a graduation project with the industry where they work on a brief assigned by the industry. This strong industry relationship prepares for industry-ready graduates who are aware of the challenges of the current scenarios. Graduates work as designers, brand managers, visual merchandisers, journalists, stylists, trend

analysts, production managers, and entrepreneurs across diverse sectors, for example, retail, export, domestic market, craft, and social sectors. Interface between industry and education can enhance students' knowledge of processes and current realities. The relationship with the industry can also be strengthened by a stronger linkage with the alumni who hold key positions in the industry.

Rathi Vinay Jha, the Founder Director of NIFT, further elaborates that the Institute's "interaction with the textile and fashion industry must increase and be even facilitated by government and industry councils. This has to be a constant relationship to benefit not just employment in industry but also to enhance the quality of practical experience requirements to support fashion education" (R. V. Jha, personal communication, January 10, 2017).

Other textile and fashion institutes also train students to meet the requirements of the garment and textile industry. There are approximately 350 colleges and universities across India offering fashion and/or textile education. About 100 polytechnics also coexist and offer courses in textiles and fashion. Specialized professional courses are available in a the following institutions: Indian Institute of Handloom Technology; Textiles Research Associations; Powerloom Service Centres; Weavers Service Centres; Industrial Training Institutes; and Apparel Training and Design Centre (ATDC). Institutes like ATDC provide vocational training for the apparel sector and skilled manpower to the industry for sewing, quality assurance, CAD, patternmaking, etc. Darlie Koshi (2017), Director General and CEO of ATDC, sums up the fashion education scenario:

> In late 80s we were talking about clothing, apparel, garments, etc. though there were nuances of meanings for each of these words and then fashion subsumed all that … fashion education was responsible for this change … but in the early part of the new millennium, fashion became a part of broader concept of lifestyle and fibre to fashion, concept to consumer, and farm to rack all became part of the emerging concept. In the last decade, galloping technology, cyber-virtual convergence, and social media really globalized the fashion—lifestyle industry and beauty, wellness, fashion, lifestyle, social media all became seamless. There are questions ahead of fashion education: Has it missed the bus to redefine itself? Can Indian education gain leadership as sustainable fashion and holistic approaches offer new opportunities? Has the fashion education missed the entrepreneurial inclination of students? Why commercialization of ideas for four-year courses is not evaluated. Why innovations are not encouraged through encounters with other disciplines, science, medicine, and all others? Time has come to be truly global with strong brands and design leadership. Fashion education need to create leaders not followers. (D. Koshi, personal communication, February 3, 2017)

With the capacity for design, production, technology, and branding in India, a larger number of fashion graduates have taken the step, creating their own ventures which can be branded not just in India but internationally. For example, Anita Dongre's *Grassroot*, a contemporary sustainable fashion brand produced by artisans in India has recently opened its store in New York.

Future of Fashion

The landscape of fashion is changing at a faster pace than education. In a recent issue of *Forbes*, Uniqlo founder Tadashi Yanai says, "Information needs to be translated into products in a very, very quick fashion" (Sorvino, 2017). On the other hand, "slow and steady" is the future of fashion for companies like Upasana that believe in slow fashion (Upasana, 2017).

Revisiting the existing education practices to respond to such changes in the fashion industry has thus become imperative. The need to offer opportunities for higher education in fashion also needs to be explored. Specialized higher education in niche areas of fashion and design is a lacuna as "[m]ost of the postgraduate programs are after degree programs. This means that at the postgraduate level instruction offered is similar in content to undergraduate programs. The postgraduate programs do not build on knowledge acquired during undergraduate studies. Rather, it starts with fundamentals of design" (British Council India & India Design Council, 2016).

Founder Director of NIFT Rathi Vinay Jha adds: "To further enhance the quality and relevance of fashion education in the future, the Government must consider a system of accreditation and affiliation. This will entail introduction of procedures to govern standards for all fashion education program" (R. V. Jha, personal communication, January 10, 2017). Such practices are present in other professional programs including medicine, engineering, architecture, whereas some norms would streamline fashion education at a national level.

The other factor that is making the review of

fashion education critical is the evolving generation of students, as Rothman (2014) points out:

> *Generation Z*, *Gen Z*, *Digital Natives*, or *Generation 2020* (the year that they will graduate from college) … is the first generation born into an Internet-connected world. Because their use of technology has developed the visual ability portion of their brains, visual forms of learning are more effective for these learners. Furthermore, the use of fast-paced multimedia has affected the ability of these learners to focus and analyze complex information.

For fashion education to keep pace with the existing and emerging demands of society, this chapter recommends five broad points for fashion educators to consider: (a) course curriculum; (b) integrating technology with fashion education; (c) sustainability; (d) online education; and (e) faculty—retention and training.

COURSE CURRICULUM

In order to meet the demands of fashion as a dynamic discipline, the curriculum and faculty needs updating constantly. In a typical academic structure, it is difficult to introduce new elements into a curriculum at a pace which could address emerging needs, as the fixed structures of curricula do not leave scope for flexibility. As an example, digital technology changes rapidly, by the time educational institutes upgrade to new technology and software, newer and upgraded versions are already available in the market. Narender Kumar, the Creative Director of the leading online company Amazon India, says: "we are going to be selling more and more through the mobile phone interface and students are still imagining data on a computer screen" (N. Kumar, personal communication, February 12, 2017). Such quick responses to industry needs could be managed through a more flexible and dynamic curriculum, which would allow a diverse set of skills to be introduced according to the exigencies of the industry. Inclusion of courses that incorporate changes for industry in a timely manner would help students come up to speed with the current times and be more equipped to handle the challenges in the workplace. As industry is surging ahead at a fast pace, mechanisms would have to be developed to allow flexibility to be built into the curriculum to enable educators to respond efficiently to the demands of the industry. An agile course curriculum would ensure that such demands on the industry are met in a timely manner.

Also, the focus of fashion education has been moving towards collaborative learning. Collaboration between students and faculties of diverse disciplines, between different academic organizations, with stakeholders in industry, and with alumni is necessary. There is a growth across segments in interdisciplinary projects provided by stakeholders in real life situations, which can be worked upon by a teacher-student team through networking with other institutes or disciplines. This will lead towards holistic development of both trainers and trainees and will also result in problem solving for the stakeholders. Collaborative education has become important and interdisciplinary programs are gaining relevance.

With increasing domestic demand and consumer buying power in India, the apparel sector has shifted its focus from export to domestic markets. This change needs to be reflected in fashion education; the trends and pulse of domestic consumers need to be emphasized while keeping technology and sustainability as a focus. Fashion education at NIFT started with a curriculum, which focused on training professionals to service the apparel export industry from India.

The lack of intrinsic Indian knowledge was soon observed in the curriculum and slowly subjects related to Indian dress, traditional textiles, art appreciation, and surface embellishment were introduced. This led to the inclusion of rich culture and heritage of Indian textiles in collections of young designers, and more and more designers graduating from fashion schools relied on Indian craftsmanship. Studies on Indian sizing and a psychographic profiling of the Indian consumer have emerged as additional areas of focus.

Wendell Rodricks (2016), a leading Indian designer, reflects upon this issue: "Our vast country with a 6,000-year-old clothing legacy is a cultural textile emporium no other country can match. I realized [in 1995] that we had to put India out there in terms of clothing, culture artisanship: 'our' version."

Likewise, Shefali Vasudev, a fashion editor and author, adds that

> [t]he Indian government, at least currently with its emphasis on Make in India emphasis as well as the Ministry of Textiles' ongoing thrust on certain key issues related to handloom, textiles, improvement in supply chain issues, farming and yarn creation, exports, as well as quality control labeling like Craft Mark, Handloom Mark, Khadi Mark—is sitting on a mine of information, data and field specific issues. A huge portion

> of in depth education of 'fashion' in our country is intrinsically linked to these concerns and study areas because of India's handloom and crafts legacy. Short courses, creation of data banks, export-import strategies, digital training of next generation weavers can be created out of a strategic, sustained dialogue, and teamwork between Ministry of Textiles, Niti Aayog, and fashion and design institutes.
>
> It will diversify the current nature of education and pull it out of its niche, elitist approach. It will make it more relevant and grounded. I see it as an existent loophole, something that is waiting to be turned into the opportunity that it is. In fashion and design institutes of the future, faculty conversant with handloom and weaver issues will be as much in demand as will be those who understand digital medium, technological finesse, and the importance of archiving. (S. Vasudev, personal communication, June 5, 2017)

Vasudev rightly draws attention to the handloom and craft legacy of India and today having a continuous heritage of 5,000 years in handlooms and handicraft, it is no surprise that designers working in India or sourcing from India create products, which rely heavily on this heritage. This growing need for design's closer interaction with craft and/or craftspeople was initiated as craft sensitization by leading design institutes, and today institutes like NIFT have integrated it into the curriculum. A natural evolution for fashion education in India has thus been an increased concentration of craft education in the mainstream curriculum.

INTEGRATING TECHNOLOGY WITH FASHION EDUCATION

Technology has always been an enabler for fashion education, but today it has become an essential component for functionality and design. Integrating fashion technology into fashion education will become key to staying abreast of change. Institutes need to work closely with innovators to understand the technology that will impact and drive product practicality and the deliverance of education. Noopur Anand, a NIFT professor, expresses the importance of technology in fashion education succinctly:

> Fashion education in India will see a radical change in content and pedagogy with technology being the driver. The content taught will become technology-focused, as fabrics, garments, and commerce get disrupted by innovative digital technologies with a greater focus on sustainability and ethics, i.e. focus on responsible fashion. Classrooms would become more global and collaborative with virtual classrooms. I see future of fashion education as more accountable, digital, and collaborative. (N. Anand, personal communication, April 10, 2016)

As technology plays an integral role in all stages of apparel manufacturing and distribution, educators would need to enhance their understanding and embrace it in teaching methodologies.

SUSTAINABILITY

Fashion, as we are aware, is one of the most polluting industries in the world. Sustainable design and sustainable education need to be integrated in the curriculum, as concerns about the environment continue to grow. The UN's paradigm of sustainable development—economic, social/cultural, and environmental, considered as the three pillars of sustainability—need to find space in fashion education in an interdependent manner. This has been captured very well by Archana Gandhi from NIFT who says that

> [s]ustainability is the buzzword, a trend, and a cultural movement zeitgeist. Fashion education must enable the rising generation to deal with increasingly complex and portentous global issues. It should prepare students to understand sustainability and interdependence of life. Fashion students have to be "ecological literate"—they have to understand and appreciate interrelations among people, their habitat, and the environment beyond their immediate surroundings. (A. Gandhi, personal communication, January 11, 2017)

Fashion programs should bring together concepts of sustainable fashion and textiles with environmental studies. The fashion industries are now pledging to work on reducing waste and educating young minds to place sustainability at the forefront of their work practice. Integrating subjects like sustainability in the curriculum has become essential. Such inclusions can help to educate the industry and students to create change in a holistic manner.

ONLINE EDUCATION

The need for learning at one's own pace and in one's own space while managing other commitments has resulted in the rise of online education across sectors. Though there are some drawbacks, especially for practical skills that require specific infrastructure in fashion education, such as patternmaking, draping, printing, and knitting, this mode of education is rapidly being accepted and sought after. It provides opportunities for an internationally/nationally recognized qualification without needing to attend classes on campus. It is aimed at those who wish to study alongside work or other commitments. This type of education requires a robust online education system, including a software application designed to take educational content and move it to the web. These will enable learners to access content from anywhere with access to the Internet.

To be successful, online education needs educational content to be authored in a way that makes it dynamic, interactive, and interesting. This could address issues such as faculty shortage and training, evolving content, interdisciplinary needs, and current updates with the changes in the Industry.

Shefali Vasudev (2017), fashion editor and author, articulates this lucidly:

> Instead of the traditional dependence on fashion colleges and formal education in fashion which depends on pre-determined syllabi, I feel fashion education will soon be ready for untried, newer, faster, digitally savvy and technologically updated methods. Digital fashion education through online packages that also coordinate and organize laboratory work or exposure and experience for students in manufacturing, production and supply units, the entire gamut of backend operations as well as familiarization with weaving clusters, the creative and cultural industries of India, will come up. These will be entrepreneurial opportunities by those who want to make a business out of fashion education but will also suit the fast changing needs of students. I see a surge in the 'business of fashion education' in this arena than just ideological and purist institutions using old styles of formal education.
>
> Traditional college set-ups cannot completely go away in fashion, just as they can't for engineering, medical, scientific courses because of the need for practical and hands-on training so I gather there will be a combination approach that institutes would want to adopt.

In the past few years, many portals have started offering Massive Open Online Courses (MOOC, https://www.mooc-list.com) in the subjects of general design. However, the courses related to fashion are relatively unexplored. It is almost certain that with innovations in teaching methods and technology, fashion will come under the ambit of online education in the future.

FACULTY—RETENTION AND TRAINING

Attracting and retaining quality faculty is a global challenge in professional education; fashion education is no exception. Future teachers will have to be trained not only in the areas of fashion and textile techniques but also in advanced ICT technology, so that they can move from traditional to transformational teaching-learning methods. Appropriate measures for training and updating faculty are of utmost importance to ensure that teaching remains current. Engagement of faculty with the industry also keeps them in tune with the latest developments and provides the financial incentive. Founder Director of NIFT, Jha says:

> Faculty development is a vital foundation to the success of any discipline. In India, we lack in adequate numbers of trained faculty. It is imperative for us to start fashion education courses to train teachers in fashion studies and this will need international collaboration and could be initially taken up with government support in institutions like NIFT & NID. (R. V. Jha, personal communication, January 10, 2017)

A number of challenges remain for faculty retention and training. Teaching is not perceived as a career of choice by younger designers who are more keen to work as practicing professionals. It is recognized however that a continued interaction with students is desirable to them. This interest can be capitalized upon to bring the expertise of industry personnel to the current teaching practices. The growth opportunities for faculty in terms of learning, career growth, flexible structures, and continued industry interaction are also points to be considered for faculty retention.

Conclusion

There are two strong forces that have emerged in fashion—fast fashion and, more recently, a revival of

slow fashion. A versatile curriculum taught by adept faculty, taking into consideration industry and consumer needs, is vital for education in this sector.

Integration of technology in the classroom and through exposure to industry would enhance student learning. There has been an increasing global interest in meaningful consumption as well as the inclusion and understanding of the "handmade" that has become essential for fashion education in India. Knowledge of craft and craftspeople is important for sustaining the rich legacy of the handmade in India.

Fashion education cannot be considered in the silos in which it has existed in the past. As the world has grown smaller, fashion designers need to understand the social, psychological, economic, and political issues around the world. While technology and speed are important, issues related to sustainability and social development have an equal value. The focus of curriculum thus must include environmental, ethical, cultural, and sustainability issues to ensure that fashion education continues to be relevant today.

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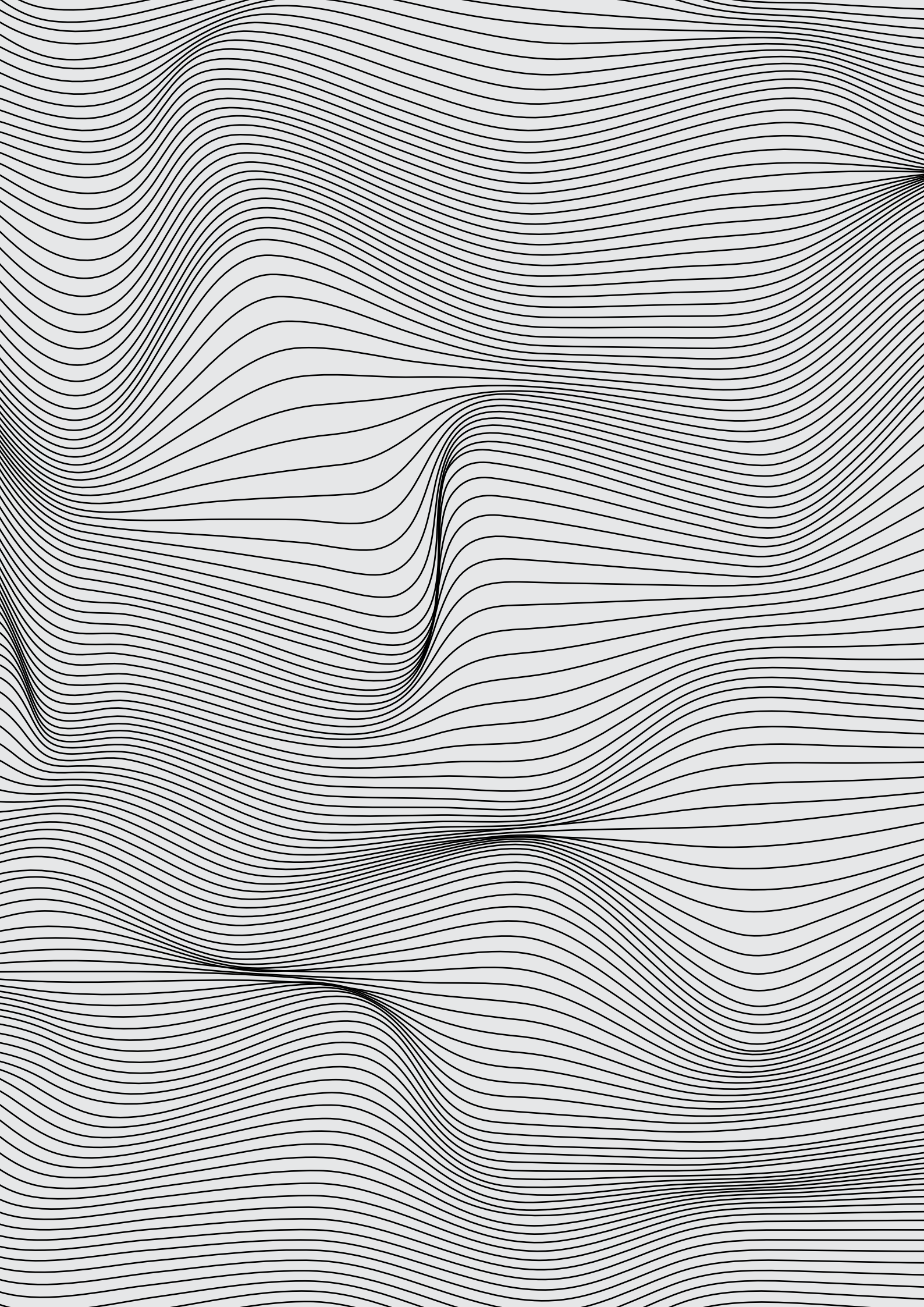

4 Textile Traditions and Fashion Education in Mexico

Thomai Thessalia Papathanasiou and Alessandra Perlatti

Introduction

> Mesoamerican textile weaving reflects a continuous history of interpretation based on ancient, historic, and modern ideologies and techniques. The textiles that are found in museums and private collections and among the indigenous people of Mesoamerica, where the ancient art of weaving continues today, are significant resources of information. (Klein, 1997, p. 1)

The richness of textile traditions in Mexico is globally recognized. Mesoamerican cultures are still alive nowadays in different parts of the country, and cultural heritage still survives among the indigenous peoples who inhabit modern Mexico. The strongest features of these cultures are, for example, their weaving, dyeing, embroidering, and looming techniques.

Textile traditions, combined with craftsmanship, music, and dance are the foundation of popular culture in Mexico. Although popular culture has always been seen as trivial and of a lower level when compared to high culture, it provides the best way to detect and recognize a collective state of mind and the lifestyle of a particular society. It is through popular culture that we can more easily identify the colors, smells, sounds, and normative behavior of a community.

Modern Mexican fashion designers therefore face a great challenge to find an in-between place where they can celebrate their cultural roots and at the same time create cutting edge designs. How can they honor indigenous craftsmanship without producing a folkloric garment? How can they use traditional textiles and shapes without creating traditional costume? How can we be true to our traditions and ourselves, and be modern and relevant at the same time?

As fashion and textile design educators, we firmly believe that the only way to have a strong sense of cultural identity is to understand and honor our traditions, and the preservation of traditional techniques is fundamental in establishing the foundation of contemporary Mexican style, as Klein (1997) points out:

> The creative application of new ideas and techniques in textile weaving is based on the maintenance of cultural foundations of tradition. For instance, although a weaver today may want to incorporate a new brocaded motif or perhaps even copy an old one into a weaving, if the weaver does not know how to make the structure for the backstrap loom, it will not be possible to

> materially produce this type of textile—let alone an innovative motif... If an ancient technology such as backstrap weaving is not maintained or is replaced by something else, such as factory-made reproductions of indigenous fabrics, then not only does the material culture or object itself disappear but the entire foundation for a cultural tradition disappears along with it. (p. 3)

With a growing number of design schools, international partnerships, and government incentives, the quest for high standards in both manufacture and concept is ever intensifying. As Guillermo Garcia (as cited in Abnett, 2014), the director of ProMexico, a Mexican government institution in charge of strengthening Mexico's participation in the international economy, states:

> The main challenge we are working with now is that there are misconceptions about what Mexico is doing in terms of design. We want to bring foreign buyers to Mexico to get them to know not only the final product, but the quality, the shops, the training, universities and design centers.

These ideas are a few of many reasons why textile and fashion design education at the University of Monterrey is looking for ways to bring traditions to our students' life in the contemporary world. Our university is located in Monterrey, a large industrial city in northern Mexico that is closer to Texas than any other parts of the country, and is rich in traditional and indigenous cultures. With the support of the Textile Museum of Oaxaca [Museo Textil de Oaxaca], we organized a workshop about weaving on a frame loom, which is an ancient practice from the Zapotec culture and the number-one source of income for the village called Teotitlán del Valle in the state of Oaxaca, from which our professor and the instructor of this workshop, Mr. Prócoro Ruiz Gutiérrez, originates. It was the first time that this type of weaving workshop was organized at the university. The aim was for students and professors in the Fashion and Textile Design Department to learn more about, and be inspired by, the rich tradition of textiles in the south of the country and to implement some traditional techniques in their design practice. In the past, field trips have been organized to the state of Oaxaca where students had the opportunity to see how the Zapotecs create their textiles and learn traditional embroidery techniques.

Zapotec Textiles

Teotitlán del Valle is a village located about 31 km from Oaxaca City, the capital of the Oaxaca state in Mexico. It was founded in 1465, and it is said to be the first village to be established by the Zapotecs (Vive Oaxaca, 2011).

Weaving is the primary income-earning activity for about 68% of the active population of Teotitlán del Valle (Stephen, 2005). The artisans use mainly three tools: (a) waist looms that have been used since the pre-Hispanic era (950–1521 A.D.); (b) mechanic pedal looms that were adopted during the colonial era (1526-1821 A.D.); and (c) frame looms that are used by many different indigenous groups for textile production. The loom typically used by the Zapotecs is similar to those used throughout Mexico such as treadle looms, upright looms, Spanish floor looms, and Mexican tapestry looms. For the aforementioned workshop, the frame loom was used.

The weavers of Teotitlán del Valle and their textiles have a special connection to the pre-Hispanic past and associations with pre-Hispanic culture. They work in pure wool, in natural colors from different plants, animals, and minerals that have been used since pre-Hispanic times. The most typical sources are: (a) the cochineal, a parasite found on the nopal cactus, for red hues; (b) the indigo plant to obtain blue hues; (c) the pericon plant to achieve yellow hues; and (d) the violet sea snail from which purple pigment is obtained.

Zapotec textiles (Figure 4.1) are colorful and come in a variety of sizes; however, the most common width is one meter. The size of a Zapotec textile is determined by the size of the loom used and by the intended purpose of the textile, such as a tapestry, a carpet, or a decorative element. Some textiles have geometric shaped designs while others have central diamond-shaped motifs or feature pre-Hispanic-looking figures. The designs and motifs serve to differentiate ethnic groups and individual classes within the communities. There are different types of motifs such as geometric, anthropomorphic, zoomorphic, cosmological, and plants. These motifs are embedded with symbolism, as Tiffany (2004) points out, a "Zapotec textile has many stories embedded in the threads of its warp and woof" (p. 312). For example, the zigzag lines are associated with thunderstorms and, therefore, rain; the meanders symbolize the life cycle of an ordinary person.

Figure 4.1. Zapotec textiles produced in Teotitlán del Valle. Photograph: Thomai Papathanasiou.

Zapotecs see the design, or at least geometric patterns, in terms of rectangular and triangular blocks of colors that are, in turn, built up out of narrow stripes of color. They do not lay designs in either centimeters or inches, but rather by blocks of color.

The actual work of weaving on the loom is only a small part of the production of a Zapotec textile. Many processes must be undertaken before one can begin to weave. The artisans need to calculate the necessary amount of threads for the warp depending on the width of the textile and the designs. Then attaching the warp to the loom is a time-consuming job (Wood, 2008). The Zapotecs prepare the loom by contemplating color blocks for the designs that they are going to weave and know by memory.

By the end of the 1940s, the completion of the Pan-American Highway, which is only five kilometers away from Teotitlán del Valle, resulted in an increase of tourism and a high demand for handcrafts (Wood, 2000; Tiffany, 2004). That is when the textile tradition of the Zapotecs crossed the borders and started being appreciated by foreigners.

The prices of the textiles vary depending on the colors (if it is red dyed from cochineal, it is more expensive) and the level of complexity of the design which increases weaving time. “In reality crafts in Mexico aren’t expensive. There’s a lot of work involved, really, for the artisan in order to sell his products.” (Wood, 2008, p. 59)

The Mexican government and private initiatives established associations to support the artisans in Oaxaca. Competitions were launched to stimulate their creativity, as part of the evaluation criteria is the presentation of new elements in their work. Artisans have used as sources of inspiration specialist publications from museums, texts about archaeology, and the codex of pre-Hispanic groups.

Day-to-day Activities of the Workshop

The workshop took place at the Textile Laboratory of Centro Roberto Garza Sada, the building that houses the Art, Architecture, and the Design Division of the University of Monterrey, located in San Pedro Garza García, Nuevo León. Four 3-hour workshops were delivered between Wednesday March 8 and Saturday March 11, 2017. The sessions were dedicated to learning the basic weaving techniques used by the Zapotec artisans in order to create their textiles.

Fourteen undergraduate students (six first year, three second year, one third year, and four fourth year) and four professors of the Textile and Fashion Design Department participated. The instructor was Prócoro Ruiz Gutiérrez, an artisan who lives and works in Teotitlán del Valle in his family workshop. He collaborates with the Textile Museum in Oaxaca giving classes at the museum, and is a member of the cooperative that exists in the town.

During the first session, the instructor provided each participant with a frame loom, cotton yarn in a natural color, and a comb. They were taught how to use the cotton yarn to warp the loom. After all the members of the group had finalized this first step, the artisan showed everyone how to weave the initial lines of the textile with the same cotton yarn in order to ensure the tension and width of the textile. He proceeded to present wool yarn in different colors for the participants to select, and explained how wool is currently purchased in Mexico City and then dyed in Teotitlán del Valle with its traditional natural methods. He then demonstrated how basic weaving is constructed by passing the yarn under one warp yarn and then over the next one.

At the beginning of the second session, the workshop instructor explained how important it was to weave thread by thread, using the fingers to keep the weave tight. This ensured that the cotton yarn warp was not visible in the textile, and that only the colored wool yarns were seen to produce the designs and motifs. He also explained that there should not be too much tension applied to the wool yarn to maintain the width of the textile and not to break the delicate yarn. Nevertheless, in the case of a broken yarn there was an easy way to continue weaving without leaving a visible trace in the design. As the yarn was hand spun, it could easily be mixed with other yarns. After all of the members of the group had woven a few lines in one color, the instructor asked them to pick a second color and explained how to construct the first and easiest pattern to produce a stripe effect (Figure 4.2). Since the participants advanced at different paces, the instructor checked the progress and gave guidance accordingly (Figure 4.3). Subsequently, the instructor asked the participants to choose a third color to create the next design. In this case, the warp was divided into three even parts and each section was woven using a different color. This helped to create a line consisting of three different blocks of colors (Figures 4.4 & 4.5).

Figure 4.2. Process of weaving. Photograph: Alessandra Perlatti.

Figure 4.3. The instructor shows a student how to improve her weave. Photograph: Alessandra Perlatti.

Figure 4.4. Students weaving on their frame looms. Photograph: Alessandra Perlatti.

Figure 4.5. Patterns created by the different techniques taught during the workshop. Photograph: Alessandra Perlatti.

In the third session, the instructor indicated that the participants were to choose two colors, and he demonstrated how to weave a diagonal motif. He reviewed the progress of each participant and made suggestions if any adjustments were required. Those that had been behind had the opportunity to catch up with the rest of the group.

Although this weaving technique was very similar to the previous sessions, what made these textiles unique were the motifs and designs created. The instructor explained how to weave the diagonal motif, so that the students could use it as a basis for creating more complex designs.

In the fourth and final session, the instructor gave feedback on the work accomplished and provided guidance on how to improve the technique. Before the session was over, he presented new wool yarn in different hues. The yarn was offered so that the participants could create their own designs based on the techniques that they had been taught.

Reflection on the Workshop and Design Task Assigned after the Workshop

Since none of the participants were familiar with traditional Zapotec weaving and the workshop was only four days, we were uncertain of the capability of everyone to learn the techniques and weave a small good-quality textile in such a short time. However, the results were satisfying as everybody was able to produce their own woven textile. After the workshop, the 14 participating students were tasked with creating an original woven design (15 cm x 15 cm) on the frame loom based on the theme "Mexicans learning from Mexicans." The students were free to select yarns from the eight colors provided: black, white, yellow, brown, beige, and three different shades of gray. In only three weeks, the students were able to create original designs based on the basic technical knowledge they acquired during the workshop (Figure 4.6).

After the final delivery, we interviewed all the students who participated in the workshop and completed their woven designs. All of them commented that they were motivated to participate in the workshop because they wanted to learn a new technique. While the fourth-year students had already taken a weaving and knitting class during which they had learned the commonly used weaving techniques such as twill, satin, and jacquard, it was their first weaving experience for the other students. They all believed that it was a positive experience and that they had acquired a new useful skill as designers. One of the participants who is a first-year student, Alejandra Vega López, mentioned: "I really like to know that with my bare hands and natural materials I can create from scratch different designs and transform something artisanal and traditional into contemporary and modern design" (A. Vega López, personal communication, April 4, 2017).

One of the most positive outcomes was the appreciation for artisanal work and the value that the students were starting to place on the traditional textiles that are often perceived as cheap or trivial here in Mexico. One of the main reasons for us introducing this kind of workshop into the university was to open our eyes to the reality of Mexico, in which so many talented artisans are working and surviving from their trade, and we should be part of the movement that changes the perception on the value of their work. Amanda Guardado Lomelí, a fourth-year student, commented: "It was heartbreaking to see the amount the hard work they put into their products and realize how cheap they sell those products, we should put more value on their work" (A. Guardado Lomelí, personal communication, April 19, 2017). She also believed that Mexico has a lot to give and that the textile tradition is rich and beautiful and should be taken care of. Another first-year student, Camila Gallegos Aviña, mentioned that she realized how much effort the artisans put into their work and how hard it actually is to apply these techniques (C. Gallegos Aviña, personal communication, April 5, 2017). Melissa Molina Barrientos, also a first-year student, believed that it [artisanal work] helped her see and appreciate different cultures and textile arts which are not often valued and that really require a lot of work, effort, and dedication (M. Molina Barrientos, personal communication, April 4, 2017).

The correlation between Mexican culture and traditional textile techniques was one of the most recognised aspects of the experience. Alejandra Vega López commented that "traditional textiles are an important part of the Mexican culture, and since Mexico has such beautiful artisanal textiles, I feel that it is important that we learn these techniques so we don't lose them" (A. Vega López, personal communication, April 4, 2017).

A subject of discussion was the collaboration between artisans and designers, and what the students think about working together with artisans, what kind of roles they would have in their projects, and their opinions on the future of Mexican fashion industry. The way the students expressed themselves revealed their views concerning the importance of keeping in touch with their Mexican roots and valuing

Figure 4.6. Some examples of the projects that the students Amanda Guardado, Mónica Narváez, Melissa Molina, and Beatriz Cárdenas developed after the workshop using the frame loom techniques. Photograph: Alessandra Perlatti.

the resources of the country. More specifically, Diana Lucia Guadiana Cantú, a first-year student, commented: "As a designer I want to transmit through my designs the Mexican pride and make people feel proud of their roots and their culture. Mexican handwork is amazing (and we are very hard workers)" (D. L. Guadiana Cantú, personal communication, April 4, 2017). She continued to say that she believed that more designers are incorporating textile traditions into their creations, working with artisans. Astrid Almaguer Salazar, a second-year student, believed that there is a bright future for Mexican fashion and that she hoped that the public would recognize the excellent work the designers do (A. Almaguer Salazar, personal communication, April 7, 2017). Another second-year student, Janna Garcia Jimenez, highlighted that due to the political climate surrounding Mexico currently, it is the moment to value what there is in the country and the great work of the artisans (J. Garcia Jimenez, personal communication, April 7, 2017). Beatriz Cárdenas Garza, a fourth year student, said: "the Mexican fashion industry is growing a lot, there's a lot of people behind this industry and I think that textile traditions are important to understand the past and create the future" (B. Cárdenas Garza, personal communication, April 26, 2017).

We ended the conversation by discussing their views on how the traditional techniques would affect their work as designers and what their approach would be on the subject with regard to the industry they have already worked within. Alejandra Vega López believes that it is important for the future of Mexican fashion to conserve the traditional textile techniques that characterize the culture, but it is important to give them a creative turn to look modern and innovative in the industry (A. Vega López, personal communication, April 4, 2017). Paulina Pérez, a fourth-year student, said: "I feel that every time it's taking more importance to the emerging designers the use of traditional techniques, it adds more value to the items" (P. Pérez, personal communication, April 7, 2017). María Eliza Castro Diaz, a first-year student, mentioned that it is important to keep the textile traditions and learn because they are cultural heritage and she feels that since not all fashion students have this knowledge she has an advantage (M. E. Castro Diaz, personal communication, April 6, 2017).

Conclusion

Taking into account the students' reflections obtained in the interviews and the design projects, it appears that young Mexican fashion designers appreciate and are completely open to learning from artisans. They are interested in combining traditional methods with a contemporary vision to create a fresh outlook for the Mexican fashion industry. Nationally and internationally known contemporary Mexican fashion designers such as Francisco Cancino with his brand *Yakampot* and Carla Fernández are using the textile traditions from different regions of the country in their highly praised collections.

Figure 4.7. Using the frame loom and the weaving techniques to create textiles from recycled pieces of fabric. Photograph: Amanda Guardado Lomelí.

Two of the students are currently developing textiles from recycled pieces of fabric using the frame loom and are applying the weaving technique they learned during the workshop for their graduate collection (Figure 4.7). We are hoping to see more students applying their knowledge in order to create collections that combine traditional with contemporary design.

As fashion and textile design educators, the experience was equally significant to us, because we had an opportunity to learn those techniques and to have a close interaction with the artisan. Starting in the 2017–2018 academic year, the frame loom technique is incorporated in the weaving and knitting

class, which is compulsory for all the Fashion and Textile Design students. The students will have an opportunity to learn how to weave in this form, and we are hoping that this will help to increase their interest in traditional Mexican textiles. One of our proudest moments was a phone call we received from the workshop instructor when we shared the pictures of our students' projects with him. He was really emotional about it, because he was unsure of how much the students learned from him. He told us that seeing these projects opened his eyes to how much he and his community could still learn about the techniques that they learned from their fathers, grandfathers, and great-grandfathers.

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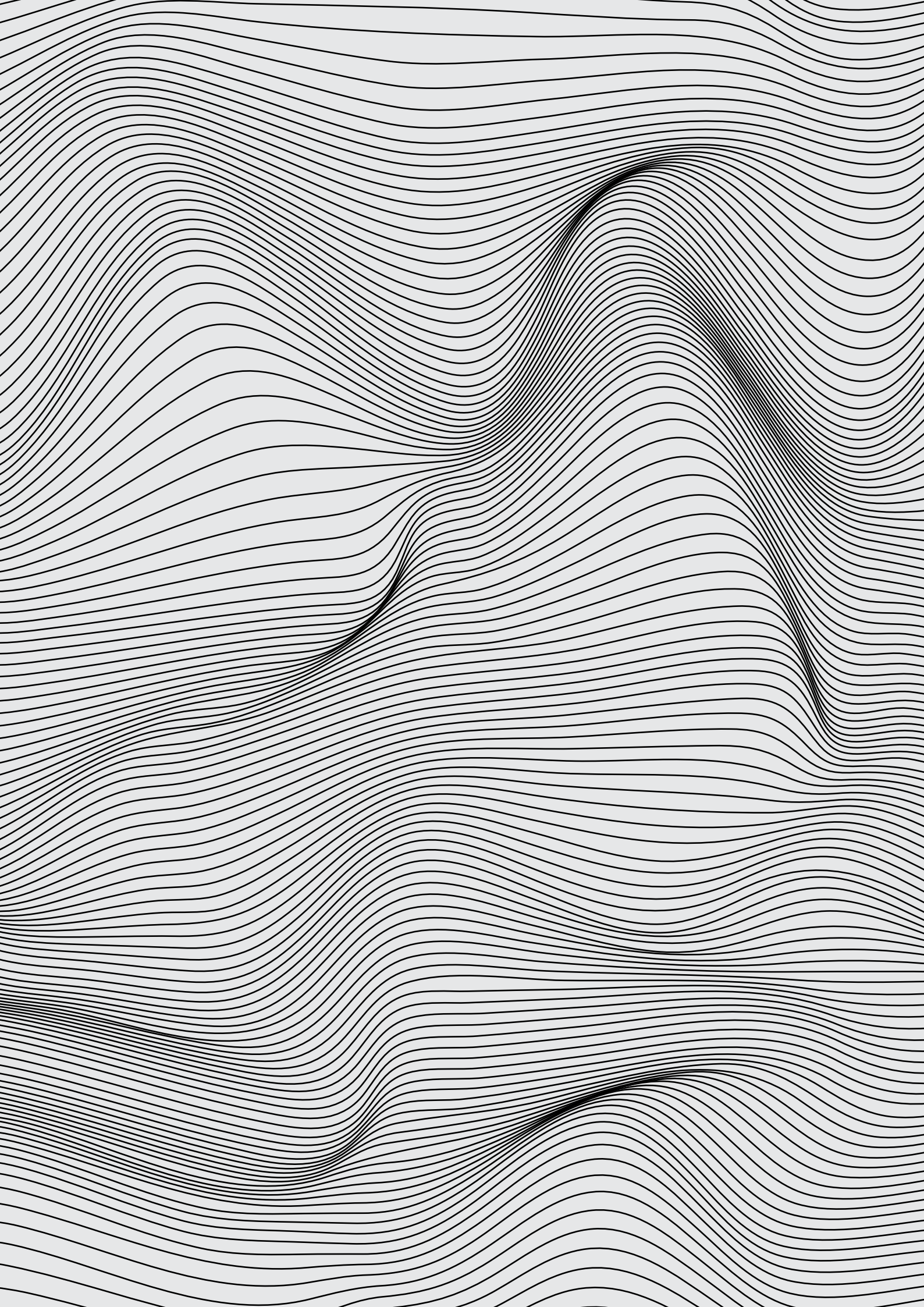

5 New Materiality: "Making Do" and Making Connections

Alice Payne, Icaro Ibanez, and Lydia Pearson

Introduction

The backdrop of fashion education globally is that of industry turbulence: radical digital innovation, hyper-competition enabled by fast global supply chains, and a world simultaneously more fragmented and more connected. In this chapter, we examine the idea of the local within the global, and explore how our experience of local—subtropical Brisbane, Australia—shapes the fashion culture and approach to materiality of our undergraduate design students and of ourselves as educators.

In our Fashion Design course at Queensland University of Technology (QUT), our teaching approach is to foster curiosity and material exploration within the students as they tackle the quixotic task of making garments in a country in which manufacturing skills are in scarce supply, and where there is no shortage of clothing, but a dearth of high quality materials. For us, the future of fashion and textile design lies in entrepreneurial and artisanal approaches to making, and we have found that living in Brisbane promotes the make-do capacity in our students—they innovate through necessity.

We begin by discussing the desire for local fashion cultures through the notion of "fashion cities"—whether first-tier, second-tier, or otherwise—before discussing the Australian and then Brisbane fashion culture. Through a series of undergraduate student projects, we illustrate how our geographical location can at once limit and expand the students' capabilities in fashion and textile design. Last, we close by discussing our expanding connections with other countries in the region.

Situating "Local"

Some twenty years ago, Featherstone (1993) noted how the more globalized the world becomes, the more sensitive we become to local difference. Designer fashion industries are flourishing away from the traditional fashion centers (Skov, 2011). It now appears very old-fashioned to speak of the "center" and the "periphery," as the promise of globalization is that of flattening, connecting, and equalizing opportunities. Yet in fashion, globalization has created more fashion centers, the so-called "second-tier

fashion cities" (Rantisi, 2011) and arguably yet more peripheries.

Examples of second-tier fashion cities include Auckland (New Zealand), Melbourne (Australia), and Copenhagen (Denmark), and scholarly studies of these proliferate (see e.g., Larner, Molloy, & Goodrum, 2007; Weller, 2013; Melchior, 2011), demonstrating an intense desire for local flavor in the face of fast fashion's global domination. Rantisi (2011, p. 264) identifies the factors needed for second-tier fashion cities include a sense of local culture and character, creating "place-based relations and aesthetics," fashion marketing and production networks, and consumption networks such as local boutiques and retail precincts.

Australian fashion's aesthetic of place has been widely debated. Australia is simultaneously a young nation and a land in which the traditional custodians are of the world's oldest living culture. This paradox is held uneasily within the country's culture and politics. In fashion aesthetics, Craik (2009) identifies elements of bushwear, surfwear, and swimwear, as well as indigenous design unique to Australia (see Figure 5.1). Designers have drawn inspiration from the colors of the landscape itself, and Australia's casual lifestyle has contributed other aspects such as the color, ironical humor—a "larrikinism"—and Australiana motifs (Gray, 2009; Healy, 2010) (see Figure 5.2).

Alongside aesthetics and fashion cultures, another crucial element to local fashion is a local production system. In terms of production networks, the mixed blessings of globalization have brought cheap clothing to Australia, but at the expense of local industry (Webber & Weller, 2001). Over the past 25 years, Australia's manufacturing capacity has been drastically reduced. With the vast manufacturing hubs of Asia close by, former Australian manufacturers have transformed into brand managers (Weller, 2010). Even in the high end, designer market levels, local production is increasingly a challenge, with reduced capacity to manufacture locally. The majority of the remaining local manufacturing is based in the south east of the continent, in Melbourne and Sydney.

For graduate employment, liaising with offshore factories appears to be the main way forward for designers. Technical skills and knowledge that once existed in Australia are disappearing. Accessing local makers and local materials is a challenge. Fabrics that may be more environmentally sustainable are chiefly manufactured offshore, and even if knitted locally, will be knitted using imported yarns.

If Auckland, New Zealand, is a "not-so-global" city, to use Larner et al.'s (2007) phrasing, then Brisbane, as Australia's third largest city, is even less so. In Brisbane, our fashion students live on the edge of the edge, dreaming of Europe, perhaps, or thinking of a fashion future outside of Queensland—in Sydney or Melbourne. Queensland is where you come from, it is not where you go, some would say. Yet there are opportunities when you are on the periphery. You can do anything on the edge, where people are not looking. You can fail safely, and so be brave and bold. One of the co-authors of this chapter, Lydia Pearson, demonstrated success on the edge, working in Brisbane for twenty-seven years as one half of internationally successful designer label Easton Pearson. In recent years, Brisbane has reinvented itself as a cultural destination, with the impressive and nationally recognized Queensland Art Gallery/Gallery of Modern Art, the largest modern art gallery in the country, and with an internationally attended triennial focusing on contemporary work from the Asia Pacific.

Today, Queensland is Insta-perfect, and tourists and locals cycle along the river, loll on the beaches of the Gold Coast, and climb through the hinterland. On summer afternoons, the storms roll in, the sky darkens and the rain falls hard, hammering the tin roofs. The rains stop as suddenly as they begin. In winter in Queensland, it is a balmy 19 degrees centigrade, and Queenslanders bundle up in coats and high boots, wincing at the slightest cool breeze. The stores are full of fast fashion, and everyone wears cut-off denim shorts. Only some 20 kilometers from the city center you will find wetlands punctuated with the aerial roots of the mangroves, long beaches fringed with pandanus trees, and the largest sand islands in the world.

In Brisbane, immaterial fashion is ever present, in images projected straight to our students' phones. Yet materially, fashion is more remote than ever, as textiles must be ordered from overseas with no textile markets, and only haberdashery stores, the local selection is either expensive or inadequate. At the same time, masses of post-consumer textile waste clog recycling bins, charity stores, and landfills.

Designing fashion in 21st Brisbane is therefore an activity characterized by paradox. Just as there are more clothes than ever before in the shopping malls, consumers are less engaged with the materiality of the garments they wear, and activities such as mending or making have lost relevance. But at the same time, Queensland designers can project a life of sun and leisure to the world more easily than ever. It is no accident surf and activewear lifestyle brands Billabong and Lorna Jane began in Queensland. Today, in Brisbane with limited local marketing and production networks, our students will have to be independent, entrepreneurial, creative, and resourceful—and forge their own networks.

Figure 5.1. QUT graduate Arkie Barton, 2015, draws inspiration from her indigenous heritage using her original artwork as digital print on fabric and referencing dreamtime for her modern take on traditional culture in her final collection. Photograph: Charles Subritzky. © The State of Queensland 2017 (bottom).

Figure 5.2. QUT graduate Stephanie Hollis, 2016, explores Australiana kitsch in stump-work embroidery and mixed-media appliqué. Photograph: Michael Greves.

Fashion Design—Staging Textile Experimentation

Our approach to learning and teaching takes into account the multiplicity of experiences of fashion, and notions of sustainability are at the core. Units of study on sustainability and materiality expose students to the complexity of fashion systems of production and consumption, and provoke them to respond to systemic challenges through awareness raising initiatives and creative interventions. These activities occur in partnership with charities and sustainable fashion advocacy groups, raising the stakes of the tasks to prompt outward looking engagement.

Within the first-year Design Studio, projects such as *Thinking Fashion Systems* challenge students to consider themselves not necessarily as designers of garments, but as designers who can design new ways of wearing and making fashion that question the design processes we take for granted. Following the ontological design of Fry (2009) and Willis (2006), the unquestioned conventions of fashion design serve to "design" and delimit possible outcomes. Proposing new ways of making, disseminating, and wearing fashion are essential, given that conventional methods are both unsustainable and inaccessible. The resulting prototypes are as varied as social enterprise models, re-makeable and modular garments, or deconstructed suits performed in public display.

For the *Kombucha Project* (Figure 5.3), in collaboration with the State Library of Queensland 2014–2016, the first-year students grow bacterial cellulose: molding, painting, sculpting the material both wet and dry, and running workshops to share the method and approach to making with the public. The principles behind the project are aligned with hackerspaces and maker labs, enabling users to engage with a low-input, low-cost sustainable material alternative to conventional leather. Although bacterial cellulose may be framed as "vegan leather," a possible alternative to industrial leather production, the focus of the project is less on sustainable industrial applications and more on promoting democratic and local materials. This material engagement enriches the maker, and promotes an experimental, creative mindset that students may take with them throughout and beyond their studies.

In their second year, the students examine the opportunities of artisanal production, in which they are exposed to luxury, artisanal, and hand-crafted approaches to making, from screen-printing to shibori, embroidery, and hand weaving. Alongside this textile development, the students explore traditional and new methods of tailoring and patternmaking. Lecturer Carla Van Lunn's personal philosophy of sensitively revalorizing waste has inspired this approach to "making do" and generating materials and opportunities from what is at hand, as bricoleurs (Levi-Strauss 1966 [1962]; Binotto & van Lunn, 2014). This philosophy of frugal design comes through in the students' inventive textiles in the final year.

In their final year, the students develop their graduate collections to present to industry members and the general public. By now, they are outwardly focused, thinking about their professional future. With limited opportunities for true design positions in our local industry, many students consider the potential of being an individual artisan-maker. With their advanced social media skills and strong individual brand identities, their opportunities to connect with an appreciative and relevant global market are beyond the dreams of designers at a similar stage ten years ago.

The philosophy behind the creation of the fashion collection for the final project is for the students to conceptualize and develop an innovative range of textiles that will be transformed into clothing. The lack of conceptual constraints and diverse restraining factors, ranging from lack of funds to lack of current/high end textile access in Brisbane, have bred successive cohorts of inventive designers. Students respond to lack of available materials by creating textiles from scratch, upcycling non-fashion materials or customizing existing fabrics and transforming them into intellectually/conceptually and materially luxurious textiles.

The crux of success is quality of execution, as well as hand feel and wearability. Guided visits to available luxury stores such as Chanel, Louis Vuitton, Hermes, and high-end fabric stores expose the students to high fashion textile manipulations, finishes, and constructions which they do not experience in their everyday lives. It is vital to touch and analyze luxury garments in an effort to "reconnect" with the materiality of fashion versus the virtual or digital version of fashion consumed daily through the screens of their devices. Encouraging our resource-poor and inventive students to focus on refinement and attention to detail has produced diverse and inventive textile developments that have successfully been applied in their end-of-year collections. Knowledge and the courage to experiment have been built up over the course but also increasingly through the body of work from previous graduates. In the following sections, we examine in detail a number of approaches to materiality.

Figure 5.3. *Kombucha Projec*t, 2014–2016. Photograph: QUT Media.

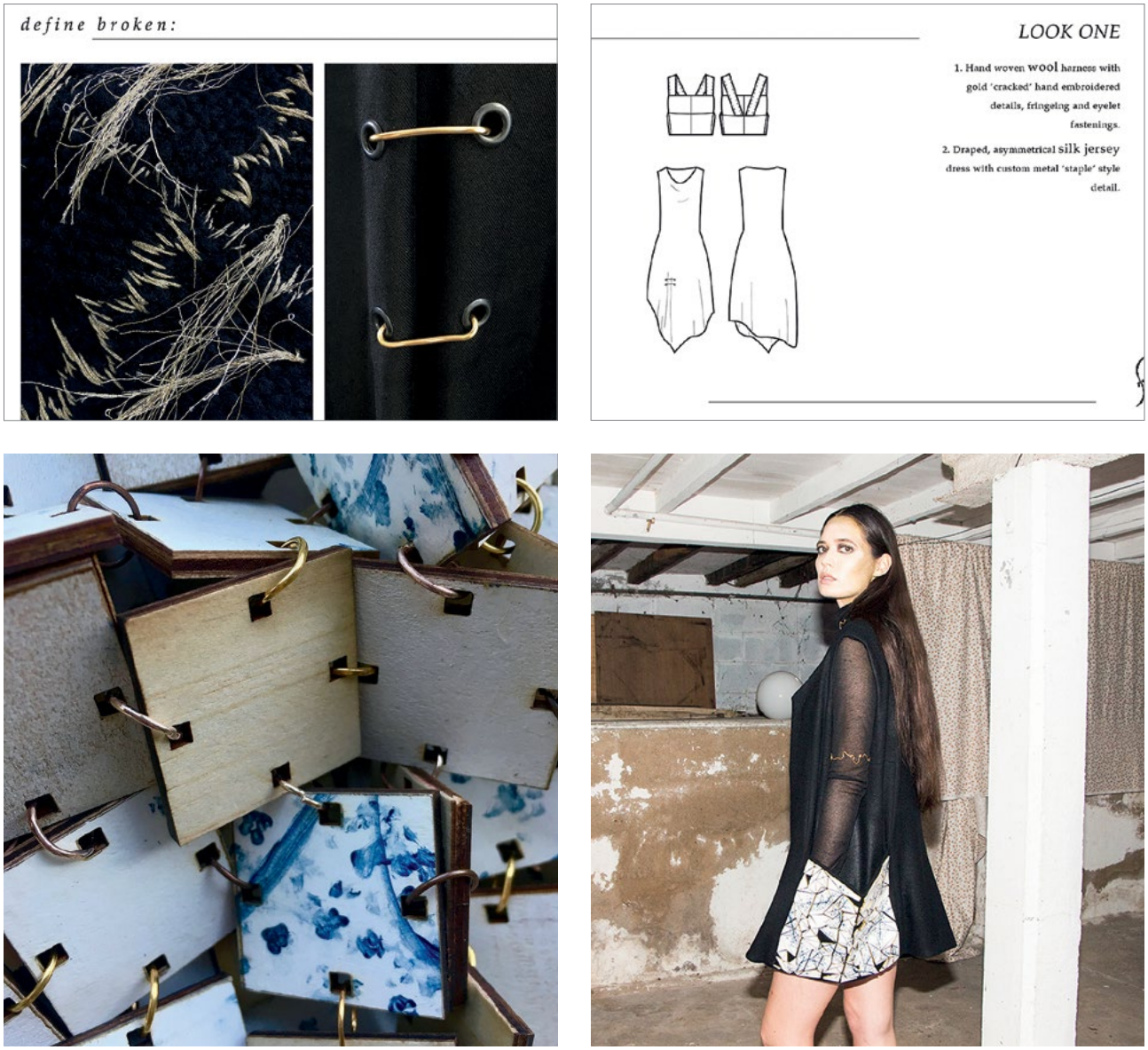

Figure 5.4. Sam Smith, 2016. Photograph: Sam Smith (top & bottom left); Natasha Townrow (bottom right). Model: Maya King.

Humble Materials

One of the overarching material and aesthetics narratives is that of "artisanal-industrial," in which the students play with the connotations of luxury and couture from the craftsmanship world by juxtaposing *povera* and non-precious materials with artisanal care. It has become commonplace, for example, for students to utilize components from hardware and construction stores mixed with traditional craft techniques, and laser cutting in one garment. As a part of their fabric development in Design Studio, they are invited to source and research in non-traditional retailers for fashion, such as dollar stores, thrift stores, and industrial waste co-operatives, a go-to place to source materials locally. This idea is introduced in the first year as the students are asked to work with wood as an embellishment or structural material in their designs.

The work of Sam Smith contains artisanal techniques reinvented and combined with hardware materials such as plywood, metallic yarn, and wire of different thicknesses, over-painted and veined, to resemble ceramic, resulting in intriguing mixtures of textures and surfaces. In Figure 5.4, gold thread "darning" is used on hand-woven woolen panels and gold "staples" on silk jersey. The laser-cut plywood is hand painted to resemble Japanese porcelain, joined with brass jump rings, and bonded to fabric backing to resemble tiling.

When contextualizing materials and components conventionally associated with material universes other than fashion, students choose to realign

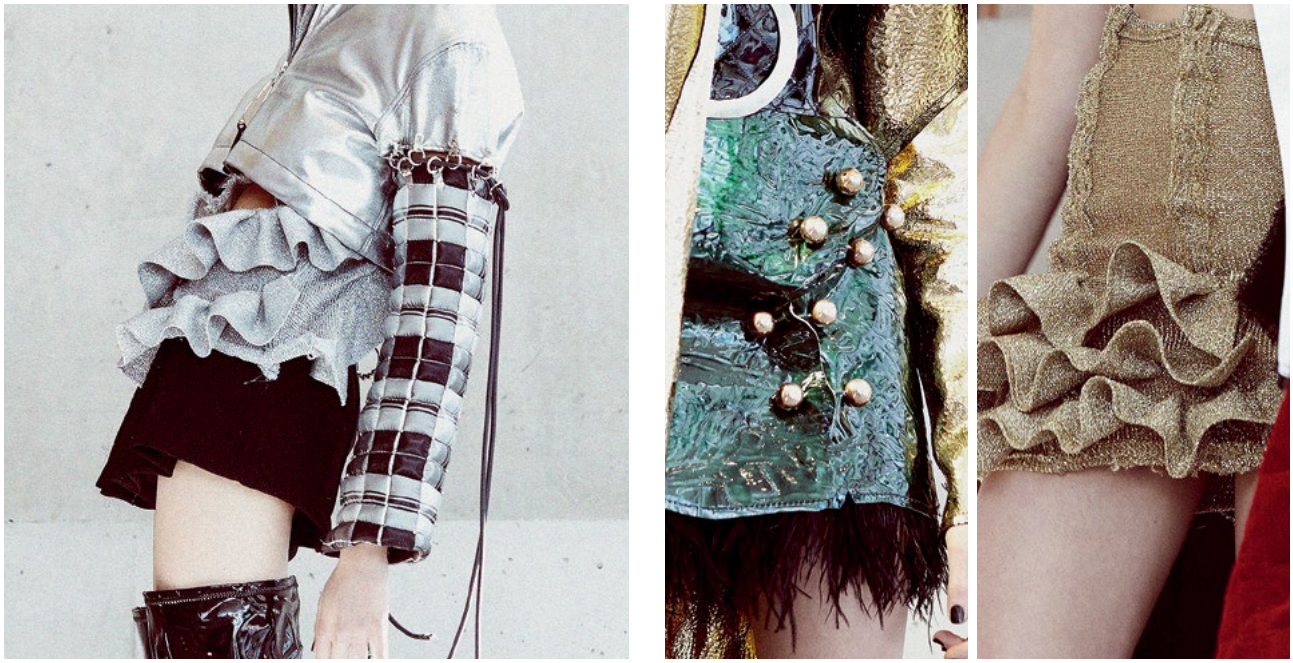

Figure 5.5. Multiple fabric manipulations, Isabella Jacuzzi, 2016. Photography: Natalie Mckain.

these in surprising combinations. Such is the case of Isabella Jacuzzi, who is influenced by punk aesthetics and the clash of materials and philosophy surrounding it. By collaborating with external manufacturers, Isabella developed barbells in different sizes, which are normally used for body piercing. She utilizes these components inventively throughout the collection, with brass screwed on balls fastening organic curves on patent leather mini skirt, as embroidery appliqué on a mini-dress and as links joining panels on white silk faille shirt. In Figure 5.5, barbells are used as stud decoration on leather vest and double-knitted lurex bands are manipulated into fluted frills.

Louise Chaney, 2016 graduate student, works with the 19th-century fashion focusing on the ladies undergarments and inmates' uniforms as the main fashion references for her collection. Louise develops a fabric decoration created by fixing nails to fabric in pattern and submerging until rusty (Figure 5.6). In some of the textiles she later removes the nails to hide the origin of the rust bleeding but later decides to also incorporate those hardware pieces in some other garments in the place of brooches or even stitching resulting into fascinating aesthetic algorithms of feminine ruffled garments covered in rust bleed and rusty hardware. Jonathon Rae, 2015 graduate student, uses jump rings to create a graphic patchwork dress from industrial felting (Figure 5.7). Hannah Dalglish, 2015 graduate student, develops industrial non-woven textile into a romper suit, with LED lights powered by battery packs worn in an internal pocketed belt.

Creating Painterly and Textured Fabrics

High quality fabric choices in Brisbane are limited to two local boutique fabric retailers, with the remaining retailers offering a standard range of dress and upholstery fabrics. If our students want unusual textures or fabric weaves, or even wholesale options, they must order online and ship from interstate or overseas at high cost, or otherwise fabricate the material themselves. They respond to this limitation through working with available base fabrics and then developing their own surface embellishments. In Figure 5.8, the 2015 graduate Tom Summers uses multiple materials, including hand-woven eyelash yarn and plastic beads, trimmed with duct tape for this gender-fluid suit. In the pink and red suit (Figure 5.8, bottom), Tom stitched and cut away the top fabric to reveal the under layers created the graded stripes. In the teal and red shirt (Figure 5.8, top), Tom uses plain fabrics layered over each other as a base for a two-tone pattern, creating textured "stripes" where the threads are drawn away, and graduating the move from teal to red in an intentionally random pattern.

The alteration of the shape and texture of fabric is a constant and fascinating source of inspiration for the students from their first to their last year of fashion studies. Independently from their aesthetics and taste, the students learn and develop different techniques resulting in beautiful experiments that help them understand and engage with the crucial material dimension of fashion and garment making.

Figure 5.6. QUT graduate Louise Chaney, 2016, focuses on the ladies undergarments and inmates’ uniforms in the 19th century. Photograph: Brodie Charters.

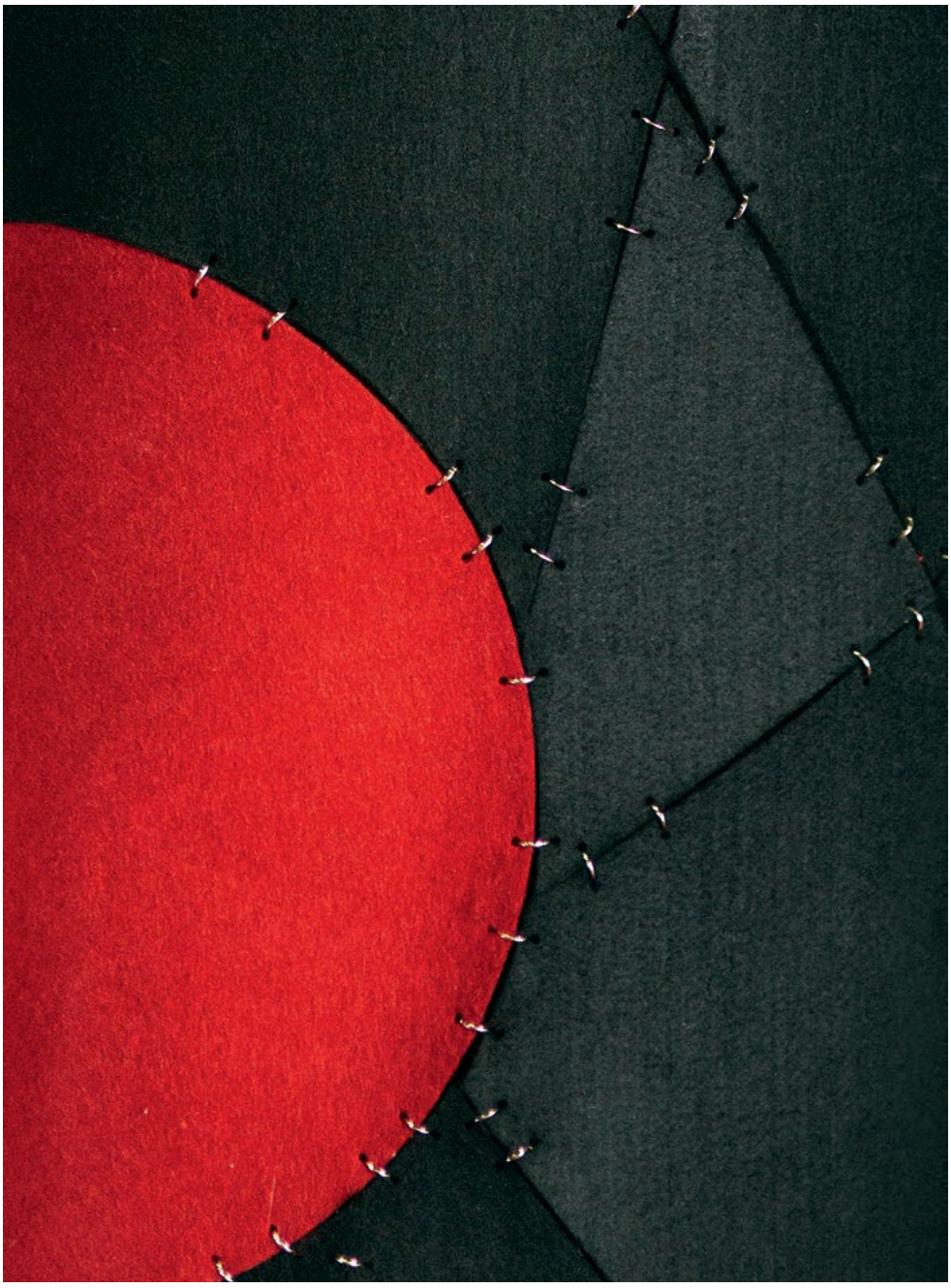

Figure 5.7. Jonathan Rae's patchwork dress from industrial felting. Photograph: Jonathan Rae.

Figure 5.8. Tom Summers, 2015 graduate, uses multiple materials including gaffer tape, vinyl, and eyelash yarn knitted with embedded plastic balls in his fashion collection. Photograph: Tom Summers.

Figure 5.9. Shannon Lewis, 2016, hand-paints organic shapes onto her outerwear made of neoprene (left), and extends these lines into three dimensions through handmade mushroom pleating which organically curves to the shape of the body inside (right). Photograph: Katriena Emmanuel.

Artisanal handmade traditional techniques like Shibori are brought into the studio from early in their studies. This Japanese technique consists of minuscule knots on the fabric that after steaming allows the fabric to preserve shape and, when working with dyes, its original color. The Shibori technique remains one of the most popular amongst our students and prevails in different forms, either just on its own or combined with hand-painting or embroidery. Other popular labor-intensive traditional craft is smocking, in which different areas of the fabric are linked with a yarn which, when pulled, results in a ruched amalgamation of the fabric creating a new volumetry of the fabric and the visual effects of pleats or seam. An exceptional example of this technique can be found on 2016 graduate Shannon Lewis, in which the draped mushroom pleating is hand threaded and molded to the body (Figure 5.9, right).

The free brush-stroke gesture of the painter is continuously romanticized but also reinvented by students. Some of them work with the fabric that will later become a garment, as if it were a blank canvas waiting to be transformed into an artwork. Such is the case of Shannon Lewis and her white neoprene outerwear pieces that carry multicolor paint in carefully crafted organic shapes. In part, Shannon takes inspiration from the Australian classic children's book *Where the Forest Meets the Sea*, a meditation on Far North Queensland's rainforests. In Shannon's silhouette the hand-painted liquid shapes of the paint extends into the actual construction of the garment, where we barely find a straight line but instead organic sections, held together with brass eyelets and jump rings or the sinuous frontal openings that resemble the profile of a face (Figure 5.9, left). The organic lines are translated into three dimensions through fluid mushroom pleating in an asymmetric and fluid linen and silk bodice with one extravagant sleeve (Figure 5.9, right).

Lauren Richardson brings a different take on the painterly theme, by painting with hardware-store silicon over organza fabric using different abstract motifs that she later finishes with spray-paint in metallic color (Figure 5.10). The reflective and metallic property of the paint contrasts with the transparent

nature of both the silicon and the base fabric, creating a holographic effect accentuated by the gradients in some of the textiles. The texture and volume of the silicon patterns resembles an outer space ice mineral, an intentional effect translating Lauren’s collection concept that revolves around the idea of frozen emotions.

Figure 5.10. Spray-painted Silicon on organza, Lauren Richardson, 2017. Photograph: Lauren Richardson.

Old and New Weaving

Present in every possible iteration, weaving can and has been interpreted and reimagined in many ways in Design Studio. The artisanal design brief in the second-year Design Studio exposes the students to global and local craft techniques, prompting reinvention and experimentation. They are introduced to the textiles of our neighbors in Asia, for example, through viewing textile samples from India, Indonesia, Papua New Guinea, and Bangladesh, and experimenting with batik, block carving, and printing. Guest talks connect our students to local and international textile designers, for instance, with indigenous artist Elisa Jane Carmichael from the Quandamooka people of Stradbroke Island. Carmichael shares her art making informed by place and culture, and the weaving techniques developed into her Masters project at QUT (see Carmichael, n.d.). Through the second and third years, student Isobel Wengert continually extends her hand weaving, deconstruction, and embroidery work, articulating a philosophy of fashion practice through engagement with cloth and materiality in her 2016 Honors project (Figure 5.11).

Figure 5.11. disfiGARMENT use of hand weaving, dyeing, deconstruction, and hand sewing to create fashion objects that evoke a sense of resourceful and thoughtful making, Honors project, Isabel Wengert, 2016. Photograph: Savannah van der Niet.

Claire Woodfield's work uses existing orange tweed fabric and modifies it by irregularly interweaving Lurex fabric resulting in a boucle effect as she references 1960s Chanel. Other students opted for more radical and not so wearable options of weaving with rubber tubes and thick colored plastic stripes glued together, a visually striking approach that is closer to art than to ready-to-wear. Alex Parker-Wilkins works conceptually around the inorganic geometric shapes becoming organic and coming to life when on a human body (Figure 5.12). In her textile developments, Alex uses laser cutting to create openings in the base fabric that she will later use to introduce straps of fabric or cord in contrasting colors, creating a new surface that plays with the notions of weaving and also embroidery. In some later work, the same student deconstructs the idea of tweed by making her own interpretation and layering stripes of different materials including silicon that remains pliable and wearable after construction.

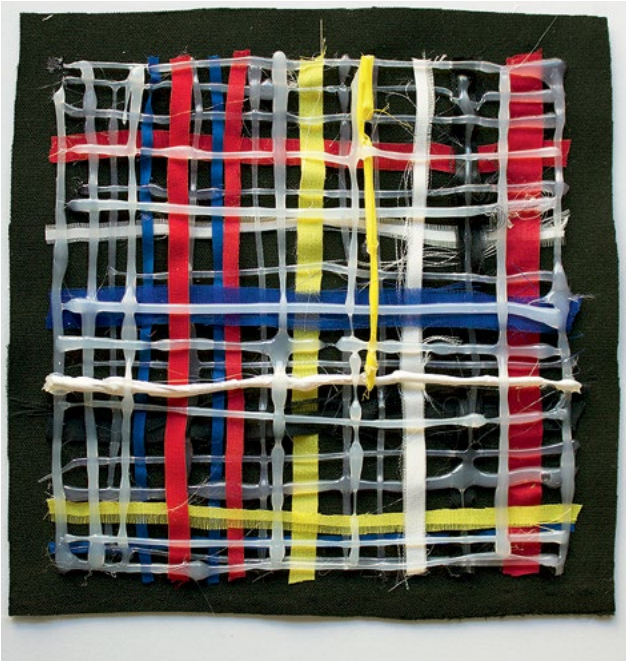

Figure 5.12. Alex Parker-Wilkin's new surface plays with the notions of weaving and embroidery, using laser cutting and straps of fabric and cord. Photograph: Alex Parker-Wilkin.

Textile Futures and Looking Outward

The focus and attention given to textiles, from technology-based manipulations to more artisanal ones has helped to enrich the design skills and knowledge of the materiality of fashion among the design students. Living in Brisbane, a city that may be a "second-tier" or even "third-tier" fashion city, has prompted creative and inventive ways to explore materials, despite the lack of manufacturing and production networks that Sydney or Melbourne designers may enjoy. Examples of successful Brisbane-based labels may be few but notable, such as Easton Pearson and Gail Sorronda, a QUT graduate. Li Edelkoort (2017), one of the most influential trend forecasters in the world, has spoken about the importance of textile knowledge in the fashion industry and fashion education. In her controversial manifesto "Anti-fashion 2015" in which Edelkoort stated that the fashion industry had become old-fashioned, one of the sole ways she sees the fashion industry maintaining relevance into the future is the focus on textiles. In her role in Parsons School of Design, she is working towards hi-tech textiles in what she calls "Hudson valley meets Silicon Valley."

Li Edelkoort's strategic base in New York definitely allows her to connect with powerful textile and technological national industries, but in the case of QUT we are looking outward to other opportunities. Our location is remote in some ways, but strong in others, as we share a time zone and neighbourhood with the fastest developing region in the planet, Southeast Asia. This strategic geographic position enables diplomatic alignments between Australia and Asia, but from a fashion perspective, it is an inspiring, powerful place for research and engagement projects for QUT School of Design in the region. In the postgraduate space, this has included Ph.D. students working on projects in the fashion industries of Cambodia and Sri Lanka. In engagement, two Department of Foreign Affairs and Trade (DFAT) funded programs have directly linked our fashion program with industry in Indonesia and South Korea with exchange of designers, industry diplomacy, and ultimately exposing the students to collaborate and learn in a bidirectional way. The exchange of knowledge ranges from the textile tradition of both Indonesian and Korean cultures, inspiring the students to engage in those textile and construction techniques, and also learn about other fashion industries, expanding the horizon of the students' career prospects to include these fashion markets.

Whether working in big businesses or for themselves, a mindset directed towards creative experimentation is valuable in any endeavor, and will sustain the students. Looking ahead, the donation of the Easton Pearson archive to the Museum of Brisbane will allow students to study the designers' production methods, including their close collaborations with

artisans locally and in India and Vietnam. Although there are limited opportunities locally in the industry, our students can think differently about career options, whether looking to Asia or staying resolutely in place. Their inventiveness as students can be extended to propel them forward as niche, local, artisanal and creative entrepreneurs—following a path forged by Easton Pearson and Gail Sorronda. They can create their own storytelling, making methods, and textiles that speak of their own place in the world.

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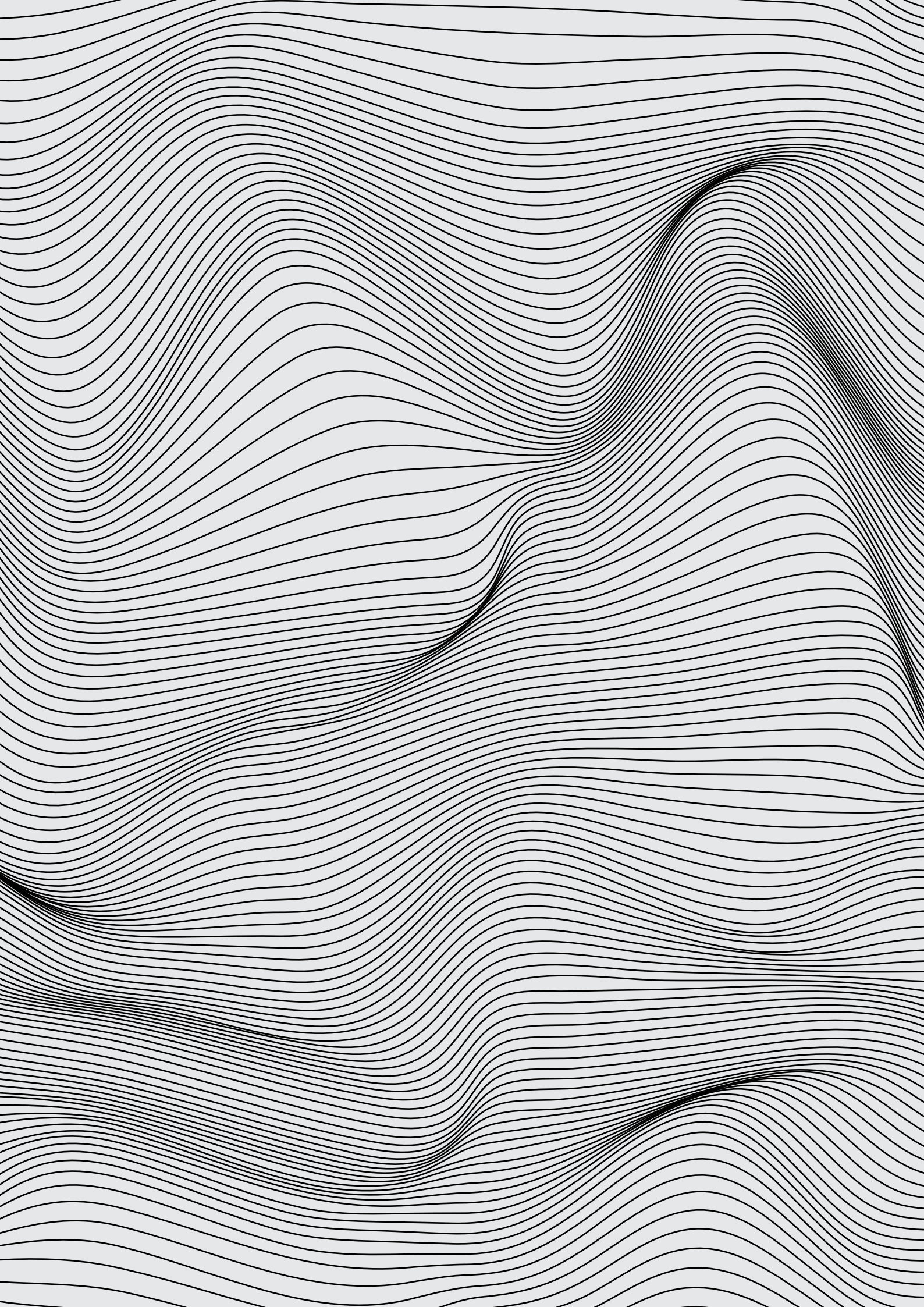

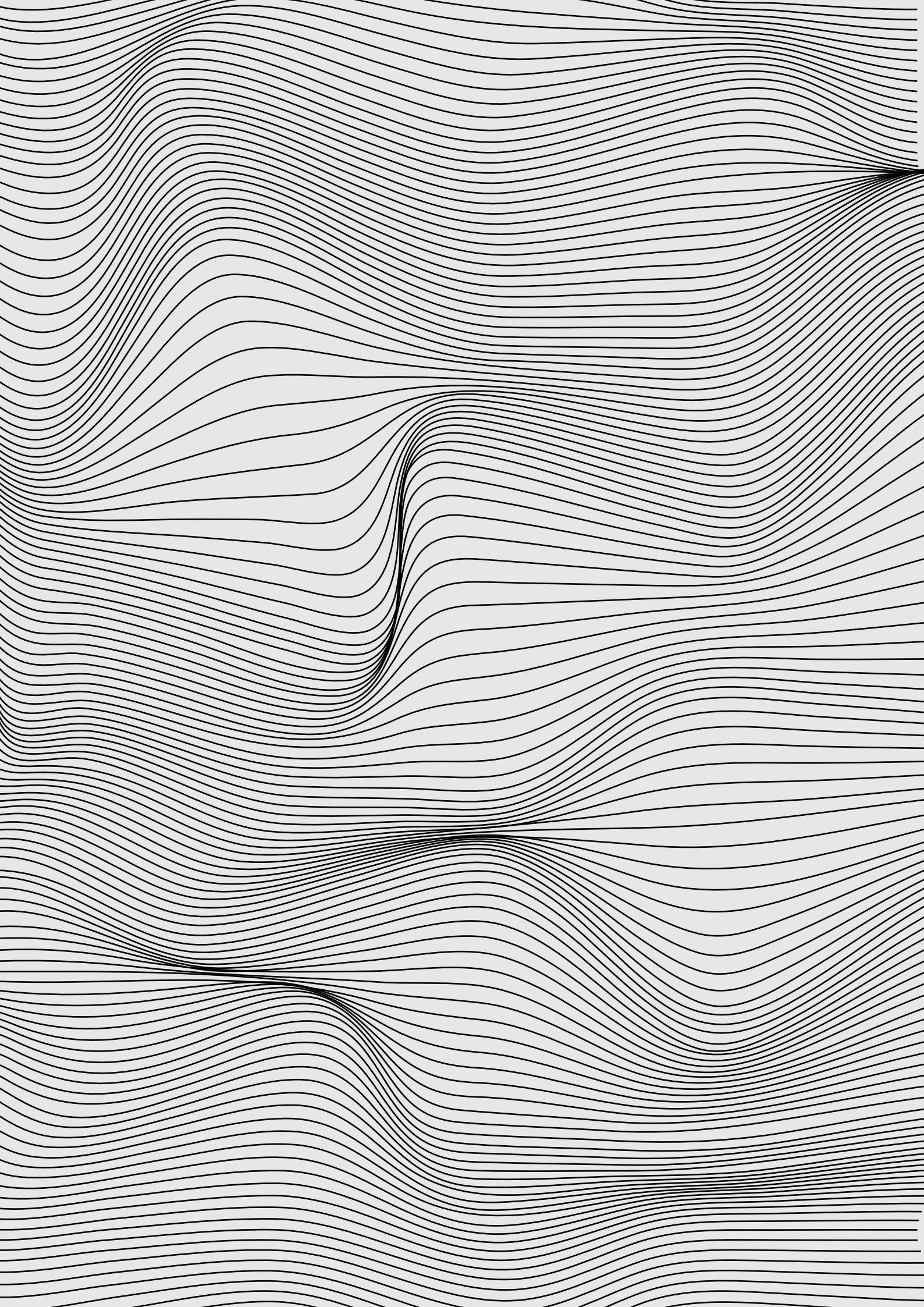

6 Opening up New Textile Futures Through Collaborative Rethinking and Remaking

Kirsi Niinimäki, Maarit Salolainen, and Pirjo Kääriäinen

Introduction

Textile design is a field where art and technology meet. In the broad field of design, textile design is regarded as a special discipline because it requires not only creative skills, but also a deep understanding of production technology. Textile designers use and sometimes even create materials from a molecular level in collaboration with material scientists (e.g., Kääriäinen, Niinimäki, & Lindberg, 2017; Aalto University School of Chemical Engineering, 2015; Smirnova, Ilén, Sixta, Hummel, & Niinimäki, 2016). The textile and clothing industry (including technical textiles) is one of the largest industrial sectors globally, with a huge economic and environmental impact. Textiles are designed for many different purposes, and accordingly textile designers have an important role to play as material experts and interpreters of users' needs. This is not enough, however. In the future, textile experts will need a complete understanding of the complex system of textile commerce, use, and lifecycle. Textiles are an essential part of our everyday life and will be needed to protect and comfort us even in an increasingly digital future.

Textile design education at Aalto University School of Art, Design and Architecture (Aalto ARTS) has gone through major transformation during the last decade. Recent developments in textile education are based on three key elements: (a) developing a new, effective pedagogy, which has been essential in opening textile design courses to fashion students as well as other design students; (b) building bridges across disciplinary boundaries to enable collaboration between design, science, and engineering disciplines; and (c) establishing academic research. By opening up textile design courses to other design fields and disciplines, Aalto ARTS has renewed the presence and importance of textile design, not only in academia but also in society. Knowledge creation in the textile field is more dynamic and collaborative than ever before.

Background: Transformation of Textile Design Studies

To provide a deeper understanding of fundamental changes in textile education, this section describes the transformation process at Aalto University (the

former University of Industrial Arts Helsinki UIAH and University of Art and Design Helsinki TAIK). By the end of the 1990s, the textile industry had disappeared from Finland and the necessity of retaining textile design education was under discussion. Despite this, the teaching staff maintained and developed good textile studio premises at the university and brought in new technologies that laid the foundation for future development in textile studies. New staff members introduced new thinking, strengthening collaboration with existing industry while discovering new industrial collaboration partners outside Finland.

More intensive curriculum development started in 2007; the Knits and Knitwear course was added into the Fashion and Clothing Design B.A. program, and a new type of studio pedagogy was introduced to woven fabric studies in the Textile Art and Design B.A. program. The next, more radical, step was taken in 2009–2010 when advanced textile courses across all textile studios were offered as minor studies to B.A. students in fashion design. In 2011, the M.A. program in Textile Art and Design was opened up to B.A. students in any design discipline. This prudent decision brought many other knowledge areas like architecture and graphic design to the realm of textile design and enhanced new textile thinking. In 2014, through a thorough curricula development process, the Design Department launched new B.A. and M.A. programs, which integrated textile design studies into Fashion B.A., Design B.A., and Fashion and Collection Design M.A. curricula, and discontinued separate textile B.A. and M.A. programs. Thereafter, both Fashion and Design B.A. programs offered a possibility to concentrate on textile design studies. The Fashion B.A. became a shared platform for fashion and textile studies with a fashion viewpoint, whereas the focus in the Design B.A. is more on interior textiles, textiles as products or with multidisciplinary applications. The Fashion B.A. program was constructed to enable the students to first learn the basics of both fashion and textiles and then choose either area to deepen their studies. However, as most of the students wanted to learn both, since 2017 the B.A. curriculum has provided the students with textile and fashion courses, thereby gaining both skill sets.

In both Aalto ARTS B.A. majors—Design and Fashion—students can study up to 34 credits of textile-design-related courses along with 10 credits for the B.A. thesis. In addition to these majors, textile minor studies of 15–25 credits are offered widely to B.A. students in other Aalto programs. Moreover, the current M.A. studies are quite flexible and can be personalized. Students follow their personal study plans and are able tailor their study paths. The master's students specializing in textile design can take up to 45 credits of textile- and surface-design-related studies along with an internship of 10 credits and M.A. thesis of 30 credits. The M.A. thesis is often done in collaboration with the textile industry (e.g., Yoshizawa, 2014; Haikonen, 2016; Paavilainen, 2015) or in an ongoing research project (e.g., Tanttu, 2015; Smirnova, 2017).

These new approaches to open and collaborative textile design education as well as multidisciplinary research have recently received recognition, e.g., H&M Global Change award 2016 for the project "Making waste-cotton new" (2016).

Moreover, textile design education has gained a solid position and appreciation at Aalto University. For example, this can be seen in the renaming of the M.A. program in 2016 to Fashion, Clothing and Textile Design (http://fact.aalto.fi/) and the increasing collaboration with Aalto School of Chemical Engineering in the current investigation of textile prototyping machinery for yarn production.

Openness Inside Design: New Methods in Textiles

Textile design is about exploring materials and structures, surfaces and constructions. Textile practices interweave expression, storytelling, and artistic and technical mastery—important skills in the broad discipline of design. Whereas difficult questions related to sustainability can only be assessed through an understanding of textile processes, teaching that clings to traditional pedagogical methods has made the essence of the highly technical, creative realm of textiles unreachable to students in other design fields. Time-consuming, purely craft- or technique-related practices, often taught at the start of textile studies, have distracted students' focus and taken time from experimenting and exploring. Simultaneously, theory (such as drafting woven structures) has been taught separately from practice instead of trusting the students' ability to understand theory through practice-based learning and self-driven exploration.

Opening up textile design to a wider audience requires a major rethinking of pedagogy. At Aalto ARTS, the renewed pedagogy has enabled design students to learn the basics of textile practices efficiently and then quickly proceed to more advanced textile studies, implementing and applying the acquired skills in fashion design or other fields. In the new approach to textile design pedagogy, priority is given to skills that lead directly to the essence of textile design—the interplay of different materials, structures, and

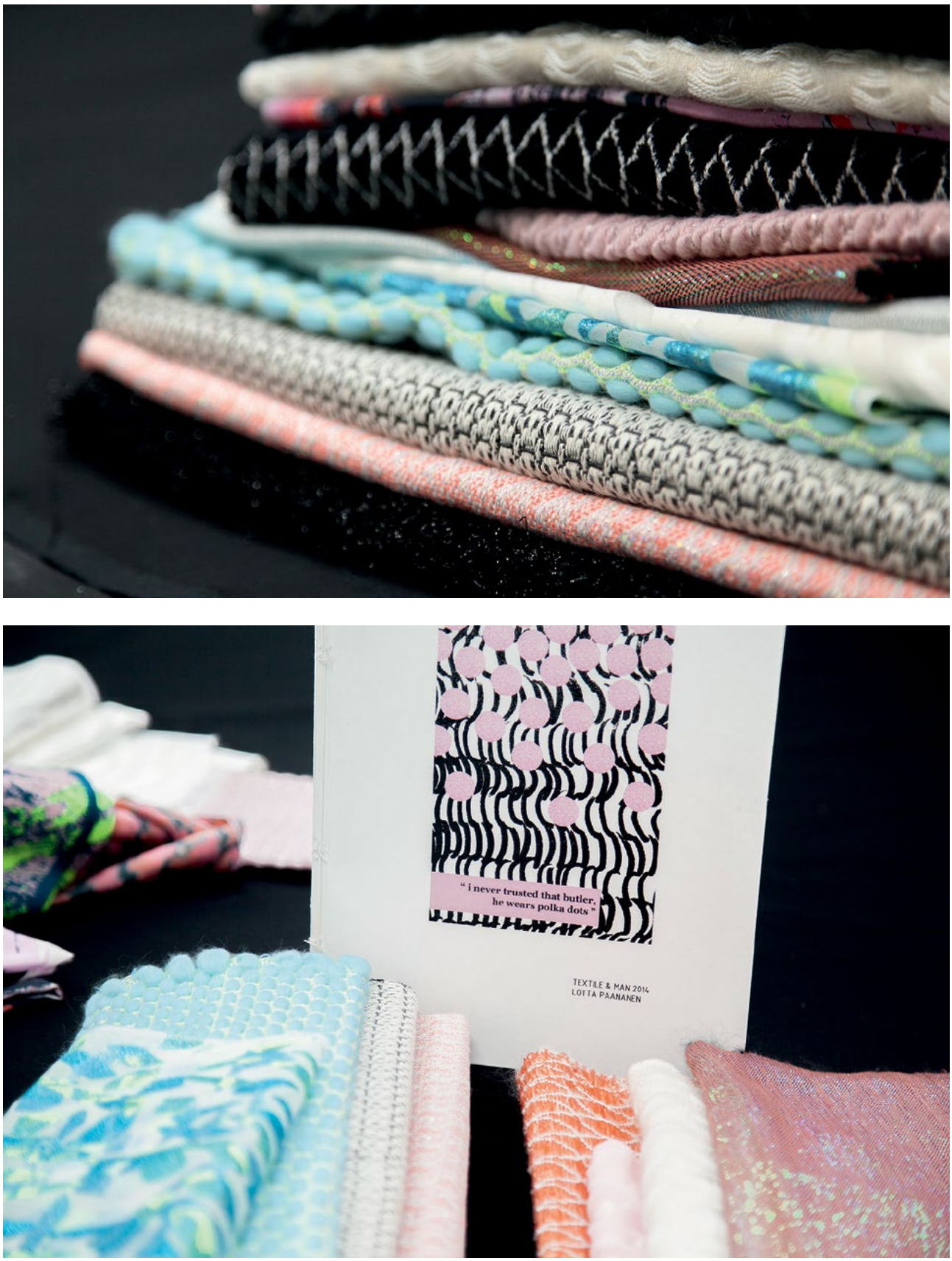

Figure 6.1. *I Never Trusted that Butler, He Wears Polka Dots*, collection by Lotta Paananen, 2014 (second year, B.A.), combines different techniques. Photograph: Eeva Suorlahti.

techniques as well as collection building. The learning process is driven by strong artistic and visual research, storytelling, and conceptualization skills. Textile collection design is constructed with different techniques, combining work in all the textile studios (Figure 6.1).

To illustrate the shift, up until 2007 the teaching of woven textiles at Aalto ARTS (in those days, University of Art and Design Helsinki) started from a theory course on woven structures and drafting, then moved on to learning weaving skills and techniques and finally on to design. Theory was distanced from practice, and the path from learning simple weaves to familiarizing with more challenging derivative weaves and jacquards took years. After the implementation of the new pedagogy, students begin to weave immediately, learning woven structures through hands-on experimentation on warps planned and set-up in advance. In addition, visual research mood boards prepare the ground for design work, making storytelling and collection design the driver for the hands-on weaving and creative experimentation in the studio.

Textiles and fashion are fundamentally interlinked and mutually dependent. The recent curricula and pedagogy development together with the well-equipped textile studios at Aalto ARTS have brought fashion students to success in international fashion competitions, e.g., Festival de Hyères, Designers' Nest in Copenhagen (Figure 6.2), and the annual fashion show has been appreciated by the fashion community and press (Figure 6.3). Fashion design by Aalto students is praised for its rich, immersive design

Figure 6.2. Portfolio with visual research, woven jacquard experiments and the final collection, Marja Korkeila's B.A. collection, 2016, finalist and Schiparelli special award winner at Festival de Hyères, 2017. Photograph: Maria Korkeila.

research, expressive use of materials, and profound mastery of textile techniques. This is the result of their textile studies that focus on fundamental technical and manufacturing skills combined with creative skills, including dobby and jacquard weaving, knitting, embroidery, printing, and finishing.

The close connection between textile design studies and the fashion and collection design courses enables the fashion students to concentrate on their material concepts and innovative textile design work. In addition, the students are encouraged to work in teams to complement each other's skill sets (Figure 6.4), and very often fabrics for fashion collections are created through collaboration with the textile industry (Figure 6.5).

Figure 6.3. Marja Korkeila's collection in Näytös16 Fashion Show. Photograph: Guillaume Roujas.


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Figure 6.4. Rolf Ekroth's B.A. collection, 2014, Designers' Nest 2015 First Prize. Jacquards by Yuki Kawagami. Photograph: Niklas Kullström.

Figure 6.5. Anna-Mari-Leppisaari's M.A. fashion collection, 2014. Jacquard on an industrial loom and the final look. Photograph: Anna Mari Leppisaari and Sara Riikonen.

Figure 6.6. During "Woven Fabrics—Material and Structure," the first course for woven textiles, students select yarns based on visual research. Photograph: Eeva Suorlahti.

Intensive Learning: Shorter Textiles Courses

The new pedagogical approach, which intensifies the learning process through the shortened duration (from over 10 credits to 5 credits) for learning the basics of woven textiles, has proven to yield desirable outcomes. During the basic (5-credit) course lasting four weeks, the students learn the fundamental and most important derivative weave structures, including multiple weft/warp systems and double weaves. As a result, they are able to manipulate these structures to design woven fabric collections suitable for various applications. The process is guided by thorough visual research and inspired by the student's will to express concepts and tell tactile stories through an exploration of materials and structures (Figure 6.6). The work done in the studios is integrated into the student's fashion collection or other ongoing design processes.

This practice-based design process also plays an important part in textile technology studies. Practical knowledge, building on fibers' and yarns' properties, behaviors, and relation to different weave structures, is fostered by the task of creating a versatile fabric collection already at the beginning of woven textile design studies (Figure 6.7). Students with various

Figure 6.7. Weaving in the studio, designing and experimenting on the loom. Photograph: Eeva Suorlahti.

Figure 6.8. Interim critiques—exploring possibilities on the different set-ups and warps. Photograph: Eeva Suorlahti.

backgrounds, and even without any previous textile knowledge, learn to use weave structures and various fibers and yarns to influence the properties and appearance of the finished fabric in a short course. After the first course, the students are ready to proceed to compound weaves and jacquards and to innovate, implement, and apply their skills.

The exploration of structures and yarns starts on various sample warps in the studio that are of different threading plans, tie-ups, setts, and materials (Figures 6.8 & 6.9). Each warp introduces new aspects to weave structures and the properties of textile fibers. As this process resembles the use of standard warps in the weaving industry, it fosters the student's understanding of processes in the textile industry and collection design. In comparison, the traditional learning method of woven textile design usually begins with lectures on weave structures and proceeds to designing one's own warp, choosing materials, planning a weave, sett, threading, and tie-up, dressing the loom, and finally weaving. This time-consuming process that heavily focuses on learning the principles of artisanal hand weaving makes textile studies very difficult to include in a fashion design curriculum.

A similar artistic, research-driven, and practice-based pedagogy has been adapted to the knitting, printing, and finishing courses. After efficient

Figure 6.9. Final critiques—presenting collections, telling stories through the materials and structures. Photograph: Eeva Suorlahti.

and thorough introduction courses into the different techniques, students proceed to building collections combining different textile techniques and finishing. Students undertake fundamental visual and material research during the textile collection courses, leading to textile or fashion collections that display skills in a variety of qualities and techniques. The process implemented in the studies is related to the professional world, whereby the collection process starts from a solid concept and is led by materials.

There is increasing need for knowledge and understanding of textile processes, structures, and materials from outside the textile domain. Numerous new and innovative products result from interdisciplinary projects, in which textile techniques and surface constructions are applied to non-textile materials, or conversely new technologies such as 3D printing are combined with textile surfaces (e.g., Salolainen et al., 2017; Moslemian, 2016). Through efficient pedagogy, the textile studio courses are open, not only to textile and fashion design students, but also interior design, architecture, and industrial design students. This pedagogical approach, which aims at making students ready to apply and implement their skills, helps to disseminate knowledge to a wider audience. Co-operation and development of ideas with peers in multidisciplinary groups are encouraged through shared face-to-face sessions. Furthermore, students organize open displays of their textile experiments in mini-fairs inside the university to find other students and collaboration possibilities, e.g., in product, furniture, or spatial design. Creativity thrives in an atmosphere of openness where there is space for equal give and take, the group of students working together for the common goal of learning.

CHEMARTS: New Experimental Collaboration Between Design and Material Science:

Four driving forces of the future of textiles at Aalto ARTS include: (a) an increasing demand for more sustainable products and systems; (b) the ongoing development of new materials and production technologies; (c) an increasing use of textile structures at different scales, from architecture to the nano scale of healthcare applications; and 4) the integration of textiles and electronics. All these developments have triggered emerging interest in textiles from outside the traditional textile industry, creating new opportunities for textile design and engineering. CHEMARTS is an interdisciplinary collaboration in Aalto University focusing on biomaterials, including sustainable textile materials and processes (http://chemarts.aalto.fi/).

Textile material consumption has been markedly increasing along with population growth and wealth increase. Textile production is causing severe environmental problems, which have to be tackled by all possible means, including the development of new raw materials and innovative production processes (Table 6.1). Change may appear to be slow, but resource scarcity, such as lack of water, and consumers' increased awareness of ecological issues are pushing the industry and commerce towards renewal. New production and recycling methods can save water, raw materials, energy, and costs. Innovations flourish in multidisciplinary environments and require a deep understanding of textile production technology as well as specific knowledge of how textiles are and could be used for different purposes. Designers have important roles to play as interpreters of users' needs and as material

CONCEPT	MATERIALS	METHODS	OBJECTIVES
Transforming new kinds of materials into textiles	Wood, algae, orange peels, manure—anything containing cellulose, or protein-based materials, such as feathers	New, sustainable, and resource-efficient production processes	Renewable raw materials only, sustainable processes, and less toxic chemicals used
Growing textile-like materials	With microbe or fungi	Synthetic biology, bioart, and biodesign	No waste materials and no extra production phases
Designing materials	New DNA combinations and genetic manipulation	Synthetic biology	New materials and production processes, and designed material properties
Recycling textile materials	Cotton, polyester, viscose, etc.	Chemical or mechanical recycling	Less need for virgin materials

Table 6.1. Approaches to textile material development in current material research.

Figure 6.10. Multidisciplinary student team experimenting with nanocellulose in the CHEMARTS laboratory during the "Design Meets Biomaterials" course, 2017. Photograph: Mikko Raskinen.

experts. Their capacity is to challenge the business community and to help technology developers by creating future-oriented concepts and scenarios. Designers can also help to communicate scientific results to all stakeholders by, for example, prototyping with new materials to find application areas for material innovations (e.g., Tenhunen et al., 2016).

CHEMARTS has two main objectives: (a) to inspire future designers and material scientists to work together and (b) to create novel sustainable biomaterial innovations for future business development. In order to enable these objectives in higher education, which is still an environment dominated by disciplinary pedagogical traditions, a set of completely new pedagogical approaches have been tested. CHEMARTS consists of multidisciplinary courses open to all design and engineering students at Aalto University. Launched in 2014, the Design Meets Biomaterials course (3–5 credits) is an introduction course targeted at a broad audience (86 students in 2017), and the more focused CHEMARTS Summer School (10–15 credits, max. 20 students) has been organized annually since 2012. The pedagogy is practice-based and student-centered where no strict guidelines are given; the students have to frame, define, and solve interesting problems by themselves, mostly by working in multidisciplinary teams (Figure 6.10). The role of the supervisors is to provide background information on existing materials, discuss relevant ongoing research, and describe applicable design and research methods. The students are encouraged to explore existing and emerging materials and to challenge technologies and their related systems. At the end of each course, the collaborative process as a whole and its results are presented publicly through visual presentations and an exhibition. Students should go beyond their comfort zones; designers might become engineers and vice versa (Kääriäinen et al., 2017).

The tight collaboration between two Aalto schools—School of Chemical Engineering (Aalto CHEM) and School of Arts, Design and Architecture (Aalto ARTS)—has enabled students to develop interesting textile and fashion projects by combining creative design with materials research. For example, one fashion design student collaborated with a research team in bioproduct chemistry to develop a non-toxic, water-repellent coating for cellulosic fabrics. In this case, the fashion student shared her knowledge of textile and garment use and production, helped to test the results, and communicated the findings of the early-stage scientific project through prototypes. Another example of CHEMARTS collaboration was a 3D-printing project where a multidisciplinary team of engineers, scientists, and designers experimented

Figure 6.11. 3D structures of cellulose printed on cellulose by Pauliina Varis and Ilona Damski in collaboration with VTT (DWoC research project, 2016). Photograph: Eeva Suorlahti.

Figure 6.12. Cardboard and paper recycled into textiles by Ioncell-F technology, designed by Marjaana Tanttu in collaboration with Aalto CHEM (DWoC research project, 2014). Photograph: Eeva Suorlahti.

with printing cellulosic materials on cellulose-based fabrics (Figure 6.11). The textile designer's role was to design suitable 2D patterns that transformed the fabric into 3D structures when printing paste shrank, and to create design concepts to explore how this technology could be applied in the future.

The most successful example of CHEMARTS is the long-term development of Ioncell-F fibers. Ioncell-F is a new technology to produce cellulosic fibers with excellent mechanical and haptic properties. It belongs to the Lyocell-type spinning category and is based on a novel solvent, ionic liquid. It is a closed-loop process that avoids the use of toxic chemicals. Raw materials can be virgin pulp, paper, cardboard, or cotton waste. In this project, the designers had to test material properties by knitting, weaving, printing, and dyeing, and to produce prototypes to promote the technology (Aalto University School of Chemical Engineering, 2015) (Figure 6.12). The multidisciplinary Ioncell-F team received the Global Change Award in 2016 from the H&M Conscious Foundation for its cotton recycling process.

Establishing Solid Research

In spring 2015, the "Fashion/Textile Futures" research group (http://ftfutures.aalto.fi/) was established at Aalto ARTS to explore new perspectives on design research through materials, textiles, clothing, and fashion. Although its strong research focus is on sustainable design, the group members' research activities and strengths encompass material-based research, creativity studies, practice-based research, and strategic fashion and textile management. The group is involved in several significant research projects, which integrate closed-loop and circular economy approaches in fashion and textile systems. Multi- and interdisciplinary collaboration is the basis for building new knowledge that can open up future innovations in material, textile, or fashion fields. Systems thinking, holistic approaches to sustainability, user-centered evidence, and creative design-driven methods are all employed in new knowledge creation, based on collaboration with other design or research fields or industry. The group has significant academic outreach, and it has successfully collaborated in applied research fields. Ongoing research projects include:

The New Road to Silk: Bio-based production of silk-like materials (NEWSILK) 2017–2020 project focuses on synthetic biology in interdisciplinary settings. The textile industry is in need of new material innovations, and engineering material properties through biotechnical production will be one of the key enablers of new materials and a future bioeconomy. At the level of DNA, technologies offer the possibility to design molecular structures for protein polymeric materials. The aim of the project is to design material properties according to the needs of final application areas. Funded by the Academy of Finland, the research consortium combines three areas: Biotechnology (Aalto CHEM), Polymer

Chemistry (University of Helsinki), and Art & Design (Aalto ARTS). It will develop and strengthen multi- and interdisciplinary research collaboration and lead to new ways of doing science.

In the *Trash-2-Cash (T2C) 2015–2018* project, new material and product opportunities are developed via creative design from textile waste or process by-products. With collaboration between 19 diverse partners from across the EU, from design research, material science, market research, and industry, this Horizon 2020 funded project aims to reduce the utilization of virgin materials, improve material efficiency, decrease landfill volumes and energy consumption, and foster design for recycling with the vision of closing material loops (trash2cashproject.eu). During the project, creative design methods for interdisciplinary material-based research are developed. Aalto ARTS contributes to the project through the development of design methods for interdisciplinary collaboration, defining principles for design-for-recycling and constructing a methodology for design-driven material innovation. For interim results, see, e.g., Smirnova et al., 2016; Niinimäki, Tanttu, & Kohtala, 2017; Niinimäki, Tanttu, & Smirnova, 2017; Tanttu, Kohtala, & Niinimäki, 2016).

Design Driven Value Chains in the World of Cellulose (DWoC) 2013–2018 is a multidisciplinary project focusing on cellulose materials and their novel applications by combining design, science, and business. The DWoC concept is based on the combination of design thinking and design-driven prototyping with a strong technology development competence. One of the focus areas is concerned with textiles, including both material innovations and production process development for fibers, filaments, and 3D-printed structures. Funded by Tekes, the Finnish Funding Agency for Innovation, the project aims to actively communicate design concepts to potential entrepreneurs and to facilitate the development of a new cellulose ecosystem in Finland (cellulosefromfinland.fi). The partners are the Technical Research Centre of Finland (VTT), Aalto University, Tampere University of Technology, and the University of Vaasa.

The establishment of the "Fashion/Textile Futures" research group was a turning point for textile research at Aalto University that had previously focused on the development of historical or artistic knowledge undertaken by individual researchers. Currently, the research group aims to open up future possibilities, which contributes to Aalto University's strategy to be an innovation university. Solid research not only produces new knowledge but also supports and challenges teaching. By bringing new approaches, methods, and research knowledge into teaching, and thereby challenging the current teaching, robust research can expand new views on the future of the profession. One principle of Aalto University is that everyone conducts teaching and research; research here can be understood as academic or creative practice. This principle has driven rich collaboration and dialogue between education and research. For example, CHEMARTS began as a pedagogical experiment, driven by designers, but it has already generated several multi- or interdisciplinary research projects. Pedagogical collaboration has been a platform for learning to understand different disciplines, to show design skills to other scientific fields, and to build networks. The *DWoC*, *T2-C*, and *NEWSILK* research projects are all initiated from this interdisciplinary mindset and require new kinds of collaboration among textile researchers, textile designers, and material scientists.

Our scientific work not only builds new knowledge, but also influences development at large. For example, research linked to future materials and closed-loop and circular-economy thinking could have a great impact on how the textile and fashion industry looks and functions in the future. New sustainable materials may revolutionize textile fiber production. It may be possible to design new material attributes at the nano-level through synthetic biology. Green business models combined with sustainable textiles and fashion systems may enable changes in current industrial production. A more holistic understanding of design and its strategic input into the consumption side might enable different ways to design in the future. Experimental design research can tackle issues at the societal level such as unsustainable consumption practices or even people's wellbeing in society. But to educate future textile and fashion designers, courageous design research is needed. Researchers can serve as inspiring role models who show students how to be activists in their own field.

Opening up the Future

This chapter has shown how the textile arena in Aalto ARTS has renewed its presence through the bold rethinking and remaking of textile skills and knowledge in open collaboration. Opening up textiles to other design fields and other disciplines has challenged but strengthened the core of textile design. New kinds of textile thinking, knowledge, and skill sets are used in new application and research sectors such as fiber and material design, systems thinking towards a circular economy, and developing new textile-like materials. Textile designers' skills have expanded towards co-design and participatory

design in multidisciplinary design-driven projects. Through textile expertise, Aalto ARTS's fashion design has boosted its international reputation, as can be demonstrated by the prizes awarded to our students. For example, fashion student Maria Korkeila won the Schiaparelli Prize at the Hyères Fashion Festival 2017 with her strong textile-driven fashion collection. She expresses her experience at Aalto ARTS:

> Having had the opportunity to study textiles (extensively) alongside my core studies in fashion design has been essential to my personal work (B.A. collection) as well as opening up more opportunities in terms of my career. It has given me the tools to truly be able to design a garment/collection from scratch, meaning I am not necessarily limited to existing materials. Learning these skills (mainly knitwear, woven jacquards, printing, and embroidery) during my studies helped form, and became an important part of my design process. My studies in textiles have helped me and my work stand out. In terms of jobs I now have more opportunities, since I can (and have) worked also within the sphere of textiles (for example on the Rick Owens' Textile team). I am presently working as a freelance designer, including textile design for a Parisian haute couture house. (M. Korkeila, personal communication, November 11, 2017)

H&M has been collaborating with Aalto University over recent years. Maria Olofsgård from H&M says that the company aims to enhance this relationship even further in the future due to the quality of textile and fashion design education at Aalto ARTS (Aalto University School of Arts, Design and Architecture, 2015). Suzanne Oude-Hengel, from the Netherlands with a background in product design, was an exchange student at Aalto ARTS in autumn 2014 and is currently working as a freelancer with expertise in knitting technology. She describes that her exchange semester profoundly opened new career opportunities in knitting and weaving. "Definitely it was my basement [sic] for everything that happened ever since. I think it opened my possibilities and brought me further. [It] set up a nice step to build up a network knowledge combo of experimental and technical knowledge from textiles" (S. Oude-Hengel, personal communication, November 11, 2017).

Through new collaboration, a solid textile knowledge base has been key to building bridges between different disciplines in both pedagogical and research contexts. Research is tightly linked to education, and researchers also contribute pedagogically to academia. It is important to note that education can be transformed through new knowledge produced in research. Pedagogy and research can have a creative, successful, and mutually beneficial dialogue. This has particularly been the case in the textile and new materials sector, e.g., CHEMARTS, which has been an experimental pedagogical platform, has introduced interdisciplinary collaboration to textile designers and material scientists. This pedagogical experimentation has produced several academic research projects and thereby new knowledge in both design and material research.

Current areas of focus for textile education and research at Aalto Arts are:

- advanced concept and product design for fashion, interiors, or architecture using ambitious artistic and technical approaches;
- multidisciplinary and experimental approaches in pedagogy and research;
- materials research including new biomass-based applications through design processes, experimental material-led design research, and scientific research;
- integration of textiles and electronics for human-centered concepts and products (e.g., wellbeing, healthcare, sports); and
- sustainability embedded in all of these areas as a well-established research entity in textiles and fashion.

The transformation process has not been easy; it has caused some conflicts and even unnecessary competition between teaching staff. The overall curriculum design and scheduling are always challenged and sometimes the students are not able to organize their textile studies according to their preferences. When analyzing the ongoing interdisciplinary collaboration, it has to be stated that it takes time and effort to create a common language, an understanding of, and a mutual respect for each other's working methods. However, by extending the borders of textile knowledge and collaboration to other fields, textile education has reintroduced its presence and meaning. The textile field, which has long been underappreciated, has returned to claim a meaningful role in societal-level discussions. When discussing future industrial practices, especially in the material sector, new materials have a pivotal role in starting new business and new industrial factories, in the context of a bioeconomy. Furthermore, through collaboration and teaching textile knowledge to other designers, the textile field has gained new appreciation and interest from other design fields. Opening up the "secrets" of

textile knowledge makes textiles more relevant than ever. By re-emphasizing the importance of textile knowledge and rethinking the meaning of textiles, textile education and research can lead to new future opportunities. The future of textiles looks brave, promising, and creative.

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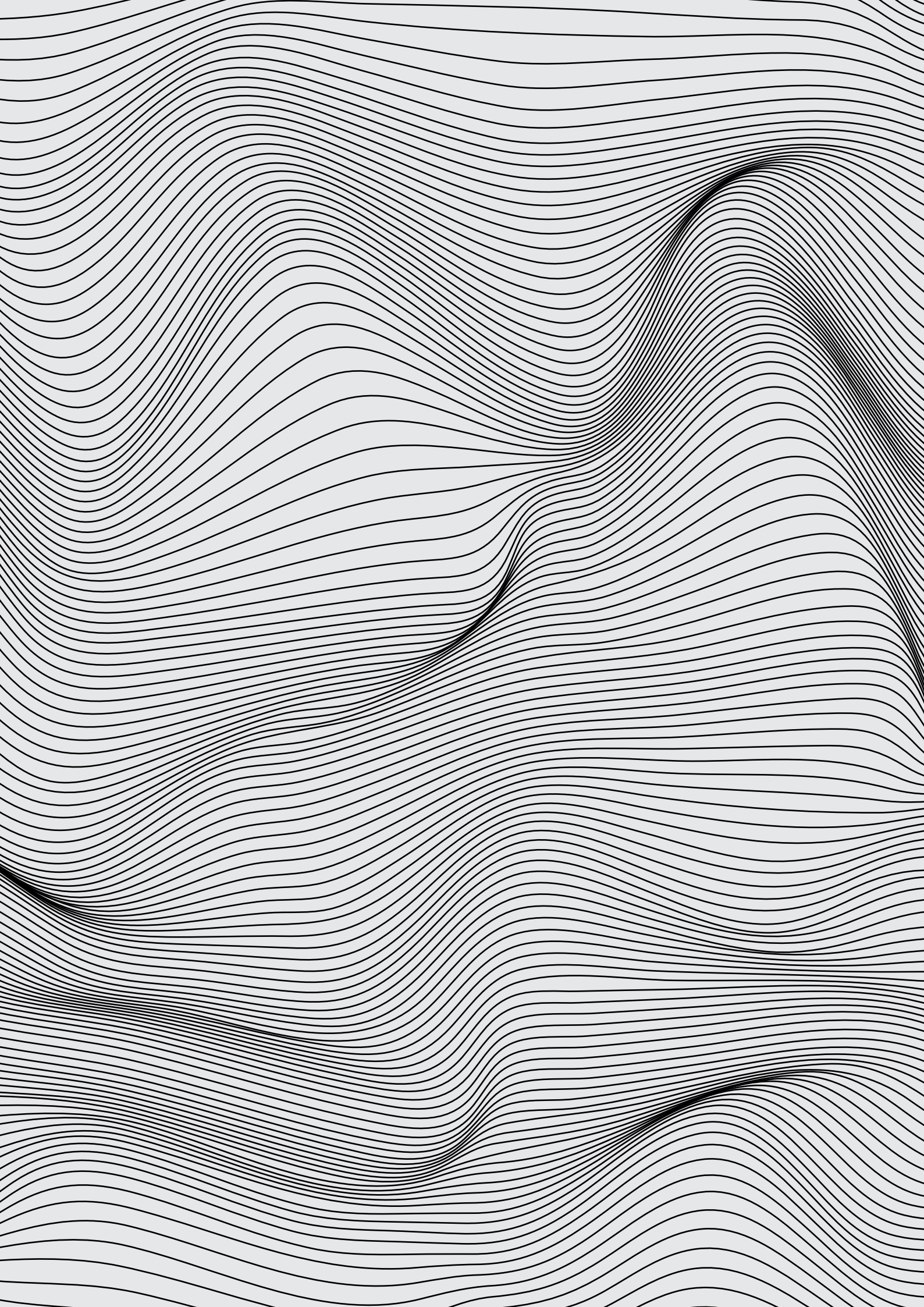

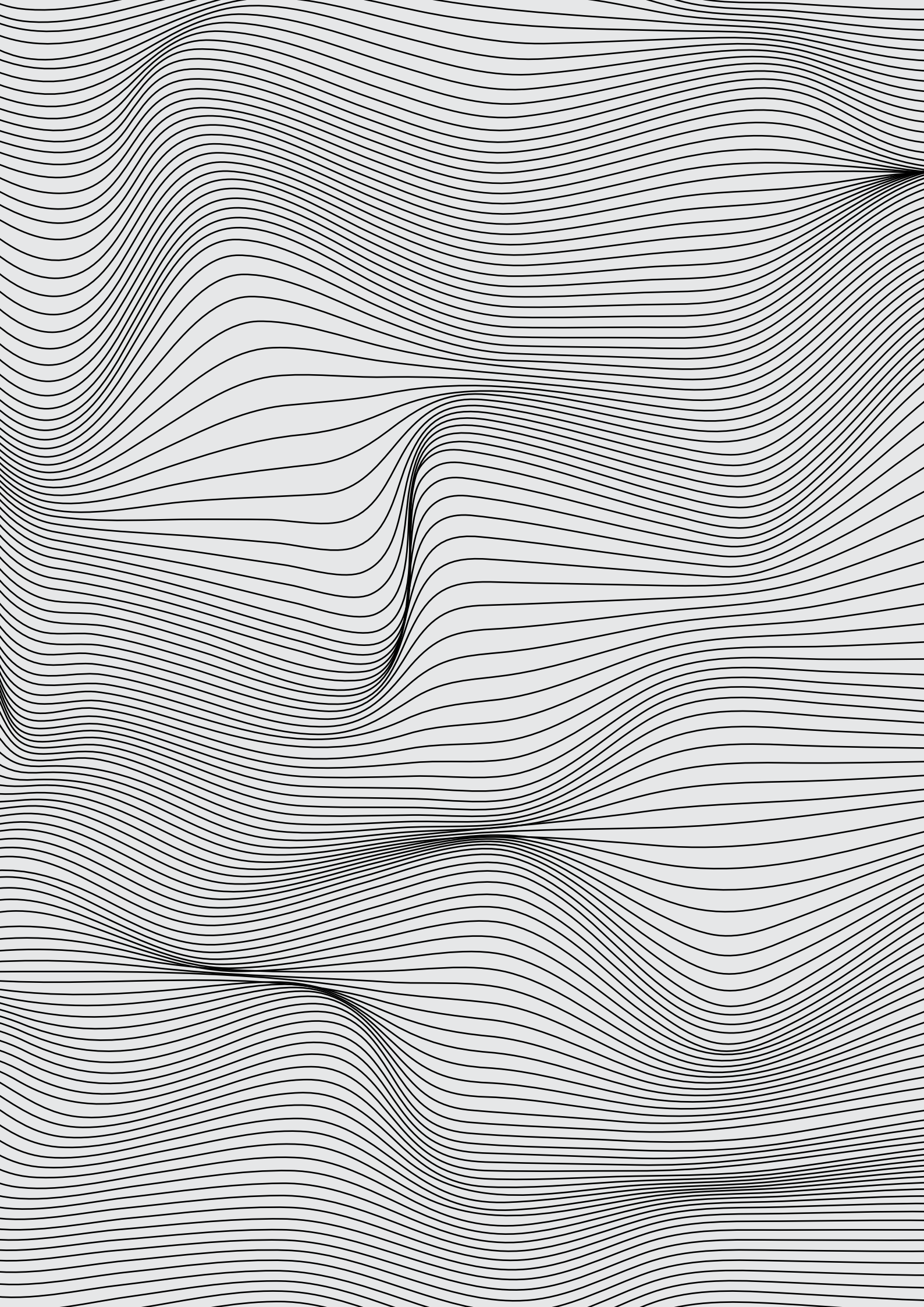

7 On Researching and Teaching Textile Design: Examples at The Swedish School of Textiles

Delia Dumitrescu, Marjan Kooroshnia, Hanna Landin, and RiikkaTalman

Introduction

Artistic research in design is relatively new compared to experimental research in the natural sciences, but it has matured a great deal over the last decade. Its extensive development has brought new challenges to professional practice, and also raised questions regarding how knowledge should be imparted in academia. By examining the field of textile design, which has traditionally been taught in close synergy with professional practice, we can discern the emergence of doctoral theses that have brought not only new perspectives to textile practice but also a new role to design educators as researchers in academia. One of the challenges that design education programs are facing, however, relates to creating a better connection between research and education in order to continually enrich curricula with innovations in the field, so that basic knowledge can interact with novelty. By looking closely at research at The Swedish School of Textiles (SST) and its interaction with undergraduate and postgraduate education, this chapter describes how research has informed the development of textile design education.

Teaching Design Rationales: Relationship between Basic and New Methods in Textile Design

A textile design education program generally develops students' artistic skills, craftsmanship, and technological knowledge, enabling rational design choices to be made when creating a surface expression. The varied expertise that students gain through a textile design education program relates to technical precision and artistic ingenuity, which are employed in order to define a textile's character and expression (cf. Gale & Kaur, 2002; Sinclair, 2015). Accordingly, the methodology builds on the fundamental notions of color, pattern, and construction, combining the aesthetic and functional qualities of a textile as a material of design, and yet is dependent on direct manipulation of material (Albers, 2000). The character of yarns and geometry of bindings are the two basic elements that form the core of the design process that a textile designer learns to operate the practice, and the interplay between these basic elements forms the structure that defines the material (the textile). While working with surface design implies a continuous

process of refinement of, and critical reflection on the basics, e.g., motif, repetition, and organization, working with colors adds to the complexity of textile structural thinking (cf. Steed & Stevenson, 2012). Having become an established area of research, textile design has begun to articulate its own perspective on the relationship between material experimentation and theoretical knowledge through the education of future practitioners. This marks a shift from imparting tacit knowledge (Polanyi, 1966) to training design rationales (Kunz & Rittel, 1970) and, even more importantly, from teaching textile design to teaching textile design thinking. This journey will be exemplified below through the development of research in smart textiles at SST.

Smart Textiles

Throughout human history, textiles have been designed to exhibit one expression—a static state that gradually changes as a result of use and the organic passage of time. However, smart textiles have introduced a new, temporal perspective on design, and today we design smart textiles with an awareness of time. We design textiles that can change from one expression to another, challenging our established views of textiles' character, functionality, and use. Accordingly, textile design practice has been broadened from working with pattern design, colors, structures, and finishes to programming and working with digital processes and methods, all in order to design complex surface interactions (Quinn, 2010; Kettley, 2016). The ubiquity of digital technology and the development of new materials have expanded the textile design field by offering a new paradigm of smart textiles. This has resulted in a shift in materials from static state materials to dynamic ones that are programmed to transform in response to stimuli. As a research paradigm, smart textiles have introduced a new perspective on textiles at the intersection of textile design, computational design, and materials technology. Research in smart textiles has challenged conventional views regarding textile methods and artifacts. It has expanded the textile design field with new notions such as temporality, dynamic forms, and acts of use. Research results in this field have led to an improved understanding of the expressive possibilities of these materials, as well as of the methods and basic variables to be used in design.

At the same time, it has been clear that further development of appropriate models to link theory and practice is needed for teaching textile design as a new academic discipline. Just as theory and practice cannot be separated in design, the development of education programs cannot be separated from the development of research. Teaching methods are needed that deal with the foundation of textile design in relation to newly developed knowledge, where the materiality of the practice and its practical experimental perspective are central.

On Teaching Smart Textiles

At SST, which is located at the heart of Sweden's historic textile-industry cluster, education has always been in close contact with industry. The Bauhaus model, with its focus on the relationship between art and technology, has been very close to the way the curriculum is organized and the way teaching models are applied (cf. Wingler, 1976; Itten, 1975; Albers, 1975). The smart textiles research program at SST investigates programmable materials, computational technology, and textile aesthetics, proposing new ways of approaching the foundational definitions of textile design through exploration of patterns, colors, structures, techniques, and expressions. Utilizing multidisciplinary perspectives, including interaction design, product design, and architecture, the program enables the exploration of new approaches using smart colors or light as design materials, a better use of conductivity as a material property, and new possibilities afforded by digital technology. SST focuses on ways of teaching new materials from the perspective of the aesthetics of textile interaction design, in terms of what a textile can do. The aesthetics of the interaction is determined by what can be achieved with the textile in relation to how changes of expression can be linked to user interaction (Hallnäs & Redström, 2006; 2008).

This perspective on teaching smart textiles has been articulated in relation to ongoing and completed research conducted in the Smart Textiles Design Lab that, together with the Smart Textiles Technology Lab and the Prototype Factory, constitutes the Smart Textiles Initiative, funded by Vinnova, the Swedish Agency for Innovation Systems. It has resulted in the development of methodological frameworks for working with new materials that move from a technological to an aesthetic perspective. For example, Worbin (2010) explores different textile techniques and ways of embedding new materials, enriching the foundational definitions of textile design by creating smart textiles that can change expression—from A to B—through programming and/or direct interaction.

Kooroshnia (2017) develops a new system for working with smart colors for printing complex multiple patterns—her experimental work is situated at the intersection of fields other than textile design, such as graphic design and interaction design. Landin (2009) explores the notion of the aesthetics of interaction when it comes to form and expression with the possibilities enabled by dynamic materials and their programmable behavior. This research has partly resulted in methods and exercises that can be used in teaching that aims to develop better sensibility to the aesthetics of interaction in a design process. Furthermore, based on a multidisciplinary perspective, Persson (2013), Nilsson (2015), and Dumitrescu (2013) examine how basic variables and textile design thinking can affect other fields of design, such as product design and architecture. This knowledge gained from practice-based experimental work performed at the Smart Textiles Design Lab has influenced the development of new methods for teaching textiles. Accordingly, the teaching of smart textiles can focus on material exploration in relation to programming (Kobakant, n.d.) or on scenarios of using smart textiles as materials to/for design (Nilsson, 2016; Dumitrescu, Nilsson, Persson, & Worbin, 2014; Talman, 2016).

The new perspectives of dynamic qualities and interaction possibilities have influenced design education regardless of the textile materials or techniques used. Today, our knowledge of the design of smart textiles is embedded throughout education, featuring as elements in basic courses, technical courses, and independent workshops. From introductory courses in printing or textile materials to conceptual workshops on the aesthetics of dynamic and interactive forms, nuanced approaches to smart textiles have enriched the conventional format of teaching textiles.

The next sections will illustrate three new perspectives on textile design education that have been performed through different categories of workshops: *materials*, *colors*, and *forms*. These workshops demonstrate how new knowledge generated from research can be transferred to students and integrated in the textile design curriculum, thus creating a continuous synergy between ongoing research in the Lab and education through textile thinking. Subsequently, textile thinking in education to which these perspectives have contributed will be illustrated through examples of student work.

A New Perspective on Teaching Materials: Transformable Materials

Bringing smart materials into the world of textile and fashion education can act as a way of introducing students to new materials and methods. A one-week workshop for second-year textile and fashion design undergraduate students is discussed here to demonstrate how students are introduced to an alternative method for designing textile expressions. The main learning objective of the workshop is to introduce the students to new materials and design methods involving transformable materials.

As a result of the research projects mentioned in the previous section, the Design Lab has developed the Smart Textiles Sample Collection, featuring materials with a variety of transformable qualities that are used by the university's programs and private sector workshops. Fabrics and yarns from the collection are used as raw material in the workshop. The collection spans a range of samples of transformable qualities that react to everyday stimuli, such as heat or moisture, including structural change (different characters of smart yarns in knitted or woven textiles) or surface change (different types of smart colors on printed textiles). The samples in the collection include, for example, knits that shrink and break in response to heat (Dumitrescu, et al., 2014), monochromatic and patterned fabrics that change color in response to heating or cooling (Kooroshnia, 2017), and knits that break, melt, and expand in response to moisture (Talman, 2015). Both irreversible (e.g., shrinking or melting) and reversible (e.g., color changing) materials are featured in the collection to provide a broad and varied range of transformable qualities that can be further explored. What these materials have in common is their openness to possible uses and functions as well as expressions and states that make them suitable for various applications. Together, the materials provide students with an easily approachable, hands-on way of experiencing dynamic qualities in textiles.

The brief for the workshop is to create textile expressions using materials that react to water or heat in order to explore how changeable expressions and forms can be designed using materials that have transformable qualities. After an introduction to the materials, the students are encouraged to freely explore all materials before choosing one for further exploration. Usually, the students' explorations take two distinctive approaches: (a) creating changeable expressions

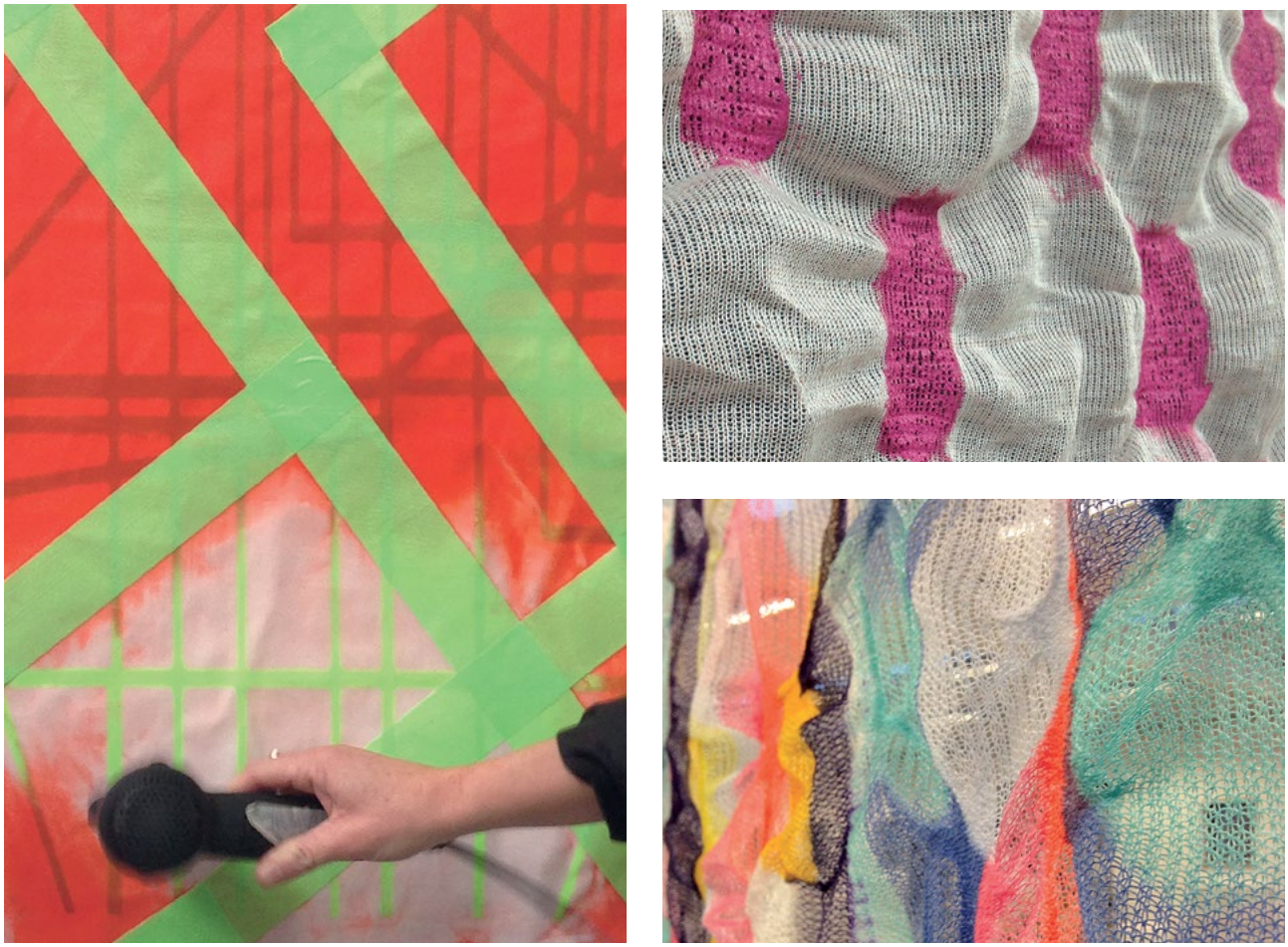

Figure 7.1. Examples of students' explorations of pattern, texture, and fabric behavior through transformable materials. Photograph: Riikka Talman.

(Figure 7.1, left); and (b) using dynamic qualities to create a relatively static expression (Figure 7.1, top & bottom right). Most students choose the latter, probably because they are used to creating static expressions. Their choices also depend on whether the change in the material could only be triggered once, such as shrinking, or if it could go back and forth between several stages, such as color changing. Many students find it difficult to work with materials that they cannot control. For instance, the exact shrinkage of Pemotex in response to heat is difficult to control, and the effect of PVA melting and shrinking in response to water depends on how water spreads on the material and how the material absorbs water.

The less successful experiments include those where students control the material's behaviors or go against them, instead of "listening" to the material in order to understand its qualities. The successful experiments are those where students attempt to understand the qualities and behaviors of the material and to use them in the design processes. The process of gaining this understanding is usually preceded by a period of experimentation that helps to solve issues relating to scale, color, texture, and tactility. The students then combine different materials to create new expressions that take advantage of the materials' qualities.

Working with these changes as design variables can open up new ways of sketching and designing textile expressions or new textile applications. In essence, the method builds on learning to "listen," to observe and understand how different materials behave through systematic, hands-on experimentation, or conversing "with the materials of a situation," according to Schön (2003, p. 78). This makes it applicable to other design contexts, where knowledge and understanding of the interactions between material, construction, color, and scale are necessary to explore forms and to create new expressions. In this way, students must surrender control over knowing the result in advance and instead are encouraged to trust the materials and adopt an experimental way of working.

A New Perspective on Teaching Colors: Changeable Colors

In the last decades of the 20th century, thermochromic colors—which reversibly change color in response to temperature fluctuations—have been introduced to and included in the color palettes of designers, particularly textile designers. For instance, *Disobedient Tablecloths* (Worbin, 2006) illustrates how a thermochromic printed tablecloth reacts to the warmth of a cup of hot water. The color disappears in the area on which the hot cup is placed. There are two major types of thermochromic ink: liquid crystal and leuco dyes. The former provides a continuously changing spectrum of colors when exposed to temperature changes, while leuco dye-based thermochromic inks are colored in a non-heated state and become colorless or have a very light color in a heated state (cf. Bamfield & Hutchings, 2010). They are usually blended with other (static) pigments, allowing the mixture to change from one color to another.

In the basic printing course, a three-day workshop for first- and second-cycle students utilizes a new system to describe changeable colors employing the pedagogical tools of color swatches and thermochromic color transition sample spectra developed in Kooroshnia's (2017) Ph.D. research (see Figures 7.2 & 7.3). Following the notion of learning by doing (Drew, 2004) and a motivational framework (Wlodkowaski, 1999), the workshop helps students better understand the behavior of thermochromic inks at various temperatures. The first task of the workshop is to work with thermochromic inks with the activation temperature of 32°C. The students are instructed to choose one warm- and one cold-color ink. They overprint one of the patterns (frame No. 1) with the chosen cold color and the other (frame No. 2) with the chosen warm color. Afterwards, they heat up their printed fabrics to above 32°C using a hair dryer or a heating pad, in order to examine and observe color changing effects. The second task is to mix the chosen inks with a static textile pigment paste. The students are then instructed to mix their chosen inks with a static textile pigment printing paste, of their choice, and overprint the pattern of the frame No. 1 with the mixture of the cold color ink and the pattern of frame No. 2 with the mixture of the warm color ink.

Printed swatches made using textile pigment printing pastes and tasks that involve using them make up the core of the teaching materials. The swatches demonstrate the color transitions of thermochromic inks at different temperatures, while the tasks give students an opportunity to develop their understanding of the design potentials of thermochromic inks through experimentation and individual exploration. Some of these are structured while others are more free, assisting in the development of students' ability to design dynamic surface patterns.

The design outcomes of the workshop are evaluated based on how they demonstrate the students' ability to integrate their new knowledge, the behavior of thermochromic inks, with their previously gained knowledge of static pigments into the design of surface patterns. The workshop allows them to work on their ideas using their design skills, and assists in developing their ability to predict the consequences of their design decisions in terms of where and how to apply dynamic colors in relation to other design elements on dynamic surface patterns. The workshop therefore introduces complexity in pattern design, regardless of the use of dynamic materials.

A New Perspective on Teaching Forms: Dynamic and Interactive Forms

Bells' definition of artworks as "significant forms" refers to an organized set of variables, e.g., an arrangement of shapes, colors, volumes, and textures (c.f. Carroll, 2008, p. 109). Here materials are seen from the perspective of forms. Thus, one of the central design variables introduced by smart materials—seen as forms—is time. This concept is addressed through the *dynamic form* workshop for the third-cycle students working on their research concerning transformable materials. The workshop aims to introduce forms and materials as fundamentals for designing time-based expressions. The workshop uses both DeLanda's (2015) theoretical perspective on new materiality and Dumitrescu's (2016) methods for working with time-based materials (not necessary textiles). Participants examine the possible variables and attributes of dynamic forms, including change, speed, and sequencing, through the discussion of exemplary works from the fields of graphic, product, interior, and architectural design. They directly explore the transformation stages of dynamic forms, examining the properties and capacities of transformable materials that are central to their research. By investigating actions that can result in the structure or surface of a transforming material, each participant is able to document the process, select preferred stages/frames of the material's transformation, relate them through new time intervals, and extract quintessential

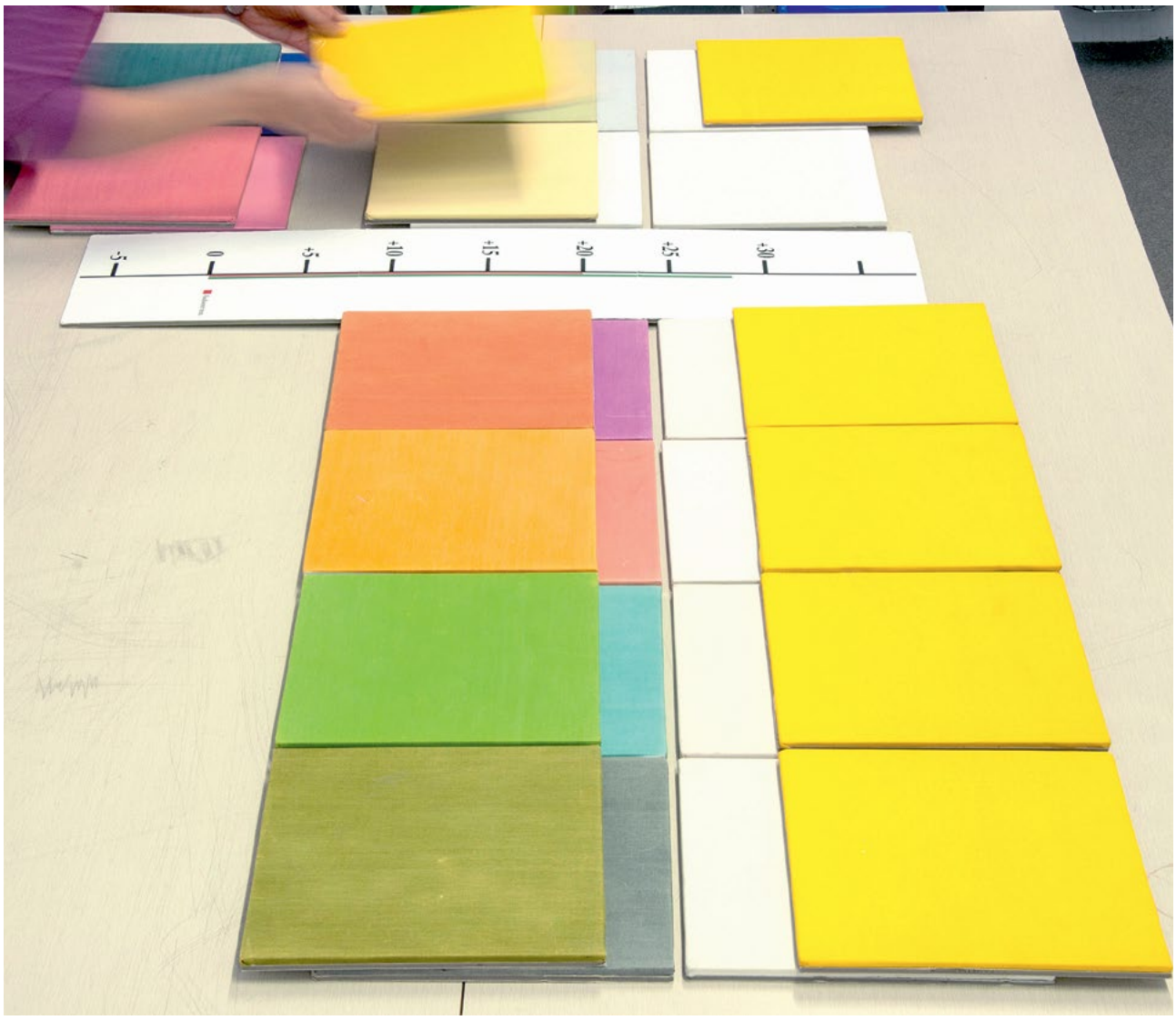

Figure 7.2. Color swatches made using static textile pigment paste demonstrates the varying colors of thermochromic inks at different temperatures. Photograph: Marjan Kooroshnia.

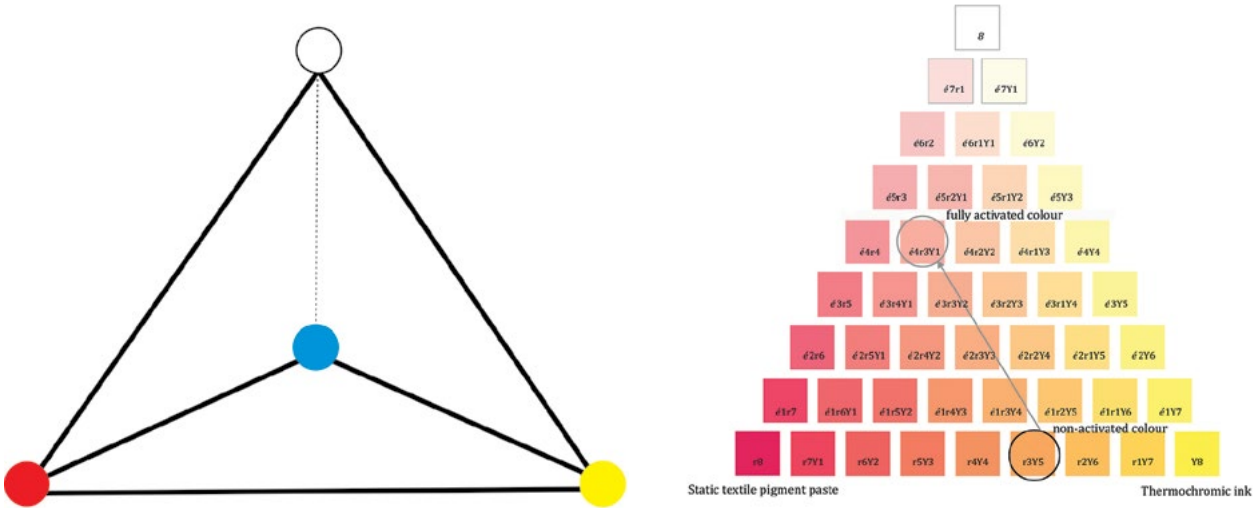

Figure 7.3. Left: The three-dimensional color system—a pyramid with a triangular base consisting of fully saturated colors. It is based on the three primary colors (yellow, red, and blue), and features colorless acrylic-based extender (é) at the very top of the pyramid. Right: The color transition on the lateral faces of the pyramid. Illustration: Marjan Kooroshnia.

variables in order to define new dynamic forms. The doctoral students select materials that are central to their research, using the workshop as a means for closely investigating the properties and design possibilities of materials, as well as finding new methods of illustrating these possibilities both practically and methodologically. The workshop enables the participants to find the most suitable way for their research to document and analyze the dynamic character of the materials that they are designing.

It is worth mentioning two student explorations during the workshop in 2016. First, a participant explored the stages of transformation of kinetic yarns. Using photography and video recordings, she documented the material's different states of change when an external stimulus was applied. The analysis of documentation enabled the participant to discover unexpected transformations and quintessential design variables that defined form. It also helped her to select preferred states, which can be used later to design a new transformation scenario. Second, another participant explored seeds as materials for textile design, photographing changes in textile expression due to the transformation of the materials that depends on different variables, e.g., time, water, light, and ways of embedding seeds in the structure (Figure 7.4).

Another workshop addresses *interactive forms.* It aims to enable reflection upon what new transformable materials, changeable colors, and dynamic forms could offer and mean to people. The workshop explores the use of writing to examine certain interaction issues (as distinct from using writing solely for documentation). Writing as a way of thinking and experimenting is introduced to doctoral students working on projects concerning future living with adaptive and responsive interior design. They are guided to try out thoughts on how the relationship between people and interiors can be designed. Writing is used as a tool for considering design possibilities and for exemplifying the differences between interaction scenarios that describe expected user experiences and interaction scenarios that build up perspectives on the relationships between people, objects, and spaces. The participants are able to explore different perspectives of what a dynamic design can add to people's lives. Such a workshop opens up questions regarding aesthetics within interaction that can be difficult to see, explore, and exemplify in other ways.

Reflections on the Present and Recommendations for Further Development of Textile Design Education

Research in smart textiles has opened up new teaching methods about materials, colors, and forms. By aligning the knowledge taught in higher education with contemporary research paradigms in the field, it has proposed new variables and ways of designing surfaces. Modules on traditional yarns of static qualities, e.g., cotton, linen, and polyester, have been supplemented with new ones on transformable materials, e.g., conductive, heat reactive, and water-soluble. Established methods of teaching color theory have been enriched with a new system to describe dynamic colors based on the behavior of the leuco dye-based thermochromic inks. Traditional form and material workshops with a focus on static expressions have been complemented with interaction design perspectives: the exploration of time as a design variable and the role of a dynamic design in people's lives.

Research at SST has provided a broadened view on what textile design is now and what it could be in the future, and on what basic knowledge is appropriate for students, who commit to the changing field, to be able to create its future. This perspective is more general than textile design with smart materials and independent of technical textiles. It has led to critical reflection on the basic notions of textile design, e.g., pattern, form, construction, texture, and color. Such reflection on the field has arisen from experimental research work, and from challenges and discoveries when working with unknown materials with changeable behaviors.

Examples of work by the first- and second-cycle students illustrate how the synergy between research and teaching can sustain ways in which students develop the field of textile design. For instance, works exploring how textile properties can be introduced to other materials by using certain techniques (Figures 7.5 & 7.6), or works demonstrating how new design expressions can be created using certain materials and structural manipulations of conventional textile techniques (Figures 7.7 & 7.8).

The foundation of how we perceive, read, and navigate the field has also been questioned through the engagement of the expressive possibilities of a technique (Figure 7.9) or through research into color and material interaction that generates new sustainable methods for designing textiles (Figure 7.10).

Figure 7.4. Svenja Keune's exploration of seeds as dynamic materials for textile design.
Photograph: Svenja Keune.

Figure 7.5. *It's Now or Näver* by Emma Dahlqvist explores ways of applying textile design thinking to birch bark craft, using the technique of laser cutting. Photograph: Emma Dahlqvist and Jan Berg.

Figure 7.6. *Dear Dear* by Hanna Bredberg looks at food consumption through textile aesthetics and proposes a way of taking care of materials which are commonly looked upon as disposals. Photograph: Jan Berg.

Figure 7.7. Inspired by the Japanese wood joinery, *Giving Textiles Form* by Lovisa Norsell develops a coating technique for challenging the soft character of textiles. Photograph: Jan Berg.

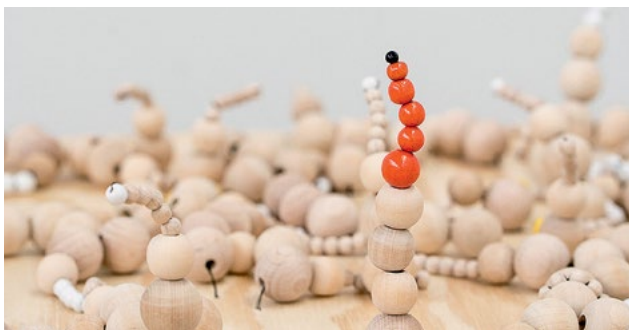

Figure 7.8. Lily Adamsdottir's *Tension Attention! Dancing Embroidery!* brings a new perspective on embroidery. The thread tension enables playfulness when interacting with the elements on the top surface. Photograph: Jan Berg.

Figure 7.9. *The Clothes I Live In* by Maike Schultz uses weaving to capture the dynamic expressions of wearing. Photograph: Maike Schultz.

The development of the textile field is maintained by keeping an active critical view of what textile design is. This can be done with the help of other fields, such as architecture, interaction design, product design, fine arts, and computer science. This perspective corresponds to Findeli's (2001) revisit of the three models of design education—Bauhaus, Chicago Institute of Design, and Ulm School of Design—that recommends design education to intertwine the following fundamental aspects: art, technology, and human and social science.

Maybe a complementary element is needed in conjunction with the existing experimental material approach when teaching design, as Findeli suggests? One way is to look at textiles outside their novel materiality and design methods, and to complement them with a relational perspective—textiles as fundamental materials for living. As relational aesthetics reverse the idea of passive matter and artifacts, which has been traditionally dominant in the artistic fields, and as we reconsider our relationships with the things around us (Bourriaud, 2002; Ladyman, 2015) we need to add new perspectives on teaching textiles as well. This could be done by looking at the three perspectives of teaching textiles proposed in this chapter—transformable materials, changeable colors, and dynamic and interactive forms—from an experiential viewpoint of the everyday use of textiles. By doing so, the teaching of textile design may need to introduce a method of changing typical situations into unexpected ones, stimulating reflections on everyday living, on ways of expressing identity, and on ways of looking at materials permanence and/or consumption.

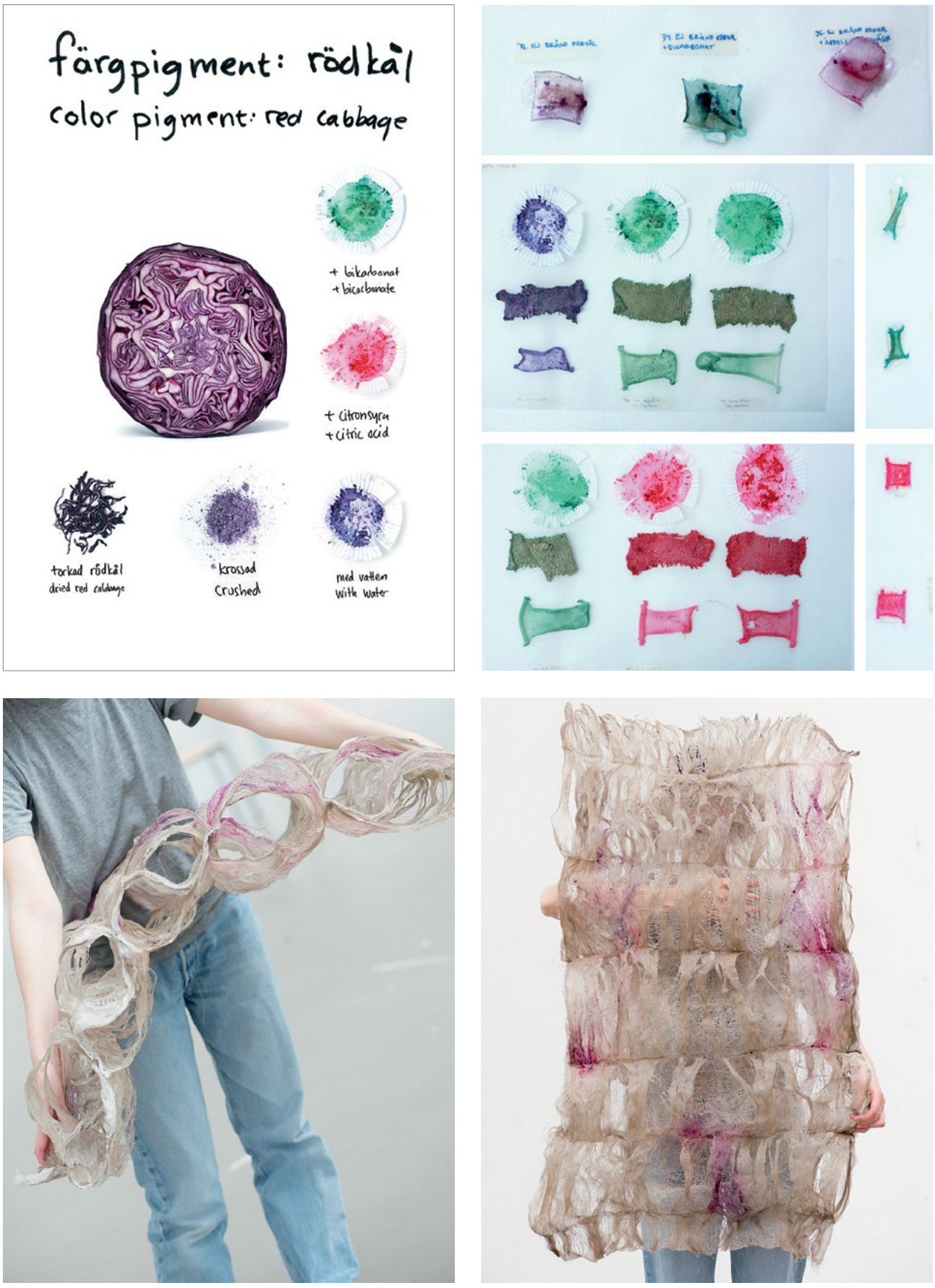

Figure 7.10. *Dyeing Diversity* by Emy-Rut Voksepp explores the expressive potential of plant dyeing and proposes a method for working with biodegradable materials and weaving. Photograph: Emy-Rut Voksepp and Jan Berg.

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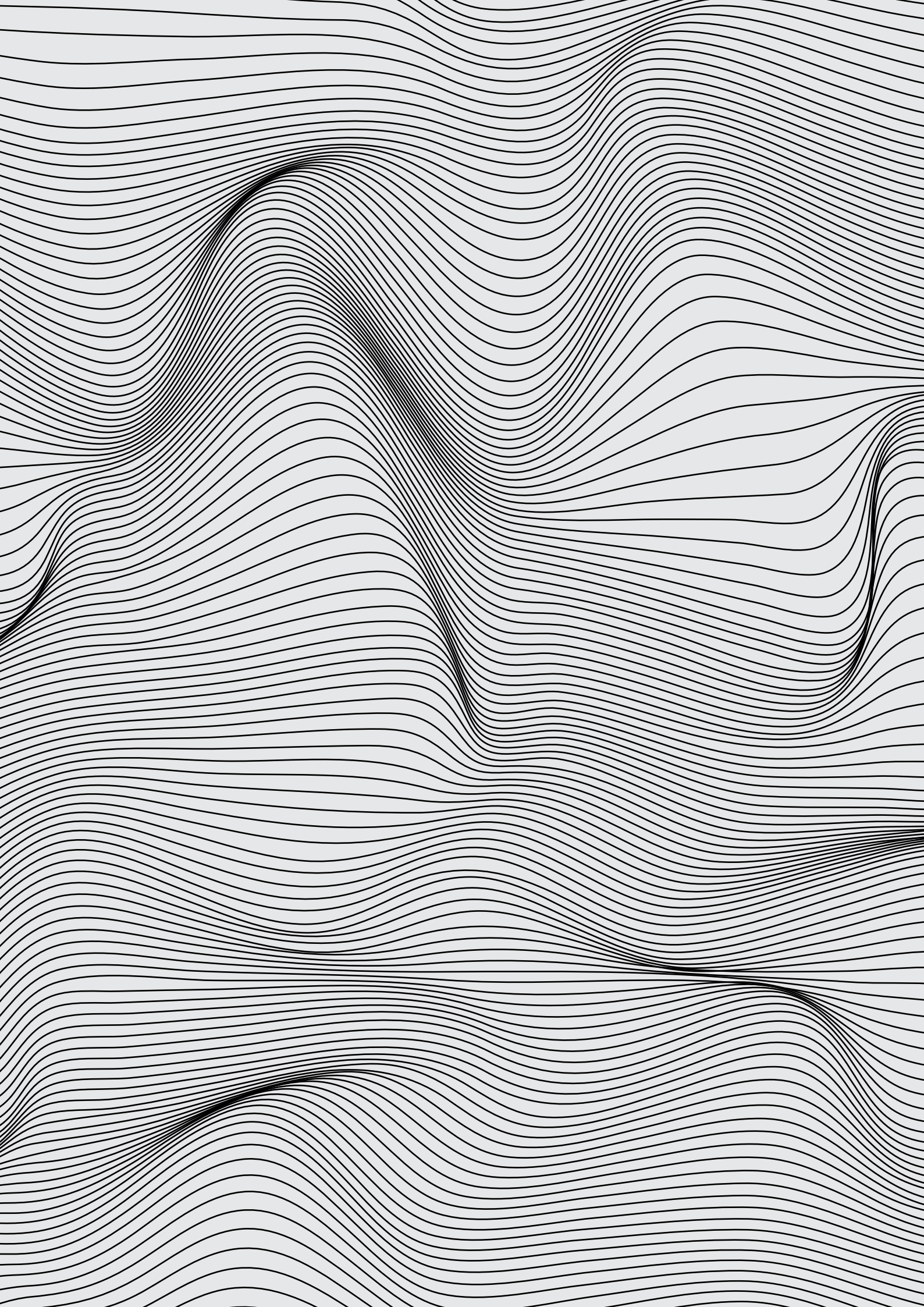

8 Biotextiles: Evolving Textile Design Practices for the Bioeconomy and the Emerging Organism Industry

Carole Collet

The Sustainable Textile Design Imperative

Historically, textiles have evolved around our ability to generate materials from our local natural environment. Linen and wool are prime examples, and our human history can be traced back more than 2000 years via the lens of local, hand-made cloth production. With the first industrial revolution (18th century), the steam engine and mass-manufacturing methods began the first great acceleration of our exploitation of natural sources at a global scale. This model preempted what is now described as the "take, make and dispose extractive industrial mode" (Ellen MacArthur Foundation, 2017) which results in dramatic environmental consequences. The textile industry today is an acute example of our endeavor to disrupt and destroy the very natural resources we depend upon to thrive as a species. A report published by the European Union in 2013 states: "Textiles is fourth in the ranking of product category which cause the greatest environmental impact, just after food & drinks, transport and housing" (European Commission, 2013, p. 1). With rampant consumption patterns putting even more pressure onto mass production, there is a strategic imperative to shift our ways of making, and to update our current manufacturing models. We know today that we are "rapidly eroding the resilience of Earth, having already undermined 60 percent of key ecosystem services in support of human wellbeing" (Rockström & Klum, 2015, p. 43).

In 2015, the United Nations launched its Sustainable Development Goals (SDG) to help target and address critical environmental challenges and to stimulate rapid and lasting actions. Centered upon people, planet, peace, prosperity, and partnership, 17 specific goals are defined to provide a framework for sustainable progress (United Nations [UN], 2015, p. 5). SDG 12 in particular endorses new targets for sustainable consumption and production and aims to achieve "the sustainable management and efficient use of natural resources" by 2030 (p. 26). In July 2017, a report assessing progress from nations against the SDG goals claims that "[g]lobally, the material footprint rose from 48.5 billion metric tons in 2000 to 69.3 billion metric tons in 2010" (UN, 2017, p. 9). This relates to the amount of global raw material extracted from the planet to meet global production and consumption demand. We are consuming our natural resources faster than they can regenerate. In terms of textiles and fashion, "clothing production has doubled from

2000 to 2014. The number of garments exceeded 100 billion by 2014" (Cobbing & Vicaire, 2016, p. 1). This pace of production and consumption is unprecedented and unsustainable. We need to start aligning our production models with new approaches that can sustain equilibrium with the natural world that we depend upon to survive.

But "while environmental degradation continues there are also unprecedented signs that we are beginning to embrace a "Great Transition" toward an ecologically sustainable future" (World Wide Fund for Nature, 2016, p. 6). Many textiles and fashion companies are actively working on improving the sustainability of their supply chains, or reviewing their energy and water efficiency to decrease their carbon footprint. However, as it stands today, this industry still largely relies on a linear model of production that does not integrate the cost to nature and the long-term consequences of extracting non-renewable materials, or generating lasting water, soil, and air pollution. Founded on a heavy use of fossil fuel, this industry is inherently unsustainable as it depends upon a finite, non-renewable resource. Oil is used not only for energy and raw material production, but also for the generation of chemical dyes, finishings, and coatings, and for the fabrication of synthetic fibers such as polyester. "Demand for polyester has grown strongly and steadily. In 1980, only 5.2 million tons of polyester were produced globally. By 2014, this reached 46.1 million tons" (The Ethical Fashion Source, 2016, p. 3). So how can the textile industry reinvent itself? How can it benefit from the emergence of a sustainable bioeconomy, and how can designers help reconnect textile fabrication processes with biological alternatives?

The next section will introduce the bioeconomy as an emerging textile design context, and will discuss how we can transition from a 20th century model of manufacturing that relies on chemical and energy intense processes towards a 21st century model that emulates biological and circular principles.

The Rise of the Bioeconomy and the Organism Industry as a Context for Textile Research

By default, designers are inscribed within economic models and are an integral part of production systems. Their design specifications pervade entire supply chains. Many professionally-active designers today are educated to design for a linear economic model based on non-renewable natural resources. For too many, sustainability is an option, a plug-in when and where possible. This is changing slowly, and in the UK creative design education is fast adopting learning strategies that embrace sustainable values. New economic models such as circular and bio-based industries are emerging, and with them a whole new range of design toolkits. The next generation of designers has begun to embrace a shifting context where the bioeconomy seems to be a fast evolving model for a post-petroleum society, and today, "more than forty countries have integrated bioeconomy in their policy strategies" (Global Bioeconomy Summit, 2015, p. 4).

The bioeconomy, in contrast with the petroleum-based economy, relies on the management and production of biological resources and combines agriculture and forestry together with innovative biotechnologies and genomic research. There are many variants and definitions of the bioeconomy; in this chapter, it will be referred to as "the knowledge-based production and utilization of biological resources, biological processes and principles to sustainably provide goods and services across all economic sectors" (Global Bioeconomy Summit, 2015, p. 1). In short, it is an economy founded on biomass and biofabrication principles rather than on fossil fuels. As such, the bioeconomy is not a truly new concept, but resonates with the origins of farming, brewing, and bio-processing, such as making wine or cheese. Yet recent advances in biosciences, in particular within the field of synthetic biology, have emulated a renewed perspective on the potential of the bioeconomy to address major sustainable challenges: "examples include using specialised microbes to transform wastes into bioenergy, or using plants as pharmaceutical 'factories' for reliable and rapid vaccine production" (Biotechnology and Biological Sciences Research Council, 2015).

From a material perspective, there is an increasing range of new textile biomaterials coming out of science labs and start-up companies that are based on bio-circular models. Waste has become a valuable resource to be upcycled into new materials thanks to the dynamic properties of biological agents. Examples include grape leather, a process that uses leftovers from winemaking to create vegetal leather ("Grape leather," 2017), orange fiber made with citrus and orange rinds left over from juice production ("Orange fiber, n.d.), or S.Café®, a yarn made from recycled coffee grounds ("S.Café", n.d.). Even "poo" has become a valuable commodity as demonstrated with Manure Couture, where Dutch designer Jalila Essaïdi proposes to extract the cellulose present in cow manure to create textiles (Tucker, 2016). In Finland, where the sustainable exploitation of forests

is critical, there is a strong focus on developing innovative cellulose materials:

> The renewability, climate-friendliness and biodegradability of cellulose-based materials are not the only properties that make these materials attractive when compared to the finite materials that they are substituting for. The organic nature of biomaterials also involves unique properties and allows for previously unimaginable applications... Nanocellulose, carbon fibres from lignin and bio chemicals from hemicelluloses have a multitude of future applications ranging anywhere from bionic materials to superconductors, to growth substrate for synthetic biology. (Kääriäinen & Tervinen, 2017, pp. 31)

These new bio-based materials and textiles offer sustainable alternatives to oil-based fibers such as polyester, and help shape a more circular textile industry.

From a more hi-tech and biotech perspective, the bioeconomy has entered a truly new era with synthetic biology tools. We can now genetically create and engineer living "machines," from the bottom up, by creating designer microbes and yeast to produce bespoke materials. Synthetic biology has opened the door to a fast developing organism industry where the "market is expected to grow to $11.8 billion in 2018 with a compound annual growth rate of 34.4% over the five-year period from 2013 to 2018" (Bergin, 2014).

In terms of textiles, leading biotechnology companies are now partnering with designers and design brands to bring to market new materials produced by genetically engineered yeast. In July 2017 for instance, Bolt Threads, a US based biotech pioneer launched a partnership with Stella McCartney to create the first dress made from bio-fabricated silk. Their technology enables them to "engineer fibres from scratch based on proteins found in nature, and then develop cleaner, closed-loop processes for manufacturing, using green chemistry practices" (Stella McCartney & Bolt Threads, 2017). Meanwhile, Adidas unveiled the first shoe made from biosteel fiber (Adidas, 2016), and Modern Meadow (2017) launched Zoa in September 2017, "the first ever bio-fabricated leather material brand" under the direction of Suzanne Lee, Modern Meadow's fashion designer and creative director. These radical developments validate the need to recalibrate what and how we design when our manufacturing tools have become living cells. How do we design with a synthetic nature? And how can we ensure this hi-tech end of the bioeconomy can lead to better sustainable production systems? Most biotechnology companies refer to a sustainable narrative when commercializing their genetically programmable new materials. This in itself is a paradox, as historically speaking bioengineering has not been associated with concepts of sustainability. Bolt Threads (2017), for instance, states that "the main input in [their] fiber-making process is sugar from plants that are grown, harvested and replanted. Compare this to polyesters which are made from petroleum. [sic] Currently, more than 60% of textiles are made of polyester and other petroleum-derived fibers." Of course, finding new biosolutions that can replace polyester and help shift from our current dependence on non-renewable oil and toxic chemical processes can only be a positive step forward. However, a full life cycle analysis of these bio-manufacturing plants is not available yet. It is a very young, fast evolving industry. Even if it offers a promising sustainable future, we also need to remain mindful of the bigger picture. If the entire industry was to turn to bio-synthetic fiber production made from genetically-modified organisms feeding on sugar, what would that mean in terms of the global environmental impact of sugar production? As usual with sustainable challenges, we need to think about the overall equilibrium.

This new range of biotextiles is shaping a new manufacturing horizon for designers. As seen above, the bioeconomy entails working with natural bioprocesses, upcycling bio-waste into new materials as well as developing synthetic biological biofabrication models. Designers will need to understand these new fabrication processes to be able to design for a new kind of biological production line. According to the European Union, "recent and continuing progress in the life sciences now makes the Bioeconomy one of the most dynamic sectors of the European economy and it is also one of the largest employers" (European Plant Science Organisation, n.d., p. 5). Designers can contribute ideas and creative thinking to this new bio-based regenerative economy to help transition towards a more sustainable future. They have begun to adapt their design briefs and to develop new design protocols to operate within the context of the bioeconomy and the emerging organism industry. Today, designers engage directly with material creation. Not content to script and shape existing materials, they become alchemists, gardeners, or even cooks to transform their tacit understanding of the creative process into new materials.

The next section will showcase a range of examples that embrace this new breed of designers, and review how they operate in the context of the bioeconomy and the organism industry.

Designing for the Bioeconomy and the Organism Industry

How can we shift from designing for manufacture to designing for biofacture? How can design contribute towards and shape the sustainable potential of the bioeconomy and the organism industry?

> Before 2100, the bioeconomy will have to double its output of raw material while halving its environmental impact. This will require not just smart science and technology but due attention will have to be given to shaping societal behavior and adapting to changing economic realities. (European Plant Science Organisation, n.d., p. 8)

Figure 8.1. Lacebark produced by the Lagetta lagetto tree. Photograph: Carole Collet.

The design profession will need to transition to this new context, and the recent rise of biodesign, a discipline that intersects biology and design principles, highlights the beginning of an emerging and profound paradigm shift for design.

The integration of biology into material systems combines traditional and ancestral techniques together with cutting-edge radical new biotechnologies such as synthetic biology. This wide landscape of techniques allows biodesigners to interconnect tradition with innovation. In 2013, after curating *Alive: New Design Frontiers* (2013), the first international exhibition that examined biodesign via the lens of sustainability, I set up the Design & Living Systems Lab at Central Saint Martins, University of the Arts London to frame this very new landscape. By exploring the intersection of biological sciences and design, the D&LS Lab develops new biomaterial agencies and propositions for future sustainability that harvest techniques issued from botanical craft practices as much as from cutting-edge synthetic biology research. First and foremost, I am inspired by how nature works and behaves. So I ask: how does nature make a textile? How does nature make a pattern at ambient temperature, without impacting on its local ecosystems, but instead by nurturing life? What can I learn from observing nature? Figures 8.1 and 8.2 show a lacebark produced by the Lagetta lagetto tree in Jamaica and a textile-like bark produced by a coconut tree.

Figure 8.2. Textile-like bark produced by a coconut tree. Photograph: Carole Collet.

Figure 8.3. *Strawberry Noir*, part of the speculative *Biolace* series, Carole Collet, 2012.

Figure 8.4. *Basil˚5*, part of the speculative *Biolace* series, Carole Collet, 2012.

Figure 8.5. *Lace Doily* hand-made lace with fresh strawberry roots, Carole Collet, 2012.

Both of these examples reveal that, in the natural world, there are sets of DNA code that can control the fabrication of materials to look and behave as a man-made woven cloth. These examples inspired the development of the *Biolace* project in 2012, where I used speculative design tools as well as traditional craft techniques to imagine the future potential of synthetic biology to grow ready-made constructed fabrics. The idea here is to imagine growing woven fabrics locally, as opposed to following the current conventional model, which involves many different stages of production from fiber to final product and relies upon different manufacturing stages spread across the globe. *Biolace* proposes to design multi-functional plants that can cater for the local food industry and the fashion supply chain at the same time (Figures 8.3 & 8.4).

Set in a future vertical urban farming context, these plants can generate locally both a food and a textile harvest. *Strawberry Noir* and *Basil˚5* illustrate a future post-natural world, whilst *Lace Doily* is real, hand-laced with fresh strawberry roots (Figures 8.5 & 8.6). The *Biolace* project explores plant roots as a material system for textiles using both speculative and traditional craft tools.

If *Biolace* explores the imaginary of the organism industry and the future of synthetic biology with bio-craft techniques, artist Diana Scherer casts plant root networks at the seeding stage to create new textiles. Her work is located at the intersection of horticulture, design, and photography. By carefully selecting plants for their root characteristics and in collaboration with plant scientists, Scherer creates living woven root systems that can be harvested and then dried. In her project, *Interwoven—Exercises in Rootsystem Domestication,* Scherer grows root systems to form a final product such as a rug (Figure 8.7).

Figure 8.6. *Lace Doily* (details), Carole Collet, 2012.

Figure 8.7. *Interwoven—Exercises in Rootsystem Domestication*, Diana Sherer, 2016.

Figure 8.8. *Harvest*, Diana Sherer, 2016.

Figure 8.9. *MarsBoot*, a collaboration between Liz Ciokajlo, Rhian Solomon, and Maurizio Montalti, 2017. Photograph: George Ellsworth.

Here, the artist has to nurture the plant growth, simultaneously guiding the shape of the final root network to control the final outcome. *Harvest* shows the challenge of fully controlling the directional growth of the roots to obtain a carefully composed root mat (Figure 8.8).

Both the *Biolace* and the *Interwoven* projects endorse a fundamental and explorative research approach to evolve new ways of making. But before all, these projects develop new design protocols that include working with living organisms to create new materials and products. The difference with conventional design involving inert or dead matter is striking. When collaborating with a living organism to create a product, a designer needs to understand the parameters of growth, such as heat, humidity, and light levels, to be able to master the fabrication process. Optimizing and altering these parameters will affect the inherent dynamic biological properties of a living system and influence the resulting materiality, as seen with Diana Scherer's work.

But when it comes to root systems, some of the most recent innovative projects are arising from working with mycelium, the root network of fungi. Mycelium absorbs nutrients from its surroundings and can rapidly change its growth patterns and other behaviors in response to its environment: it is agile, dynamic, and adaptive. It is known as a recycler organism and has the ability to disassemble large organic molecules into simpler forms. Inspired by visionaires such as Maurizio Montalti and Phil Ross, who pioneered this idea very early on, an increasing number of artists and designers are exploring mycelium to create new "grown" materials. The latest example is a collaboration between Maurizio Montalti (Officina Corpuscoli) and Liz Ciokajlo/Rhian Solomon (OurOwnsKIN) which resulted in the production of *Caskia / Growing a MarsBoot*, commissioned for the MOMA exhibition *Items: Is Fashion Modern?* in October 2017 (Figure 8.9).

The project addresses the restrictions characterising space travel and the need to optimize logistic needs, by minimising the quantity of required matter (fungal mycelium spores) loaded in the craft at launch and by later growing materials and tools during the journey towards Mars. In this scenario, astronaut's sweat is filtered and combined with fungal mycelium, partly feeding the fungal culture for the generation of grown materials, raising debate about how much of our own bodies can be utilized as a material source for producing fashion items in space and on Mars (OurOwnsKIN, 2017).

In this example, the brown leather-like material is a natural composite grown with mycelium and the *MarsBoot* becomes a symbolic icon to explore future conceptual possibilities for grown materials in the context of space travel.

Mycelium Textiles is another example of a research project that explores the potential of mycelium, but with a focus on creative biodegradable and sustainable coatings and materials for the textile industry. In this project, traditional finishing textile techniques are revisited to grow a range of mycelium textiles, using waste coffee as the main food source to feed mycelium as it grows. The careful nurturing of mycelium and the control of the dynamic properties of life allow for the development of composite materials, partly as a result of the design intent and partly as the manifestation of the mycelium life form. *Mycelium Lace* (Figure 8.10) shows how mycelium can be grown to mend and strengthen a cellulose-base lace cloth.

Mycelium rubber (Figures 8.11 & 8.12) is the first self-patterning mycelium material ever produced. The floral patterns on the surface of the mycelium rubber have grown without a mold; they are simply the result of a self-assembly and cellular self-organization behavior inherent to living systems.

Figure 8.10. *Mycelium Lace*, Design & Living Systems Lab, Carole Collet, 2015.

Figure 8.11. *Self-Patterning Mycelium Rubber*, Design & Living Systems Lab, Carole Collet, 2016.

Figure 8.12. Details of *Self-Patterning Mycelium Rubber*, Design & Living Systems Lab, Carole Collet, 2016.

The creation of this collection (work in progress) converges the growing stage of the material with the control of the final form. The final outcome will be a collection of fashion collars. They will be grown, as opposed to sewn together. In a conventional design and manufacturing context, a designer would specify the transformation process required to shape a product after a material has been grown (i.e., wood from a tree), extracted (i.e., a metal sheet), or produced via a petrochemical process (i.e., plastic). Here, the developmental morphogenesis of the mycelium material becomes the site for design intervention and the final form evolves out of the growing process. Figures 8.13 and 8.14 compare key conventional textile manufacturing steps with emergent "horticulturing" practices.

Mycelium Textiles offer new propositions to grow textile products as opposed to textile materials and proposes to bypass conventional steps by converging the shaping stage with the growing stage. This is currently very much an exploratory project, but the aim is to develop new protocols to grow bespoke textile products locally at ambient temperature.

As seen above, biodesign can rely on a range of design methodologies, from using the growth process of an organism to control the morphogenesis of the final output, to using speculative design tools or working in a biology lab to co-produce with living organisms.

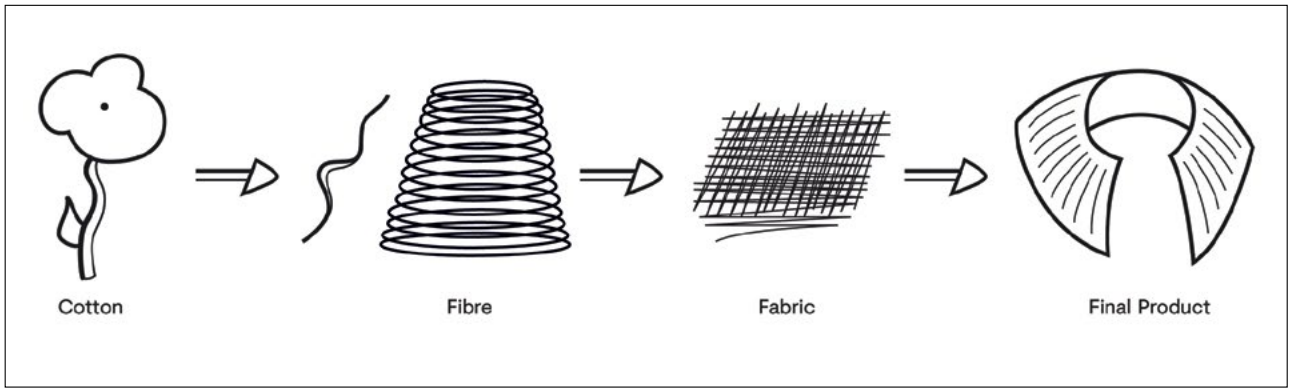

Figure 8.13. From cotton plant to final products; example of key manufacturing stages. Diagram: Carole Collet.

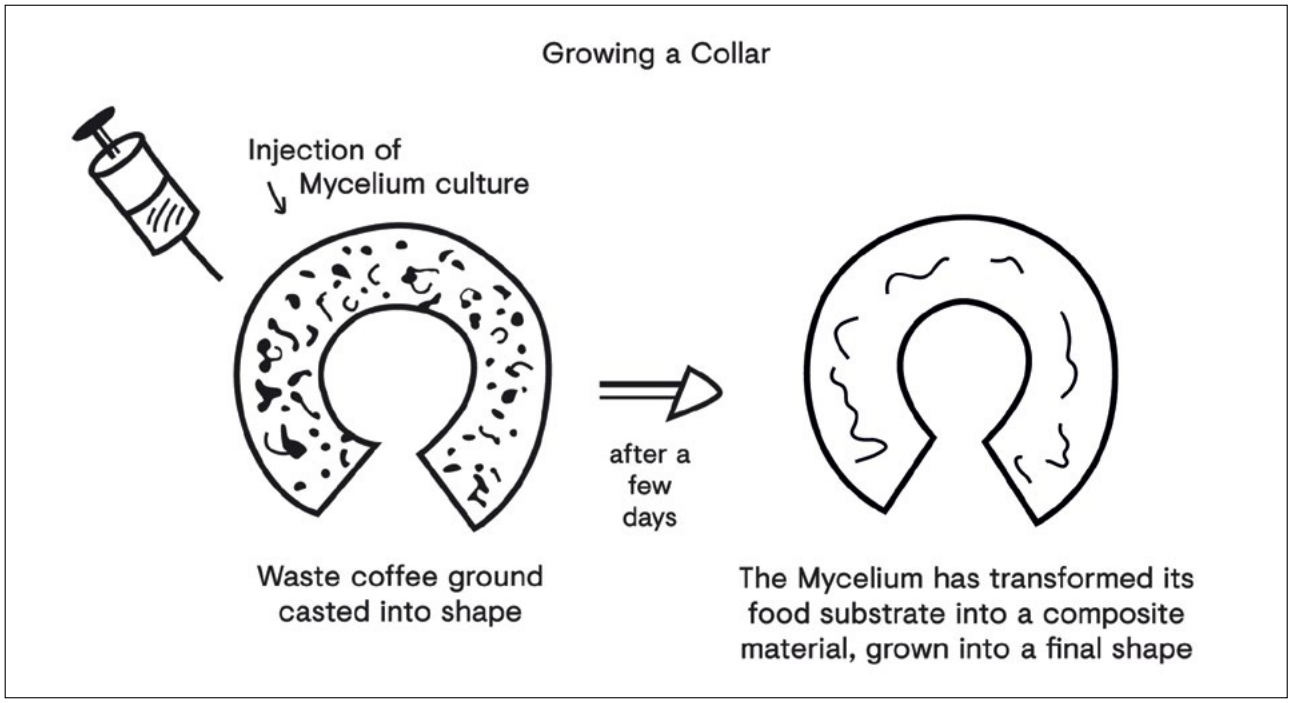

Figure 8.14. Using mycelium to grow local products such as a fashion collar, using waste substrate for food.

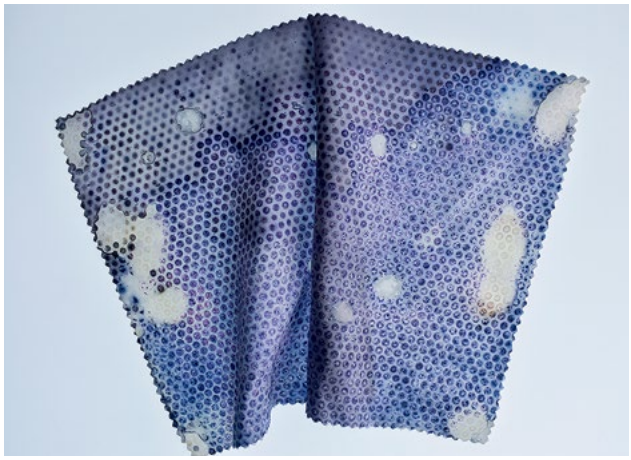

Figure 8.15. *Faber Futures* | *Void* (experimental sample), Natsai Audrey Chieza, 2017.

Figure 8.16. *Faber Futures* | *Void*, Natsai Audrey Chieza in collaboration with Ginkgo Bioworks, exhibited at Hubweek, Boston, 2017.

For designers, this also means that we can integrate traditional hand-made and man-made production modes together with what I call the "grow-made" fabrication process.

But when it comes to textiles, one of the most damaging environmental impacts relates to the use of large quantities of water and chemical dyes. Independent designer Natsai Chieza proposes an alternative dye technique that relies on a bacterial production line. She cultivates bacteria that can dye fabric as part of their growth process at ambient temperature, without requiring large quantities of water. This innovation can radically transform our conventional water-intensive toxic dyeing industry. Figures 8.15 and 8.16 show her latest fashion textile range, up-scaling petri dish sample tests to lengths of fabric that display the patterns resulting from the bacterial life forms.

Chieza selects bacteria that can naturally express color. She then orchestrates variations in color expression by simply altering the environment of growth via the growth media and temperature levels. By controlling how the fabric is folded when in contact with the bacteria, she can also generate patterning techniques that resonate with traditional resist-dye techniques. This is the most innovative use of natural bacteria for a chemical-free dye technique that could revolutionize the textile industry. Traditional natural dyes that rely on toxic heavy mordants to fix color into fibers are therefore not a viable solution for sustainable textiles. Synthetic dyes are born out of petrochemistry and generate persistent water pollutants. This new bacterial-based technique offers a transformative, innovative approach to sustainable textile dyeing and patterning.

All the projects cited in this section have relied on "design-science" collaboration. The intersection of scientific and creative expertise is increasingly proving to be a model for sustainable innovation. Chieza began by working at a small scale in collaboration with Professor John Ward at University College London (UCL). Her recent collaboration with Ginkgo Bioworks in Boston has allowed her to challenge the scientific process further and to create hybrid biodesign protocols that incorporate biological research together with creative thinking and an understanding of the needs of the textile industry.

Another pertinent example is a current Ph.D. project at Chelsea College of Arts, University of the Arts London by designer Miriam Ribul that has developed experiments in dissolution and regeneration of cellulose. During a series of design research residencies at the RISE Research Institutes of Sweden with Dr. Hanna de la Motte, she has developed design-led models to shape regenerated cellulose. Her work shows how material development in the science laboratory can become inherent to the design process. An innovative technique that enables regenerated cellulose to be directly shaped into a 3D form, with variations in both the tactile and visual aspect of the base material, has resulted in the first samples shown in Figure 8.17.

The potential for regenerated cellulose to be used in the form of pigment to produce a print effect has also been tested (Figure 8.18). In this test sample, both the base fabric and the print paste are made of regenerated cellulose, thus creating a patterned mono-material that can be upcycled easily. Here we see the very early stage of the design development in the context of the bioeconomy. Working with these emergent bio-materials directly in the science laboratory offer new possibilities for designers, and crucially allows them to get involved into the material development stage to influence and develop new textile applications.

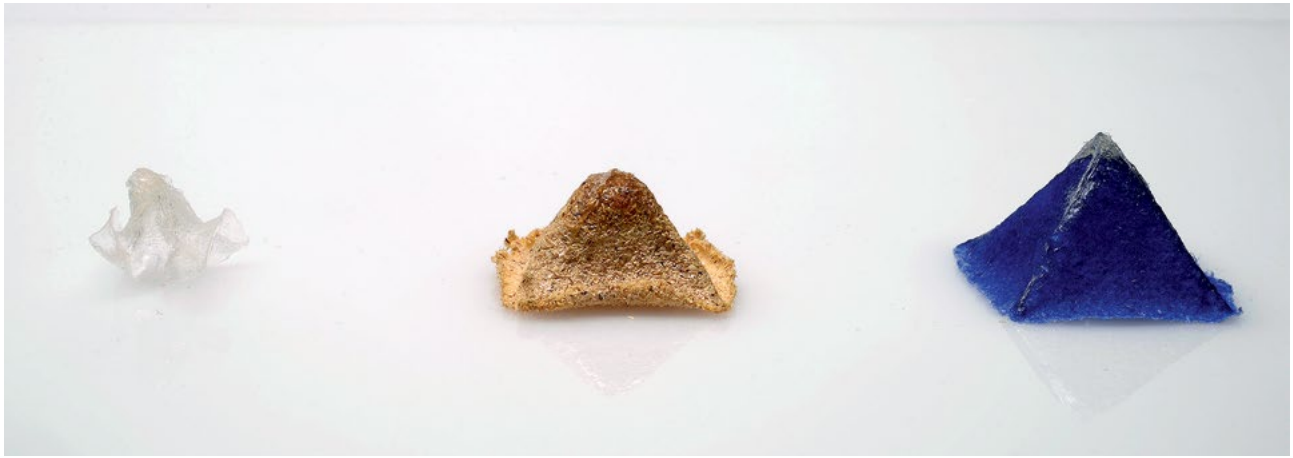

Figure 8.17. Regenerated cellulose 3D tests, Miriam Ribul, 2016.

Figure 8.18. Regenerated cellulose print test, Miriam Ribul, 2016.

This section has shown a range of approaches to design in the context of the bioeconomy. From speculative work that explores the emergent and future potential of synthetic biology, to creating biomaterials in collaboration with living organisms such as plants and mycelium or co-opting bacteria to create colored patterns without chemicals, these textile proposals offer new possibilities to design for a fossil-free manufacturing system. Balsamo (2011) writes that "designers work the scene of technological emergence: they hack the present to create the conditions of the future" (p. 6). A fast growing generation of designers is embracing old biological principles as much as new bioengineering protocols to reimagine materials and products of the future and to explore technological emergence to develop alternative sustainable design scenarios. They set the boundaries for a transition from global manufacturing to local horticulturing and open the door to a new kind of design practice.

Conclusion

As a growing number of initiatives take a stance to protect the environment, the bioeconomy is fast emerging as a transitional model away from the current linear petrochemical economy. Converging traditional exploitation of biological resources together with cutting-edge synthetic biology research and the design of living factories, the bioeconomy invites designers to recalibrate their practice. Biotextiles can offer alternative material choices and designers have begun to get involved directly in the material development phase to influence future sustainable textile propositions. However, we need to remain critical of the promises of the bioeconomy. It will deliver its environmental benefits only if it respects the circularity of our ecosystems, and it must incorporate inherent sustainable practices. But even if we succeed in shifting from conventional linear manufacturing systems to more sustainable circular bio-based production models, we are still at risk of endorsing further our current overconsumption mindset. The bioeconomy can only succeed if we alter our consumption behaviors, and fundamentally rethink the notion of progress to create a new bio-modernity that is inclusive, interconnected, and mindful.

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9 Opportunities of Interactive Textile-Based Design for Education Tools for Children with Various Spectrums of Alertness Sensitivities

Kristi Kuusk and Nithikul Nimkulrat

Introduction: Textile Design and Social Design

Whilst social design can improve human livelihood and well-being, it offers designers challenges to tackle with traditional materials and approaches. For nearly ten years, social design projects at the Estonian Academy of Arts have touched upon the applications of textile knowledge and skills for the creation of teaching and therapeutic tools for children and adults with special needs. By collaborating with various care and support organizations in Tallinn, the projects capitalize on the traditional textile design students' skill base, and at the same time encourage the student cohort each year to learn additional electronic textile properties, so that they can apply these consolidated skills and knowledge of textiles and electronics in a social context.

This chapter will take a recently completed social design project as an example to demonstrate the way in which traditional textile skills can be combined with electronic textile properties to solve specific problems designated by social care services. In spring 2017, the final-year textile design bachelor students received an assignment to design tools and playful interactive textile-based educational games for the Tallinn Children Hospital's Mental Health Center's multisensory room. As pointed out by Salonen (2008), an interactive multisensory sound room is a learning environment. It adopted ideas from Montessori pedagogy where the pupils actively explore different ways of using selected sensory materials. Learning occurs by playing or experimenting with immediate feedback. In this way, the pupils gain internal motivation to explore and learn new things (Hayes & Höynälänmaa, 1985). The interactive multisensory environment provides direct and indirect stimulations of sensory modalities. For people with autism, for instance, the following stimulations are advised: visual stimulation (sight), auditory stimulation (sound), olfactory (smell), gustatory (taste), tactile stimulation (touch), and proprioceptive and vestibular stimulation (movement) (Collier, n.d.).

Electronic textiles, also known as e-textiles, smart textiles, or intelligent textiles, are generally different

combinations of textiles and electronic materials and techniques. They have been used in products or solutions for health improvements. For example, Philips' *PLACE-it* project proposes BlueTouch as light therapy for pain relief and Bilirubin blanket for neonatal jaundice phototherapy care (van Os & Cherenack, 2013). Another example is a series of e-textile weaving workshops with blind and visually-impaired people conducted by Emilie Giles and Janet van der Linden (2015); they find that "eTextile pieces, simply put together by people using their own hands and imagination, can form a powerful way to tap into people's creativity and raise their curiosity" (p. 10). Giles and van der Linden (2014) have also explored the possibilities of touch-based interaction in connection with the materiality of e-textiles. Co-creation of textiles by people with impairments can be seen in a project led by Sense, a national charity, in which people with sensory impairments over the age of 50 in Islington, London, work together for twelve weeks at Islington Museum to design a patchwork representing their memories (McEwan, 2015). In the educational context, Lara Grant at California College of the Arts works with her students on designing a wearable device or soft interface for people with cerebral palsy (Grant, 2016).

In the project to be exemplified in this chapter, the students were encouraged to use electronic textiles together with their traditional textile design background in their work. However, they were also allowed to develop textile-based interactive tools with no relation to electronics. The students began by participating in a one and a half-week introductory workshop on soft switches where they learned the basics of soft electronics, electronic circuits, and programming Arduino. After the workshop they started with the social design project in which they were required to design and prototype interactive textile-based educational tools.

Process of Designing Interactive Learning and Therapy Tools

At the start of the project, Tallinn Children's Hospital special needs educator introduced the needs of various spectrums of children's alertness sensitivities to the students. The students were asked to develop learning and therapy tools for the specialists to use in their daily work with their clients. The students could choose to work either individually or in self-formed pairs. In the cohort reported here, one student worked individually and four other students worked in pairs, creating three interactive tools that will be introduced in the next section of this chapter.

The participating students all had background in textile design and wished to develop their knowledge of social design and e-textiles. First, the basics of social design and educational development of children were introduced to the cohort. They learned about the sensory room concept (International Snoezelen Association, 2017) and visited a multisensory room in a local children's hospital in Tallinn. A special needs educator from the hospital talked to the students, describing a typical working day, patients, tools, and procedures. The students could try some of the existing tools equipped in the multisensory environment. They were introduced to the Lovaas approach, which is a behavioral treatment model typically used with children with autism aged between two and eight (Lovaas Institute, 2005). In this approach, social interaction and cooperative play are integral; parents and instructors interact with a child through one-to-one activities in order to establish rapport and develop constructive and positive relationships.

As a next step, the students were asked to envision a new tool for the special needs educator. The design had to fit into the existing multisensory room, benefit the clients, and suit the hospital's requirements (such as easy to clean, reliable, etc.). Along with sketching and ideation, the students were encouraged to start rough prototyping, e.g., building the tool from available materials in a quick way. These materialized ideas were reviewed by the special needs educator, who then provided feedback based on her experience. After that, the prototypes were improved, refined, and built from more reliable and refined materials.

Three Prototypes of Interactive Learning and Therapy Tools: *UUDU*, *SHPACO*, and *TEKK*

UUDU: TOOL FOR COLOR/PATTERN MATCHING AND TEXTURE EXERCISES

The first student project *UUDU* (Figure 9.1) has a soft rotatable hexagonal wheel divided into color and pattern sectors and attached to a wooden panel painted in the same colors and patterns on the top part. The title *UUDU* came from the word "puudutama" which means touch in Estonian. It draws inspiration from a tactile color wheel game for blind children that introduces colors using tactile objects, braille, and social play (Bobnar, n.d.), and interchangeable textured

Figure 9.1. *UUDU* by Helen Grass and Irina Pommer, 2017. It has a soft rotatable wheel for matching exercises and changeable material swatches for tactile exercises. Photograph: Helen Grass, Irina Pommer.

rollers (Technical Solutions Australia, 2015) with five different textures that provide sensory awareness. The rollers encourage reaching, swiping, and grasping.

UUDU enables children with various spectrums of alertness sensitivities to play color or pattern-matching between the painted plywood box and the soft cushion wheel according to the task given by the educator. The bottom part of the prototype that aims at encouraging children's free exploration of different textures contains three soft rollers around which changeable textured bands can be attached using Velcro. The bands are made of various materials, such as beads, sequins, yarn, felt, and fabric, with a variety of techniques including printing, crochet, beading, embroidery, and appliqué. The interchangeable materials invite the child to touch and spin the rollers. Children can replace and organize the covering bands on the backside of the prototype (Figure 9.2). These bands can be placed on the rollers to match descriptive pictures or words (e.g., soft, coarse, etc.). *UUDU* is equipped with 15 textile bands whose material properties can be compared to words. Additional pictures, graphics, or words can be attached on to pillow with Velcro.

The proposed design encourages children to explore different textures and colors. Having multiple uses and levels of difficulty, the design gives the flexibility to choose tasks with different levels of difficulty suitable for children with various abilities. Some elements of *UUDU* can be used in different ways, therefore not all the use-cases have been envisioned and can be further developed by the child and his/her teacher. The interchangeable, washable covers also allow the tool to be cleaned as required by the hospital's requirements and staff.

The team had several advanced material concepts, which they neglected in the process. For example, they were thinking of filling the rollers with water that would create different sounds when rolled as well as change its state when frozen. They also played with the idea of using portable microphones to emphasize the sound of materials through speakers. They wanted to add LED lights that would turn on in a certain color when the respective color buttons were pressed.

These concepts were explored through rough prototyping but were not developed because they did not correspond to the requirements of the hospital environment and children needs.

SHPACO: INTERACTIVE GAME FOR LEARNING COLORS, SHAPES, AND PATTERNS

The second student project *SHPACO* [SH = shapes; PA = patterns; CO = Colors] (Figure 9.3) aims to help children with various spectrums of alertness sensitivities to recognize colors, shapes, and patterns, and to balance the body. The floor game with soft switches invites two participants to play. Each symbol represents one color, one shape, and one pattern. Each color, shape, and pattern appears twice on the textile surface. For the exercise, the instructor can stand on one color and ask the client to find the same color, or do the same with shapes or patterns (Figure 9.4).

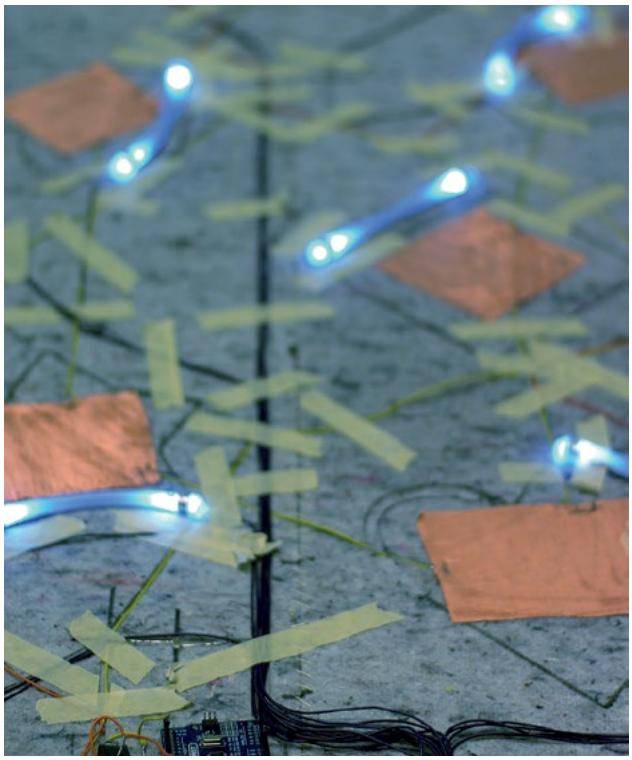
SHPACO draws inspiration from Moto tiles (Entertainment Robotics, n.d.), an interactive floor tiling for the elderly to practice balancing the body, and from shape memory games that help people to train memory function.

Figure 9.2. *UUDU* has material exploration swatches that can be attached to the rollers as well as backside of the prototype with Velcro. Photograph: Helen Grass, Irina Pommer. © Helen Grass, Irina Pommer, and Estonian Academy of Arts.

Figure 9.3. *SHPACO* by Maria Teng, 2017. It is an interactive floor game that allows children to learn colors, shapes, and patterns. Photograph: Maria Teng. © Maria Teng and Estonian Academy of Arts.


Figure 9.4. *SHPACO* invites the collaborative players to recognize different colors, shapes, and patterns. Photograph: Maria Teng. © Maria Teng and Estonian Academy of Arts.





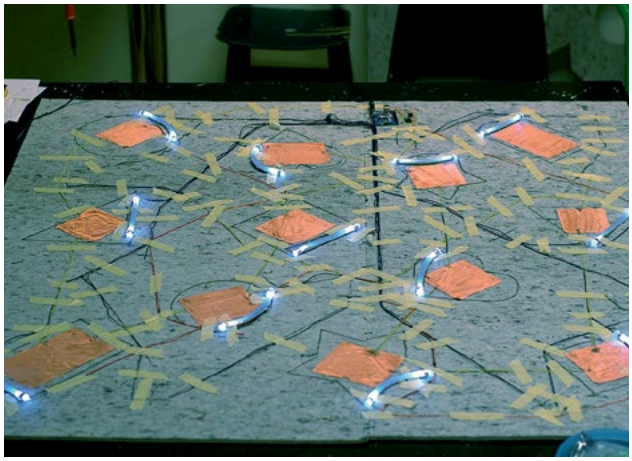


Figure 9.5. Overview of how the *SHPACO* project was made from design concept, silk-screen printing, color mixing to embedding LED-s into tubes, creating channels for the connection wires, and programming its behavior. Photograph: Paul Urbel. © Maria Teng, Paul Urbel, and Estonian Academy of Arts.

SHPACO uses bright colors and large shapes in combination with sometimes more-difficult-to-distinguish patterns. The variety of exercises and levels of difficulty make the game usable for a large group of people of different spectrums of alertness sensitivities and ages. The colorful patterned shapes are made of silk-screen water-soluble pigment printing on cotton fabric (Figure 9.5). For easy cleaning purposes, the whole fabric cover is removable from the recycled-felt base, which is embedded with electronic components, such as LEDs, resistors, transistors, electrical wire, conductive fabric, and conductive yarn. The game is controlled by the switches on the plywood box with an Arduino Uno hidden inside and connected to the electronics embedded in the base and a power cord.

SHPACO builds upon this student's previous work, a small flower with color-matching petals, created during the introductory workshop on soft switches. She scaled it up into a play mat and changed the programming code based on the newly developed interaction and item layout. She tested what needed to change when replacing a small smart textile item with a large soft electronic prototype. She managed to solve several technical challenges along the way, such as the use of soft and hard electronics combined, running wire within the textile surface, and protecting electronics from being stepped on.

TEKK: MULTIFUNCTIONAL THERAPEUTIC BLANKET

The third student project *TEKK* (Figure 9.6) is a multifunctional therapeutic blanket with adjustable weighted sachets for conveniently altering pressure and function of the blanket. The title *TEKK* means blanket in Estonian. It works as an anxiety relief tool based on deep pressure touch stimulation (DPTS). As a play mat, it develops balance skills, mimics a massage, and stimulates tactile senses. The blanket set includes buckwheat and aromatic herbal heat pillows to stimulate smell and tactile senses (Figure 9.7). The traditional weighted blanket aims to calm, promote sleep, imitate a warm hug, and provide a sense of security (SensaCalm, 2015). *TEKK* can be used by people

Figure 9.6. *TEKK* by Kris Veinberg and Egle Lillemäe is a multifunctional buckwheat blanket that, besides its calming effects, invites playful interaction. Photograph: Kris Veiberg. © Kris Veinberg, Egle Lillemäe, and Estonian Academy of Arts.

Figure 9.7. The buckwheat sachets filled with additional scented herbs in *TEKK*.
Photograph: Kris Veinberg. © Kris Veinberg, Egle Lillemäe, and Estonian Academy of Arts.

of all ages at public institutions, such as hospitals, as well as in the home environment. It uses buckwheat, a local material often used in therapeutic buckwheat hulls pillows (RemedyWay, 2017), of which both the hulls and the seeds can be used to achieve different weights of sachets (Tõrvaaugu Organic Farm, 2017).

TEKK builds on the prior knowledge of the benefits of weighted blankets for calming over-stimulated children and adults (Mullen, Champagne, Krishnamurty, Dickson, & Gao, 2008; Vaucelle, Bonanni, & Ishii, 2009; Venosa, 2016) and the benefits of buckwheat as biodegradable and natural, breathable, hypoallergenic, long-lasting, and therapeutic (Buckwheat Hull Pillows, 2014).

The main material of *TEKK* is cotton supplied by a manufacturer of hospital bed linen. *TEKK* is 120cm x 160cm in size, containing 25 pockets with closures using elastic bands that fit 25 zippered sachets, each 20cm x 25cm weighing 500 g. The maximum weight for the blanket is 12.5 kg. *TEKK* has an additional four heat pillows of slightly different sizes and inserted anti-anxiety herbal scents, such as star anise, chamomile, and lavender.

The student team who developed *TEKK* worked persistently with a clear vision on the buckwheat blanket idea. Next to the weighted blanket prototype they considered several other blanket-style concepts that were developed up to a certain extent. However, in the end the team decided to focus on one item and its presentation.

Testing Prototypes in the Context and Feedback

To better understand the context and improve the designs, the special needs educator working with her client tested all of the student works in the children's hospital. The client is a boy, 6 years and 2 months old, with autism and attention deficit and hyperactivity disorder. He has language perception and communication difficulties. The students could observe how the client reacted to their design prototypes.

When introduced to *UUDU*, the child was excited to see many colors and textures and immediately touched and pressed different materials (Figure 9.8). He enjoyed reorganizing the textile swatches on the board and found out by himself that the materials can be changed on the rollers. He was most intrigued by a sample that had soft, shiny, and hard materials mixed in one. Matching colors of the pillow and board did not retain his interest for long; it seemed to be too easy a task for him.

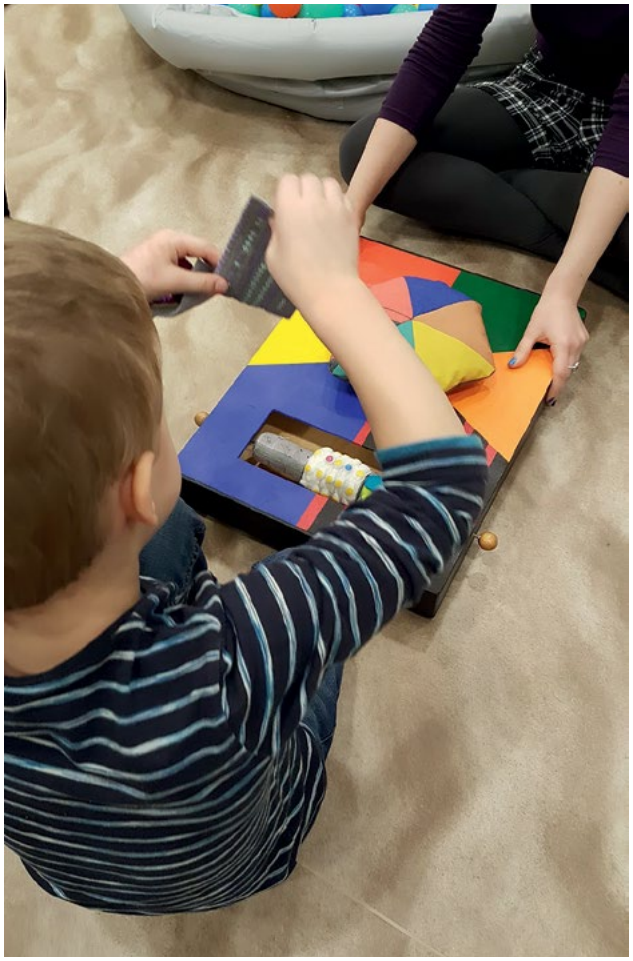


Figure 9.8. A child discovering *UUDU*, matching colors with the soft wheel, organizing the swatches on the back of the box, changing the roller swatches, and feeling them. Photograph: Helen Grass, Irina Pommer.

Figure 9.9. *TEKK* and *SHPACO* in the Childrens' Hospital testing room and the special needs educator introducing them to the child. Photograph: Kris Veinberg. © Kris Veinberg, Egle Lillemäe, Maria Teng, and Estonian Academy of Arts.

The special needs educator involved in our project liked the textile swatches on rollers. She pointed out that the game was perhaps cognitively too simple for the child, but he enjoyed the tactile aspects of the textures and the possibility of changing the cover of the rollers with Velcro. In her view, *UUDU* could be used more successfully with younger or cognitively less-developed children for enhancing their visual perception and their creation of associations. *UUDU* therefore works for improving tactile sensing, raising, and lowering sensitivity in children of all ages and levels of development.

The *SHPACO* play mat was not completely finished when it was tested in the hospital (Figure 9.9). All the lights illuminated when it was stepped on, but not all the functions worked at that point. Nevertheless, it was interesting for the child. During the testing, he discovered a new game by stepping on soft buttons embedded under the shapes and the lights were then turned on. So when he wanted to keep the light on, he learned that he had to step from one shape to another without leaving the shapes in the meantime. It was apparent that the development level of the child would have allowed the actual game to be played. Therefore, the special needs educator was confident that the game, when ready, could be played successfully by children of a similar age group and learning ability and would enhance the children's learning of colors, shapes, and patterns and of how to balance their bodies.

As *TEKK* was taken to the hospital's multisensory room one week before the testing day, the special needs educator and other hospital staff were able to familiarize themselves with the prototype beforehand (Figure 9.9). Overall, the user experience during this week was positive. The special needs educator mentioned that children came up with new ideas and uses for it, for example, pillow fight, hide-and-seek, building a pillow castle, etc. The hospital staff also used it as a weighted blanket to reduce stress. The children used the weight function by placing individual pillows on themselves rather than the blanket with pillows. In addition, the weight function of the whole blanket was successfully used once to calm down an agitated three-year-old child. During the testing session, the child was playful with it and noticed straight away that it is for lying down and he started to play a fantasy game (day and night). It is worth noting that the students did not foresee that bringing *TEKK* to the multisensory room one week before the testing day would influence the user's experience during the testing session.

According to the special needs educator, *TEKK* was used in multiple ways during the week it was in the multisensory room, not only by the clients but also by the therapists and other hospital staff. For the clients, they sometimes took the sachets out from *TEKK* and placed them on their laps, until they felt more comfortable. The children built different forms and constructions. They played peek-a-boo, hid things in the pockets, for example, hiding photos of animals in order to group them into types of animals. Children also hid their own feet into the pockets. In some sessions, the pillows were thrown towards each other. *TEKK* was also used for an obstacle course game. The work therefore represents a clever use of local natural materials and the upcycling of textiles, which keeps the cost of production low, to create a product with multiple functionality. An actual link created by the students with the industry (buckwheat and textiles) gives the project extra value.

The insights from testing and interacting with

the special needs educator and the child allowed the students to finalize the projects. *UUDU* was improved with even more textile swatches, allowing the users to experience wider spectrum of tactile and visual sensations. *TEKK* included additional scented sachets and an instruction manual to communicate the various ways it can be used. *SHPACO*'s interaction program was finalized with the option of switching between different difficulty levels.

As seen from the *TEKK* example—one week of testing in the actual environment brings up additional uses not originally envisioned by the designers, and the staff familiarizing with the prototype can lead to more insightful feedback. All the prototypes will be used in the hospital multisensory room from now on. After six months a meeting will be held to discuss how the prototypes have been used in the hospital context and what the design-researchers can learn from the long-term use.

Conclusions

The social design project, where textile design students learned about children with special educational requirements and interaction design, provided new equipment for the special needs educators in Tallinn Children Hospital. It started up a conversation on how to enrich the learning experience of children with various spectrums of attention sensitivity between special needs educators, children, textile design students, and researchers. The joint project resulted in three interactive textile prototypes for the hospital's multisensory room, where the special needs educators continue to use them in their daily work with their clients.

From the brief one-day trial in the hospital's multisensory room, the special needs educator evaluated the developed interactive textile-based prototypes to diversify the child learning activities. She recommended that the students introduce their work to other institutions with multisensory spaces that might benefit from the work.

In addition to achieving high-level interactive textile-based prototypes, the students experienced the benefits of multidisciplinary teamwork by including family members and friends with knowledge about the context of special education, electronics, or materials. The students iterated very successfully between the material and context development, for example, simultaneously improving the game ideas and patterns for recognition, programming interaction patterns as well as building the electronic textile prototype. The students used their initiative to find locally produced materials (buckwheat) and entered into conversations with the producer. The collaboration might continue beyond the student project at the Estonian Academy of Arts.

Iterating from a prior workshop on soft switches into the social design project, prototyping was challenging for most of the teams. Working with soft electronics materials to create work in a larger surface and diameter is much more complicated than in small-scale work. Not everything works as predicted, nor can it necessarily be scaled up. This differs from what the students are used to when working with more traditional materials. It would have been useful to provide programming help to the textile students throughout the project as this turned out to be one of the barriers for further idea development.

All in all, next to the diverse learning opportunities in the context of social design, interaction design, e-textiles, and other materials, the students consolidated the separate subject areas successfully in their project prototypes. Additionally, they extended their professional network through the connections provided by the class as well as those they organized themselves. They improved their visual and oral presentation skills by taking photos and videos of their prototypes as well as presented their concepts in various contexts (e.g., hospital, academy, advisors, collaboration partners, etc.). The project has demonstrated that textile design can extend its territory beyond its traditional use. Using textile design for a new contextual application such as social design, the project has broadened the student's view of their future opportunities and the contexts in which they can contribute their knowledge and skills. The creation of teaching and therapeutic tools for aiding and educating people with special needs is not new. The market for these kinds of products exists, as can be seen from trade fairs such as REHACARE Exhibition (www.rehacare.com) and companies such as Rompa (www.rompa.com) that has manufactured such products for over 30 years. What is new in this project is that it shows ways in which textile professionals can offer more personalized, environmentally friendly, and affordable products to this market.

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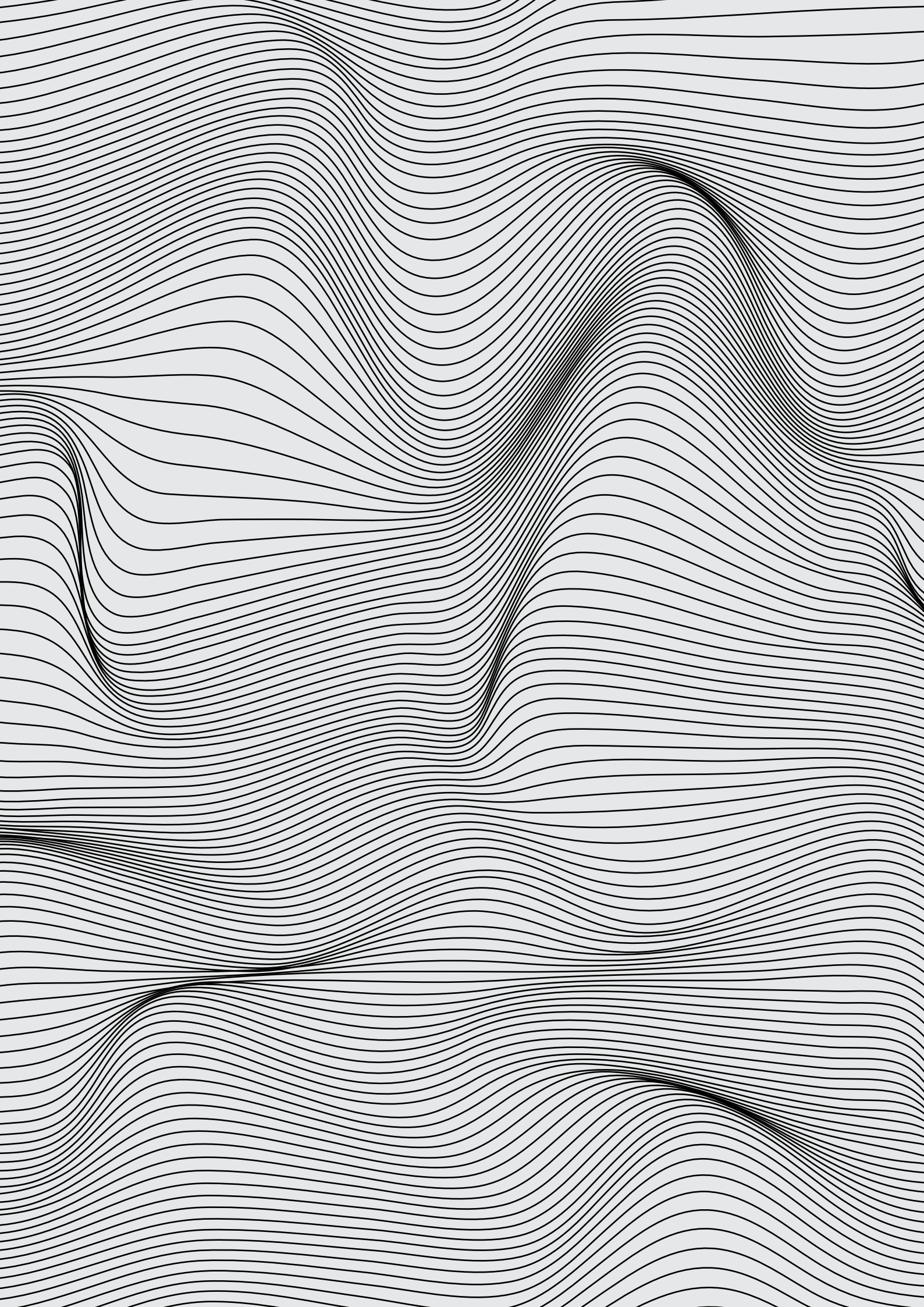

10 From Fashion Pusher to Garment Usher?

How Fashion Design Students at Design School Kolding Currently Explore their Future Role in Society

Ulla Ræbild

Introduction

This chapter addresses an observed tendency in fashion students at the Design School Kolding (DSK) to focus on ways of creating sustainable and/or societal change. With this focus, students increasingly bypass the conventional fashion industry as context for both their design practice and their design outcome. The observed development mirrors what Fletcher and Grose (2012) propose as new roles of fashion designers that can support sustainable development: (a) the designer as communicator/educator; (b) the designer as facilitator; (c) the designer as activist; and (d) the designer as entrepreneur. Furthermore, in moving the practice from a position primarily servicing the private sector to one serving the public sector, the non-profit sector, and research (p. 156), there is an opportunity created for designers and for society as a whole. This viewpoint suggests evolving possibilities for fashion designers in terms of where, how, and to what effect their fashion design practice is applied. With these possibilities, fashion design might follow a general evolution in designing for sustainability, moving away from being primarily an activity at a product level towards increased importance at service and socio levels and arriving at a rather complex spatio socio-technical system level, as Ceschin and Gaziulusoy (2016) argue. Hasling (2016) proposes a model of "Five Perspectives of Sustainable Design" (Figure 10.1). Built on insights from her thesis partly conducted at DSK (Hasling, 2015), this model sees sustainable design as a broadening of interconnected sustainable perspectives in fashion and textiles design, from materials and processes, to products and use, services and systems, businesses and strategies, and culture and experience.

The chapter aims to look into how the above proposed developments, arising from a general sustainability agenda, might affect the concrete fashion design practice, exemplified by four DSK student projects. The projects are chosen in order to show the span in combinations of designers' roles, positions, and sustainability perspectives that students at DSK currently undertake. Although they are local examples, they might indicate a general development in fashion students' aims and visions for their own practice and future work life. The chapter begins with a short background of how sustainability has developed in the curriculum and is presently taught in Fashion and Textiles courses at DSK. It then continues with a description of the four projects, with a focus on the

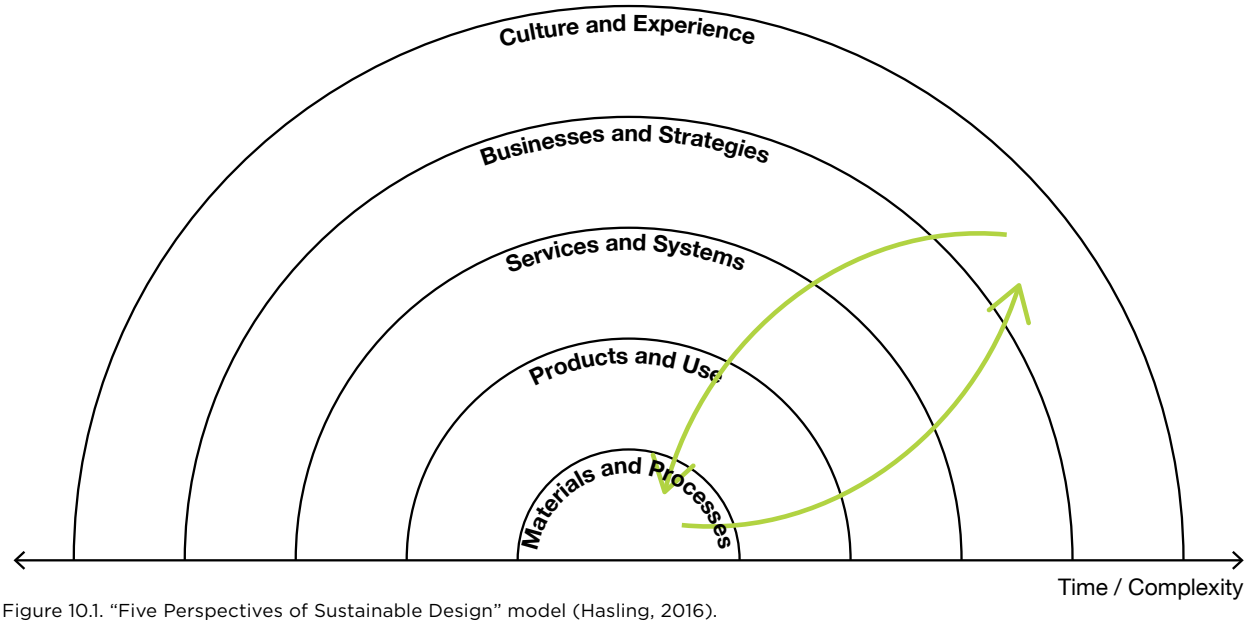

Figure 10.1. "Five Perspectives of Sustainable Design" model (Hasling, 2016).

role of designers and sector positioning (Fletcher & Grose, 2012) and design perspective (Hasling, 2016). The chapter closes with a reflection on the development of fashion student projects, addressing potential implications for fashion design education.

Sustainability Teaching at Design School Kolding

At the Design School Kolding (DSK), the subject of sustainability is fairly engrained within Fashion and Textile education, as *Sustainability* is a strategic focus area for the whole institution, along with *Play* and *Social Inclusion*. The subject was formally introduced to the curriculum in 1992 by Professors Vibeke Riisberg and Joy Boutrup, setting out to develop didactic approaches to "engage students in an enthusiastic and pleasurable learning process" for textile design education (Riisberg, 2010, p. 14). The initial teaching used the terms "sustainability" and "sustainable design" according to the broad definitions in the so-called "Brundtland Report" (United Nations, 1987, cited in Leerberg, Riisberg, & Boutrup, 2010, p. 307): "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Furthermore, the teaching leaned on Graedel, Comrie, and Sekutowski's (1995, cited in Leerberg et al, 2010 p. 307) definition of "Design for Environment" as "a proactive approach to environmental protection that addresses lifecycle environmental concerns in the product design stage." Hence, the initial focus on sustainability was in relation to material development and use in the design and production phases. Sustainability has since developed in the curriculum to encompass multiple approaches and systems levels. From being a course-specific subject centered on materials, sustainability teaching at DSK has expanded in order to build a range of broadly applicable competences in relation to sustainable design (Hasling & Ræbild, 2017). According to Wiek, Withycombe, and Redman (2011), these competences can be described as normative, interpersonal, anticipatory, strategic, and systems thinking. Thereby, sustainability teaching at DSK follows the general evolution of design for sustainability as described by Ceschin and Gaziulusoy (2016). All along, and key to the fashion and textile education at DSK, sustainability teaching has been conducted as practice-based courses with studio assignments and introduction to relevant theories.

The curriculum as a whole equips students with sustainability knowledge, skills, and competences that can be applied to existing practices, business models, and/or support the development of new ones. The following projects exemplify ways in which students shift their focus from the inner to the outer rings in the "Five Perspectives of Sustainable Design" model (Figure 10.1) to explore the notions of sustainability beyond materials, production, and products. In doing so, students make a move away from the context of the fashion industry, while still making use of core fashion skills and techniques.

The Four Projects

FORMAL BACKGROUND

The final projects included in this chapter have been carried out by fashion students in bachelor's and master's programs at the Design School Kolding during the academic years 2015–2016 and 2016–2017. At DSK, bachelor's and master's final projects are self-directed, meaning that students themselves identify the design challenge they wish to address and solve. A bachelor's project has the duration of ten weeks (20 ETCS), while a master's project takes 22 weeks (30 ETCS). In both levels, students write a thesis that informs and/or explores a design question posed in their practical project, thereby tying together design theory and practice. A standard requirement for final work in both levels is that all projects must include collaboration with an external partner, e.g., a company, an organization, or an institution.

The first project described in this chapter sees the fashion designer, as a type of activist entrepreneur, using fashion garments and fashion imagery to promote reflection on preconceptions of wheelchair users. The second project sees the fashion designer as a disseminator of knowledge and fashion design as a means for critical reflection within a museum context. The third emphasizes the fashion designer as a facilitator of user creativity and fashion design as a means for social interaction of children age 9–13. The fourth project is about the fashion designer as a material communicator (as opposed to a visual communicator) and fashion design prototyping competences as a way to process data and offer solutions, shown here in the specific area of food production and consumption.

EXAMPLE 1: *#THE WHEELED BODY* MATHILDE BESS FLØE JØRGENSEN'S B.A. FINAL PROJECT, SPRING 2017

The project was carried out in collaboration with a Danish wheelchair company, TA Service A/S, and three wheelchair users; Janne, Helle, and Judith.

In the project Jørgensen aimed for a new aesthetic for handicapped people, in which aiding tools are considered and embedded in the expression as indicators of identity, in the same way as clothes. Leaning on Smith (as cited in Barnard, 2014, pp. 119–120), Jørgensen wished to address the design gap around the disabled body, i.e., the disabled body is either ignored or 'covered' with functional garments and hidden from the public eye. Jørgensen tried to imagine what she would want herself, as a cool and fashion conscious young woman, if she were a wheelchair user. The design process involved personal wheelchair tryouts; interviews with wheelchair users; form and movement studies; historical research on aiding tools; body and machine interactions; functionality requirements in terms of textile materials; garment shapes, pockets and closures, etc. Jørgensen developed the designs in collaboration with three wheelchair users, to whom she was introduced via her collaboration partner, each with a particular disability to consider. Jørgensen reserved the right to make her creative point of view clear in the outcome. The process ultimately produced a range of basic styles that can be used by people of similar disabilities. These were supplemented by a series of individual styles adjusted to specific combinations of body shapes and wheelchair types (Figures 10.2 & 10.3).

Figures 10.2. Final fashion image with model Janne. Photograph: Ida Dorthea. © Mathilde Bess Fløe Jørgensen.

Figures 10.3. Final fashion image with model Judith. Photograph: Ida Dorthea.

Roles, Positions, and Perspectives

In this project, the student took on a new role as fashion designer in the sense that she addressed a new type of fashion user who required a direct designer/user involvement in the fashion design process. This kind of design could potentially be taken to the public sector, whilst the project itself could lead to some kind of private enterprise, either her own organization or an existing company, thus suggesting the role of the designer as entrepreneur according to Fletcher and Grose (2012). Jørgensen expressed that her biggest interest lay at the intersection of social sustainability (e.g., Manzini, 2015) and critical design (e.g., Sanders & Stappers, 2014).

Hence, she considered the poster images as the project outcome rather than the actual garments—a way to create awareness of "fashion others" (Skjold, 2014), i.e., people that were not usually considered fashion users, or in this case wheelchair users. Her plan was to submit the images to open art exhibitions and similar, thus situating the project at the "Culture and Experience" level in Hasling's (2016) "Five Perspectives of Sustainable Design."

EXAMPLE 2: *#HUMAN*
PERNILLE KAAB'S M.A. FINAL PROJECT, SPRING 2016

The project was a collaboration between the student and the Women's Museum (Kvindemuseet) located in Aarhus, Denmark.

Kaab wished to examine how she could use her knowledge and competence in fashion design to create a new medium that would allow her to tell stories in a different way, not as embedded design stories in contemporary fashion design, but as embedded interpretations of historical knowledge. Having selected the story of feminism in Western society for her project, Kaab took an artistic hold on history and employed garment design as the means for dissemination. She reflected on the link between women's societal standing and the clothes they wore throughout the 20th century, by "weaving" into her designs historical facts on women's rights and living conditions, fashion history, and the dress story of the female members of her own family (Figures 10.4–10.7). As such, she distanced herself from the passive act of allowing museum curators to interpret her work as a fashion designer.

Figure 10.4. Initial research on feminist history in the 20th century and on women and garment icons from each decade. Photograph: Pernille Kaab Mosegaard. © Pernille Kaab Mosegaard.

Figure 10.5. The ten silhouettes, each representing a decade, and the 11th "now" silhouette using a veil to point to a current, unsettled debate on women's liberation in non-Western cultures. Photograph: Pernille Kaab Mosegaard. © Pernille Kaab Mosegaard.

Figure 10.6. At the examination. Photograph: Pernille Kaab Mosegaard. © Pernille Kaab Mosegaard.

Figure 10.7. Location photo shoot at the museum and exhibition. Photograph: Pernille Kaab Mosegaard.

Roles, Positions, and Perspectives

In this project, Kaab took on the role of the designer as communicator and educator (Fletcher & Grose, 2012) to design for storytelling rather than for practical use and everyday wear. She used garment design as a way to engage an audience in history. Although she did not explicitly address an issue related to sustainability, she raised awareness of how our clothes reflect, and maybe even influence, societal norms and views upon women, i.e., how garments are influential on how we live our lives. This is an important issue in a time when the use of garments requires consideration in terms of its sustainability. The project could potentially be positioned in the public sector, due to the educational focus and the museum context, but the activities might also provide for an entrepreneurial concept in the private sector, e.g., a type of educational service. The role of the designer and the position of the project also relates to the "Culture and Experience" perspective in sustainable fashion and textiles design (Hasling, 2016).

EXAMPLE 3: *#THE TRASHION CO-LLECTION* SOLVEIG BERG SØNDERGAARD'S B.A. FINAL PROJECT, SPRING 2016

The project was carried out in collaboration with a local state school [Folkeskole].

Inspired by Otto von Busch's (2008) ideas of hacktivism and social engagement in fashion, Søndergaard explored how to shift power away from herself as a designer towards the users of fashion garments. The project centered on the question of how a designer acts as a facilitator for user creativity and community building in the manufacture and use of garments. Søndergaard's investigation took place as a series of workshops designed for different age groups and contextual settings (Figure 10.8). However, the key target group included children and young teenagers, age 9 to 13, which she sees as a relevant age group due to the early formation of identity through clothes (Figures 10.9–10.11). Her intention was to let fashion and garments serve as a means for bringing people together (as opposed to the notion of fashion as an excluder) and handing over the authority of the creation process to the individual and/or the community.

Figure 10.8 (left and right). "Friendship-Top" workshops. Photograph: Solveig Berg Søndergaard. © Solveig Berg Søndergaard.

Figure 10.9. Customization Workshop with girls aged 9. Workshop participants bring their own clothes that they wish to change. They then choose "Trashion" methods and conduct the upcycling process facilitated by the designer. Photograph: Solveig Berg Søndergaard. © Solveig Berg Søndergaard.

Figure 10.10 (left and right). "Collage Your Favorite Outfit" workshop with pupils at a local state school. Photograph: Solveig Berg Søndergaard. © Solveig Berg Søndergaard.

Figure 10.11. "Weave and Tell" workshop with children aged 10–11. Making new textiles and accessories out of cut up discarded garments, while telling and sharing personal stories attached to the discarded clothes. Photograph: Solveig Berg Søndergaard. © Solveig Berg Søndergaard.

Throughout the workshops, Søndergaard applied an upcycling design strategy, where worn and possibly worn-out clothes were given new life. The insights arising from the workshops were ultimately transformed into a community-based website. The website offered "Trashion" methods for redesign, displaying user design examples, and featuring Søndergaard's own "Trashion" design as inspiration (Figure 10.12).

Figure 10.12. Søndergaard and the process of developing the "Trashion" making methods. Photograph: Solveig Berg Søndergaard. © Solveig Berg Søndergaard.

Roles, Positions, and Perspectives

In the project Søndergaard primarily took on the role of the designer as facilitator (Fletcher & Grose, 2012). She facilitated children in designing personal garments or other artifacts, both in terms of generating ideas and carrying them out (the actual making). Furthermore, she encouraged children to work together in a design process and share stories and memories with garments. Søndergaard describes how the process of making something tangible seemed to open up a space for the children, wherein they could convey rather personal issues and problems (S. B. Søndergaard, personal communication, September 4, 2017). In addition to the role of a facilitator, Søndergaard also acted as an educator of methods and techniques and as a form of garment activist who promoted alternative fashion activities beyond consumption. Positioned in the public sector Søndergaard tied together the perspectives of the "Systems and Services" level with the "Culture and Experience" one (Hasling, 2016) to develop alternative ways for users to acquire garments through upcycling experiences with hands-on engagement, co-creation, and personal creativity as keys.

EXAMPLE 4: *#KNOW YOUR CHICKEN*
LOUISE PERMIIN (FASHION DESIGN) AND ANDREAS SOLHØJ'S (COMMUNICATION DESIGN) B.A. FINAL PROJECT, SPRING 2016

The project was carried out in collaboration with COOP Danmark, a Danish supermarket chain (food and non-food).

The final project consisted of a fashion design student teaming up with a communication design student. At DSK, interdisciplinary collaboration is possible throughout the study. This student team wished to address what they saw as the non-existent relationship we have, as consumers, with the animals that we eat. Specifically, how design might make organically produced chicken become a more frequent consumer choice, despite its higher price. Knowingly naïve, in the context of the meat industry, the designers conducted field observations of chickens in their surroundings at an organic chicken farm, and also staged a number of chicken behavioral experiments in order to inform the design process, e.g., patterns of movement and chicken color preferences (Figures 10.13 & 10.14). The designers also tested a way for people to interactively play with the chickens via an iPad through light sensors in the chickens' habitat. Outcomes were documented and interpreted by the use of tangible stories and objects (Figures 10.15 & 10.16). These became part of a final "package" of a subscription enabling the consumer to not only follow "their" chicken from hatching, to shop cooler, and to kitchen, but also interact with it while it grew. By applying observation and engagement of design methods to animals, the project raised awareness of the hierarchy between species and how we perceive what we eat. Moreover, by treading the line between the serious subject and the often-humorous outcome, the designers hoped to open up for new types of conversations around animal welfare.

Figure 10.13. Field observations and chicken behavior experiments. Photograph: Louise Permiin and Andreas Solhøj. © Louise Permiin and Andreas Solhøj.

Figure 10.14. Data processing through sketching. Photograph: Louise Permiin and Andreas Solhøj. © Louise Permiin and Andreas Solhøj.

Figure 10.15. Building understanding through an embodied re-enacting of chickens' movement patterns. Photograph: Louise Permiin and Andreas Solhøj. © Louise Permiin and Andreas Solhøj.

Figure 10.16. The subscription as it would be presented in shops, the complimentary family apron, and the information folder presenting the concept and the app. Photograph: Louise Permiin and Andreas Solhøj. © Louise Permiin and Andreas Solhøj.

Roles, Positions, and Perspectives

Looking at the outcome of the project, one could say that Permiin adopted the role of a designer in the traditional way, in that, she framed a problem, conducted research, made and tested prototypes iteratively before finalizing a product. However, she shifted the context of her design practice in this project from that of a designer of fashion garments to a designer of a service, with an intention of influencing consumer behaviors towards sustainable food choices. Her interest was to see whether her abilities as a fashion designer, joining forces with a communication designer, could contribute something towards this challenge through subtle design activism. In this respect Permiin took on the role of designer as activist (Fletcher & Grose, 2012).

Although the project was positioned in the private sector, i.e., a company, the context of the problem expanded the reach of Permiin's practice. In terms of perspectives, the project spanned several levels. The subscription service and the accompanying product sat at both the "Product and Use" and the "Service and Systems" levels (Hasling, 2016). The second project outcome consisted of a published process book containing research, sketches, interviews, etc. and was intended to pose reflection, awareness, and curiosity on food culture and experiences and thus tapped into the "Culture and Experience" level (Hasling, 2016).

Reflection on Implications

The above examples show that students currently operate within the new roles proposed by Fletcher and Grose (2012), but not necessarily in an isolated form. Each challenge that the projects address seems to call for different combinations of roles, positions, and perspectives, as the students test the boundaries of their practice. What is significant is the desire to engage with society and users in a manner that transcends the launch of seasonal collections. This is a promising development if fashion designers are to shape a voice of their own with regard to the value of their competences within sustainable societal development. However, one could easily foresee that the real challenge will await them when they leave the higher education environment and enter the high intensity and ever-changing world of the fashion industry. If the presented examples indicate a specific direction, it is one that seems to bypass the conventional fashion and textile industry as a main context, and also explores the role of the design practice itself as something other than fashion styles for fashion consumption. Nevertheless, all projects point to new potential markets, users, and livelihoods, and here the teaching of sustainability has provided the students with a fundamental understanding of systems thinking, whereby they can argue and plan models for how business can be viable.

On the other hand, as the projects all call for new pathways in terms of income, perhaps the future of the students is less bright, if there is no work to be found, or no customers to pay for the new services and experiences. It is not easy to be a frontrunner. Still, if we assume and acknowledge that student behavior can be indicative of what is to come, then this new exploration of fashion design's roles and practices is worth noticing as an educator. Personally, I would have to consider what it would mean to fashion design education at DSK if the majority of students do not see the industry, as we know it, as their future workplace. So, how might we, as educators, be supportive of the students as they strive to change things in new and more sustainable directions, whilst helping them to get a foothold in the real world and a bridge to industry? My reflection goes in two directions. I believe we must aid the move into the expanding design field, and for designers of garments and fashion, to forge strong, personal, informed, and considerate ways of making, using, and understanding clothes and their roles in our lives. It is often addressed that the fashion industry has been slow to adapt and make changes towards sustainability and this might be a reason for students looking elsewhere in search of more ethical and value born ways of practicing their discipline. Here education could help to build portfolios of internship places that are situated outside the fashion industry, and thereby provide new sectors with the experience of working closely with design and designers. On the other hand, education could form deeper collaborative networks with companies that on a larger scale could explore solutions in terms of new sustainable practices, not only through scientific research but also through the involvement of students. Real hands-on projects that could be implemented and foster real changes might be a way to engage a generation that seems highly value-driven in their way of approaching design.

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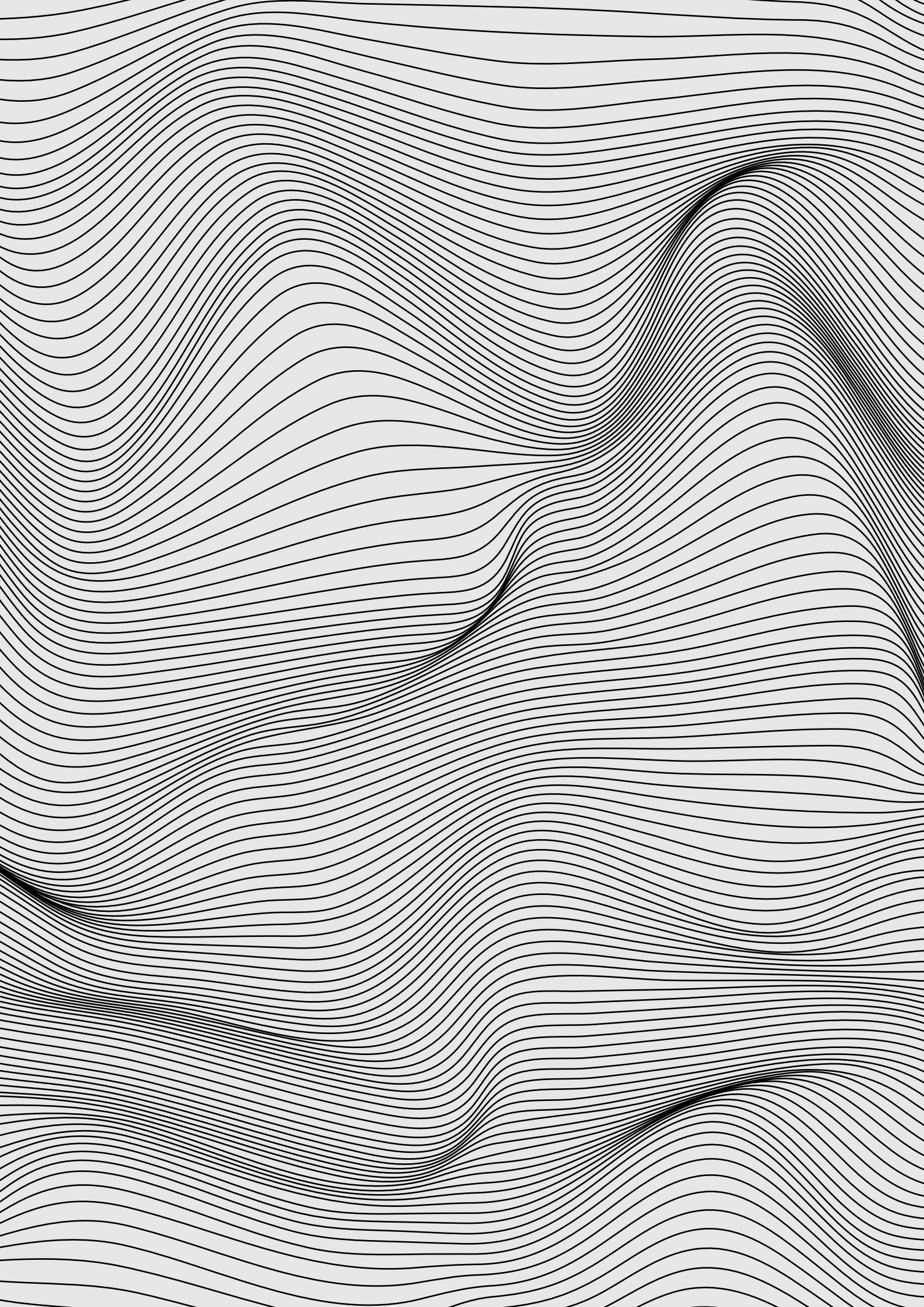

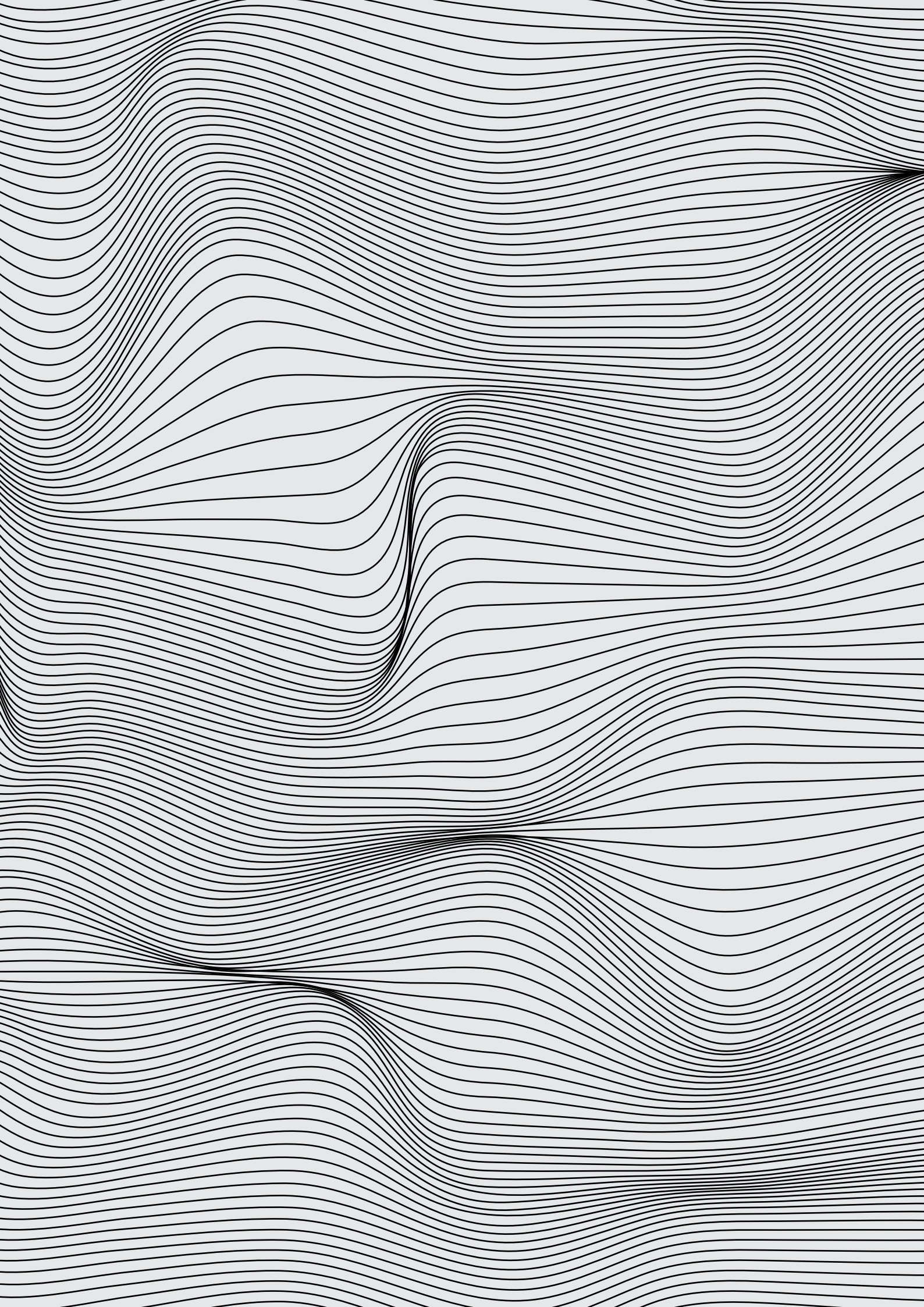

11 The Fate of Textiles

Laura Pavilonytė-Ežerskienė

Introduction

Textile art most rapidly evolved and entrenched itself as an equal field of visual arts in the second half of the 20th century. Prior to this period, as the professionalism of textile art had not been questioned, an attitude arose of textile art as a "painting's maid" or "way of spending free time by women intellectuals." This was due to the fact that artistic textiles were largely drawn by professional non-textile artists (usually painters) and made by master craftsmen without an artistic education. Nevertheless, as soon as artists started creating textiles and calling themselves textile artists, a wave of searches for new means of expression swept across the entire panorama of global textile art. Along with the application of unique textile techniques and exploration of increasingly diverse themes and ideas, textile artists dealt with their identity issues and rendered social or political dimensions to their textile artifacts.

The borderline between fine and applied arts disappeared in the post-modernity era when textile artists shifted their commitments from working with fiber materials, but did not abandon them in the creation of installations, performances, photography, or video art. For example, during the International Biennial of Textile Art held in Kaunas in 2005, Serbian artist Snezhana Skoko held an embroidery performance titled *The Fate of Textile Art / A Cup of Coffee* in which she invited textile artists from different countries to participate. Whilst sitting round the table and embroidering the words "the fate of textile" on the tablecloth, the participating artists contemplated the issues brought up by Skoko, including "[w]hat is the future of textile art," "[w]ho establishes standards in textile arts," and "[h]ow are artistic experiment and originality conceived nowadays" (Vitkienė & Gelėnienė, 2005, p. 30). These issues have retained their relevance up until now in the community of textile artists and in textile art education. This chapter aims to shed light on the overall challenges and milestones for the development of textile art degree programs in order to train textile artists for the future.

In building a new generation of textile artists and delivering textile programs in higher education institutions, textile art educators are facing the following questions: (a) how to reconcile the individual creative process and the needs of modern society; (b) how many craft/technology skills textile artists need; and (c) whether "making things by hand" (Wilson, Larocque, Thompson, & Wilson, 2015, p. 151) has a

sense and relevance in the environment of new technologies. Other challenges for program developers in the post-modern era include evaluating students' creative processes and learning outcomes (which are works of art and design) and answering the question: "What is innovation, relevance, and originality in artistic textiles that we expect from young artists?" This chapter does not attempt to provide an exact answer to this question. Rather, it seeks to intensify the debate on the survival (or fate) of artistic textiles in artistic and academic communities, using the example of textile art education in Lithuania. Constant reflection on these issues is expected to generate and crystallize the values and criteria that would lay a foundation for building future visions of artistic textiles.

The Tradition of Teaching Artistic Textiles in Lithuania

The study programs of the Textile Art and Design Department of Vilnius Academy of Arts (VAA) follow the principle that contemporary textile art is a meeting point between applied and visual arts. Therefore, the VAA's bachelor's and master's degrees in textiles foster students' coherent development of cultural and technological skills, critical thinking, awareness, and autonomy in choosing artistic textile contexts for their self-expression. Interestingly, this trend of development has been influenced not only by changes in contemporary art, but also by the very tradition of professional textile art in Lithuania which began to take shape 76 years ago. From the very beginning, the tradition of teaching textile art focused on developing a professional, pure-art-oriented branch of fine arts that includes two directions: textile art and textile design. The teaching included figurative, carpet composition and weaving, and patterning of decorative fabrics of a more applied nature. In the Soviet era, solid professional textile fundamentals built into the Textile Art and Design Department served as a basis for Lithuanian artistic textiles. This specialism took an exclusive role in the context of the Soviet Union's fine arts, representing Lithuanian culture all over the world through neutral decorative artworks. Lithuania's independence in 1990 evidenced great transformations, including the reformation of Lithuanian artistic textiles. Changes in the philosophy and quality of contemporary art called for changes in study programs, taking into account interdisciplinary issues and trends of collaborating between various fields of art. In addition to the purpose of satisfying aesthetic and functional needs of society, artistic textiles became an equal part of contemporary conceptual art, stimulating the emotions and intelligence of viewers.

The Textile Art and Design Department of VAA currently emphasizes the individuality of textile artists, the understanding and mastery of means for creating various textile expressions, and the ability to understand today's problems, reflect on them, and express oneself in the cultural context. Thus, young textile artists are trained here with a focus on the concept of "textile thinking" (ArcInTexETN, n.d.), which gives priority to the values of relevance, originality, and creative freedoms (see Figure 11.1). The concept has been formulated by the EU-funded ArcInTexETN network of international researchers that connects architecture, interaction design, and textiles, in order to seek more sustainable forms of future living. This network perceives textiles as a wide-ranging field of textile culture, art, craft, and design. The programmatic provisions clearly point out that it is vital to identify how textile artists can stand out from a large field of artistic activities and how "textile thinking" can manifest or be built in the process of educating young artists. As a matter of fact, the answer to such a specific question requires the identification of how artistic creation is generally perceived in today's world where art projects encapsulate various combinations of different art genres, different areas of art, and the interaction between science and art.

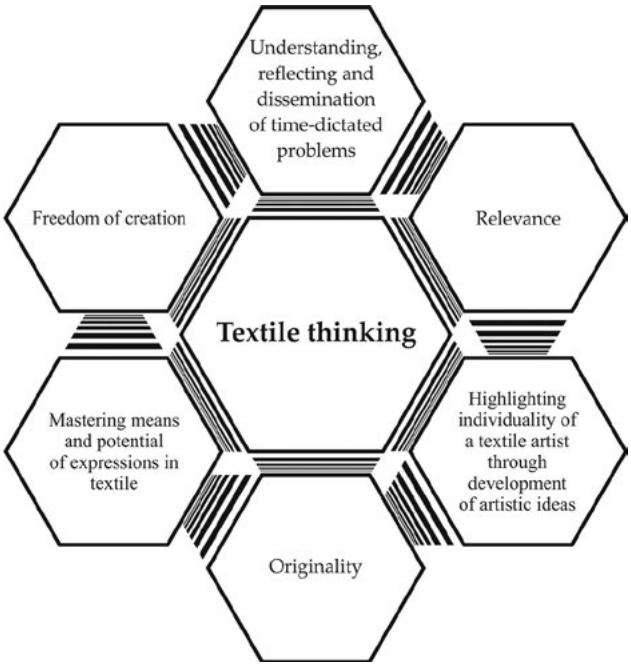

Figure 11.1. The concept of "textile thinking" in the study program of the Textile Art and Design Department of Vilnius Academy of Arts. Diagram: Laura Pavilonytė-Ežerskienė.

Freedom in Creativity

In order to understand the diversity of definitions of artistic creation in our time, the preference is given to the insights of anthropologist Claude Levi-Strauss (1996), who makes a comparison between professional art and naïve art. According to him, professional art consists of artists "trying to communicate either with the model" (idea, image) "or with the materials or with the future user, as the case may be, according to which of these the artist particularly looks to for his directions" (p. 27). In other words, the purpose and expression of a work of art depends on which of these aspects is more important for the author. In applied arts, there is indeed a predominance of "purpose and execution," whereas in fine arts these proportions seem to be reversed: they are freed from purpose and execution not only because of their non-existence, but also because they have been "completely overcome" and not subordinate to any "occasions" (Levi-Strauss, 1996, pp. 27–28).

Hence, what comes into particular focus, when we look at the creative behavior of modern artists, is that what matters, in the process of artistic creation, is not only the relationship between the author, the idea, and its intended purpose, but also the implementation of the idea. This raises the importance and interest of understanding the real attitude of a modern artist towards the ability of making things by hand, the knowledge of craft and techniques, and the ability to apply this in a professional manner. Janis Jefferies (2007), Professor of Visual Arts at Goldsmiths, University of London, has observed that: "crafting is [an] essential element within [the] textile process" (p. 187). In order to further discuss this issue, one more comparison by Levi-Strauss (1996) is invoked with regard to *bricoleur*, a creator from archaic times (p. 16) and a professional artist. The word *bricoleur* is hereinafter used as a synonym to describe a creator capable of implementing creative ideas by hand. The comparison of such contrasting times (archaic period and modern) is founded on the idea that mythical thought as a factor influencing the creator postulates a complete and all-embracing determinism. In the context of modern culture, this resembles the post-modern environment of cultural phenomena full of various interdisciplinary and inter-domain overlaps, combining frequently incompatible things into one whole—an integral system. The logic of such combinations can vary widely and, in some cases, are understandable only to the artist himself. Accordingly, a contemporary artist has something in common with both a scientist and a *bricoleur*. Using the terms coined by Levi-Strauss (1996), contemporary artistic creation can be defined as "a kind of intellectual bricolage", where *bricolage* is understood as an artist's dialogue with the material and means of execution, and "the essential problem for the philosophy of art" is to reflect on whether "the artist regards them as interlocutors or not" (pp. 16–29). Also, a man of archaic thought, or a *bricoleur*, is adept at performing a large number of different tasks and "does not confine himself to accomplishment and execution: he *speaks* not only with things, but also through the medium of things: giving an account of his personality and life by the choices he makes between the limited possibilities" (Levi-Strauss, 1996, p. 21). By such definition, the *bricoleur* has obvious similarities with the professional artist.

However, Levi-Strauss's (1996) thinking from 50 years ago when post-industrial societies would not tolerate *bricolage* at all, or would tolerate it only as a hobby or pastime (p. 33), are obvious today. Postmodern pluralism has weakened the integration of crafts into the world of visual art started in the modernist era. It does not mean that crafts are completely excluded from the world of art, but in order to integrate the craft into this world, the creator has to comply with the rules of contemporary art practice, adopt the issues and challenges of time, and develop individual relation to the ability of making things by hand. A modern artist is often understood "as a generator of concepts" (Wilson et al., 2015, p. 160) who, like a film director, simply has to choose appropriate professionals, but not necessarily perform the work himself. It is hard to disagree with Larocque's argument, in Wilson et al. (2015), that the current model prevailing in artistic higher education institutions emphasizes the search for the idea and its formulation, while the knowledge of aesthetic expressions and the embedding of an idea in materials are little discussed. The impact of such trends can be seen on many art programs in Lithuania; they naturally influence the development of artistic textiles. Larocque takes the ceramics program at Concordia University to exemplify the extent of craft skills the students need in artistic higher education institutions: "students lacked basic skills but they had been allowed to make videos about clay. […] The previous faculty were uncomfortable with calling themselves ceramicists. […] As a result, the ceramics area was on life support" (Wilson et al., 2015, p. 160). Here, in Lithuania, we are actually in a similar situation. Many creators of artistic textiles no longer call themselves textile artists, but simply artists. They think that the term "textile" restricts or even devalues their creative work due to its relation to craft. Nevertheless, the media of textile

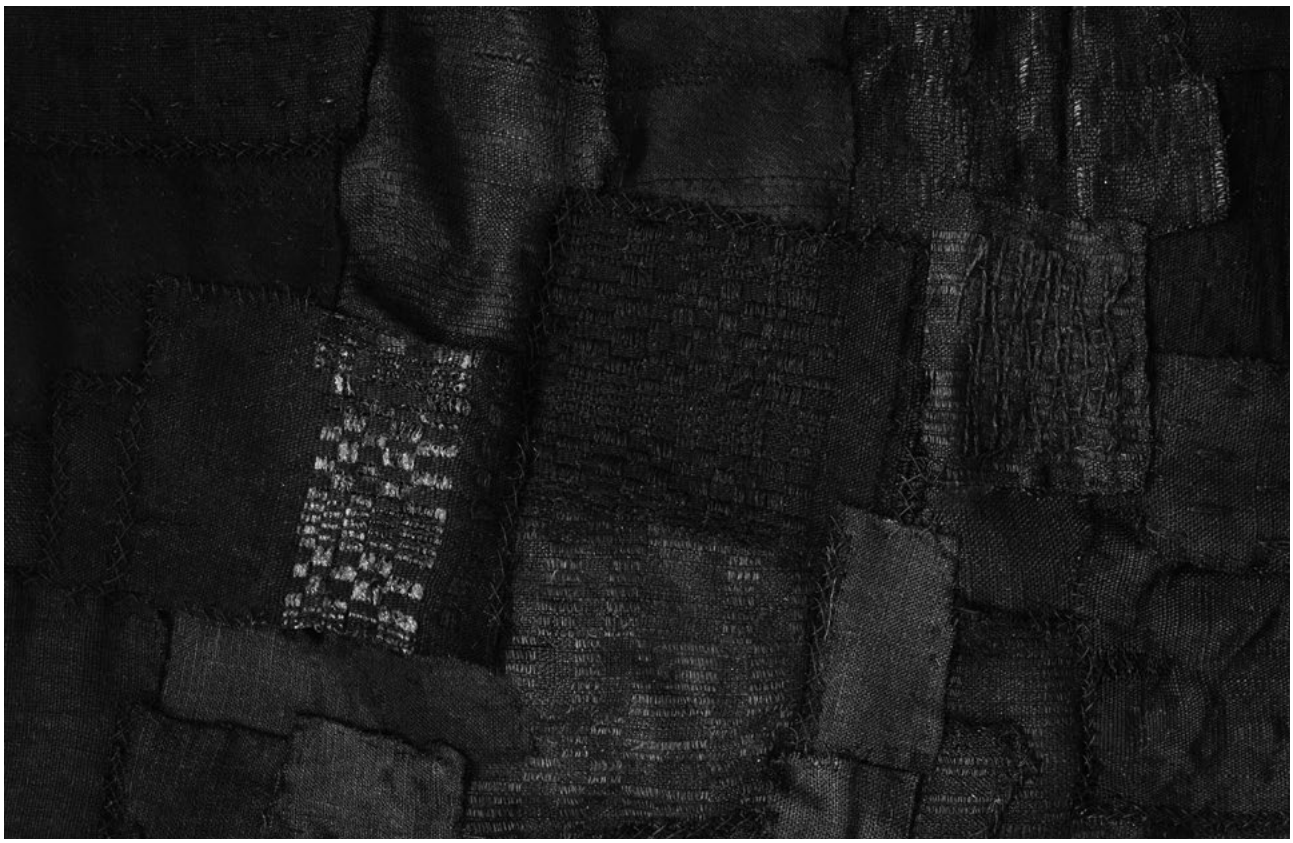

Figure 11.2. Laura Kunciūtė's bachelor's degree diploma work, *Char-Cloth* (detail), 2017. Supervisor: Laura Pavilonytė-Ežerskienė, Vilnius Academy of Arts, Textile Art and Design Department. Photograph: Laura Kunciūtė. © Vilnius Academy of Arts and Laura Kunciūtė.

expression appearing in works of art can still serve as an example of distinctiveness or "textile thinking."

Art tutors from other higher education institutions also share Larocque's concern about the problem of contrasting craft with art in art schools and the need to discuss this problem in the academic community. In their conversation (Wilson, et al., 2015), all agree that "the separation of "technical skills" and "concept" is troublesome," although "the desire to move away from the "fine-tuning [of] high skill" is understandable" (p. 159).

Like many other art schools, VAA is looking for a compromise in its textile program. Teaching technologies plays an important role, but the emphasis is not on the technology itself and the ability to use it, but the individual's relationship with materials, craft, and acquired skills. An analysis of the process of artistic creation in VAA's Textile Art and Design programs, conducted by the program leaders, shows that it works best in assessment criteria for creative results which encompasses three equally important quality components, i.e., the individual attitude towards the theme and ability to raise and formulate the idea; the selection of means of expression that are adequate to the idea (the most appropriate plastic expression); and quality execution of the work (mastery of the selected material and technology). Actually, this is what determines the instillation and suggestion of the expression of the work for the viewer. It should be noted that a professional and high-quality execution in this context is understood slightly differently from the way it is understood in the craft domain and is directly contingent on the aesthetic form chosen by the author, i.e., works may be left *non finito* or executed by deliberately breaking traditional technological rules. *Char-Cloth*, a final project by the B.A. graduate Laura Kunciūtė (see Figure 11.2), is a good example of harmony between the idea and means of expression that requires expert knowledge of technologies and individual experiments. Influenced by oriental aesthetics, black nomad tents, and new materialism, Kunciūtė researched carbon (coal) as a vibrant and filter-like material relative to the element of fire and the energies of warmth. The charred linen cloth, made by Kunciūtė's own technique, serves as a filter and becomes extremely flammable and fragile. However, it retains its memory and as such it is a creation that is able to filter and revitalize spaces in the light of energy pollution in the era of globalization.

Hence, based on the insights of the authors above and the analysis conducted by the VAA Textile Art and Design Department, it could be summarized that the ability of making things by hand is a freedom in artistic creation rather than a restraint and is highly beneficial for the creator. Therefore, with regard to artists' training in moving towards interdisciplinary creation, it must be kept in mind that combining several disciplines into one unit requires prior profound knowledge and understanding. "Mixing disciplines is exciting, but interdisciplinarity benefits from strong disciplines. [...] What new generations of artists will do with it all is their business. Let's not interfere or edit their choices. Who is to say what will be relevant?" (Wilson et al., p. 158)

Originality and Relevance

As for originality, it undoubtedly unfolds from the individuality of a creator as a human being, from his individual sensitivity, his worldview and the depth of his soul. Naturally, there arises the question whether it is possible to teach someone how to be original. Every man is individual in nature, but the originality of an artist can only be seen if he is able to express his observations and experience, and convey it to others in various forms of art. Therefore, in debates and efforts to define originality, probably the most interesting element is the ideas that creators themselves have about the efforts they make (or do not make) to stand out and how they succeed.

According to Saulius Jarašius, a Lithuanian designer and teacher at VAA Kaunas Faculty, the desire to stand out is an artist's inherent characteristic, not hubris: "Originality makes sense because it is an incentive not to stand in place, look for a [sic] new forms, new relations between form and function. But originality is a difficult path; it has more possibilities of failure" (Dirgėla, 2016, pp. 68–69). Jarašius recommends the process of education to place emphasis on "teaching the methodology of the creative process and leaving the search for originality already after graduation" (p. 69). Such a consideration stems from the fact that *otherness* by itself is not a value, especially in the context of design, because works are finally evaluated only when they are purchased.

Laima Oržekauskienė, a prominent textile artist, professor at VAA, and winner of the International Triennial of Tapestry, Lodz 2016, and other national and international awards, addresses *otherness* in a very different rhetoric. According to her, *otherness* manifests in the works of an artist, and is a feature of an artist's creative position, standing in one line with self-criticism, creativity, and conceptual engagement. Referring to her many years of experience of organizing the Kaunas Art Biennials, Oržekauskienė (2007) says: "We are not afraid to make mistakes, not wanting to hide shivering in the co[z]y nest of the already familiar world" (p. 15). Although the artist does not directly refer to originality, I can see it in her words as a feature of brave creators, of those who are not afraid of meeting challenges and have "a passion for change" (p. 15).

Designer Nauris Kalinauskas tests the originality of his solutions using function, aesthetics, and material as criteria. "If [originality] already exists – then I put it away as there is no sense. While creating for yourself, you become an artist for whom it is evil" (Dirgėla, 2016, p. 48). According to him, it is quite a challenge to be original in the world of constantly changing forms and technologies. Even though there are frequent voices claiming that artists lack managerial and entrepreneurial skills, he believes it is much more important to teach young artists creative freedom, original thinking and to ask questions of themselves and others (Dirgėla, 2016, p. 49).

Vytautas Puzeras, a promising young designer working in different design fields, gives his opinion that "a designer must stand his feet on the ground, but keep his head in the clouds. He must see far ahead. Things we are doing today, tomorrow will become the present" (Dirgėla, 2016, p. 80). According to him, if you want to create something new you have to "constantly ask yourself ... [whether] you [are] satisfied with the current environment" (p. 81).

As we can see, some artists refer to originality as a distinctive touch, others emphasize the novelty of thought and idea, and some believe that every creator must find and develop his own individual formula of originality. Creative success comes to those who meet the needs of the time, i.e., those who are *relevant*. According to Jefferies (2007, p. 195), creators in general should often ask themselves: "So, what is it to live in the contemporary?" A variety of contexts in which to answer this question can be found in contemplating textile "as part of everyday creativity, spanning all sectors of community across the social and cultural landscapes of contemporary life" (Jefferies, 2007, p. 187).

Returning to the education tradition at the VAA Textile Art and Design Department, the leading principle is close to Peter Wilson's views that erudition, knowledge of the world of art and practical skills in technologies are necessary for students until they find their voice:

> Finding your voice means what? It means: dedicated practice in your chosen areas; looking

Figure 11.3. Rasa Jundulaitė's master's degree work, *XII + I*, 2015. Supervisor: Eglė Ganda Bogdanienė, Vilnius Academy of Arts, Textile Art and Design Department. Photograph: Arnas Anskaitis.

> critically at your own and others' works, nature, the world; reading poetry, literature, reviews, catalogs, journals; accessing images; discussing exhibitions and artworks with friends; looking through museum collections; visiting galleries; traveling to other places; viewing architecture, fashion, paintings; being aware of art in all its forms such as music (classical in particular) and drama; developing your own opinions about the world, art, form, sculpture, painting, and knowing why. It means, then, setting a direction for your own work and developing ideas. (Wilson et al. 2015, p. 167)

Of course, the development of individuality is an ongoing process which will unfold through the intensive process of creation within the continually provoking environment. The distinctiveness of the VAA's Textile Art and Design programs is built by developing the student's ability to choose means of expression (materials and technologies) that best match their idea of the work and by highlighting their relationships and linkages with the theme topics and statements or questions brought forward by the creator. This is achieved by maintaining a balance between art theory and practice, and by giving sufficient attention and time during studies both to technology training and research into the contexts of visual culture. In parallel, much attention is paid to the search for self-identity through the exploration of various aspects of own family's or country's inherent culture.

Conclusion

"Textile shapes our life fabric from cradle to grave. It is the mediator through which we acquire our first life experiences. It allows us to feel our cultural roots and our long-forgotten past" (Millar, 2006, p. 6). Following Millar's idea, it can be further elaborated that textiles also invite us to look for new and relevant perspectives of sustainable and harmonious life and mediate how we look towards the future.

The values entrenched in the programs delivered by the VAA Textile Art and Design Department (see Figure 11.1) give grounds to state that artists trained in accordance with a tradition of teaching artistic textiles are outstanding for their "textile thinking." "Textile thinking" originates in the interaction of the abilities to understand, reflect upon, and develop time-dictated problems in the cultural context, as well as to generate and expand artistic ideas by employing knowledge, practical, and technological skills in a broad domain of textile culture, arts, crafts, and design. A tangible example of "textile thinking" is a final project by Rasa Jundulaitė who visualizes in a modern manner a symbolic and magical meaning of the nettle fiber in old fairy tales (Figure 11.3).

The tradition of teaching Lithuanian textile art is and has always been focused on promoting "craft-related thinking," to use the term stated in Wilson et al. (2015, p. 153). This is for young creators to maintain good craft skills and be able to execute their works themselves, and to enable them to think originally, and creatively and to invent something new. Today, artists frequently contemplate the criteria outlining the specificity of textile artworks. Selection criteria for prestigious textile exhibitions tend to include a convincing connection between the artistic idea and technology as well as professional performance. Janis Jefferies (2007), the chair of the jury for Kaunas Art Biennial Textile 07, has mentioned in the foreword to the catalogue that "the value of textile as a primary source of cultural knowledge and experience is increasingly being recogni[z]ed" and "the idea of making something by hand, drawing on learned and tacit skills, continues to provide a rich stream for invention and play, ritual and performance for many contemporary artists who express themselves through textile-based processes" (p. 185).

The fostering of the textile genre and maintenance of its identity demonstrate attention to and respect for the culture of textiles: art, design, and craft. Therefore, the most important thing the creators of textile art need today, and will probably need in the future, is the ability to be relevant, original, and creatively free.

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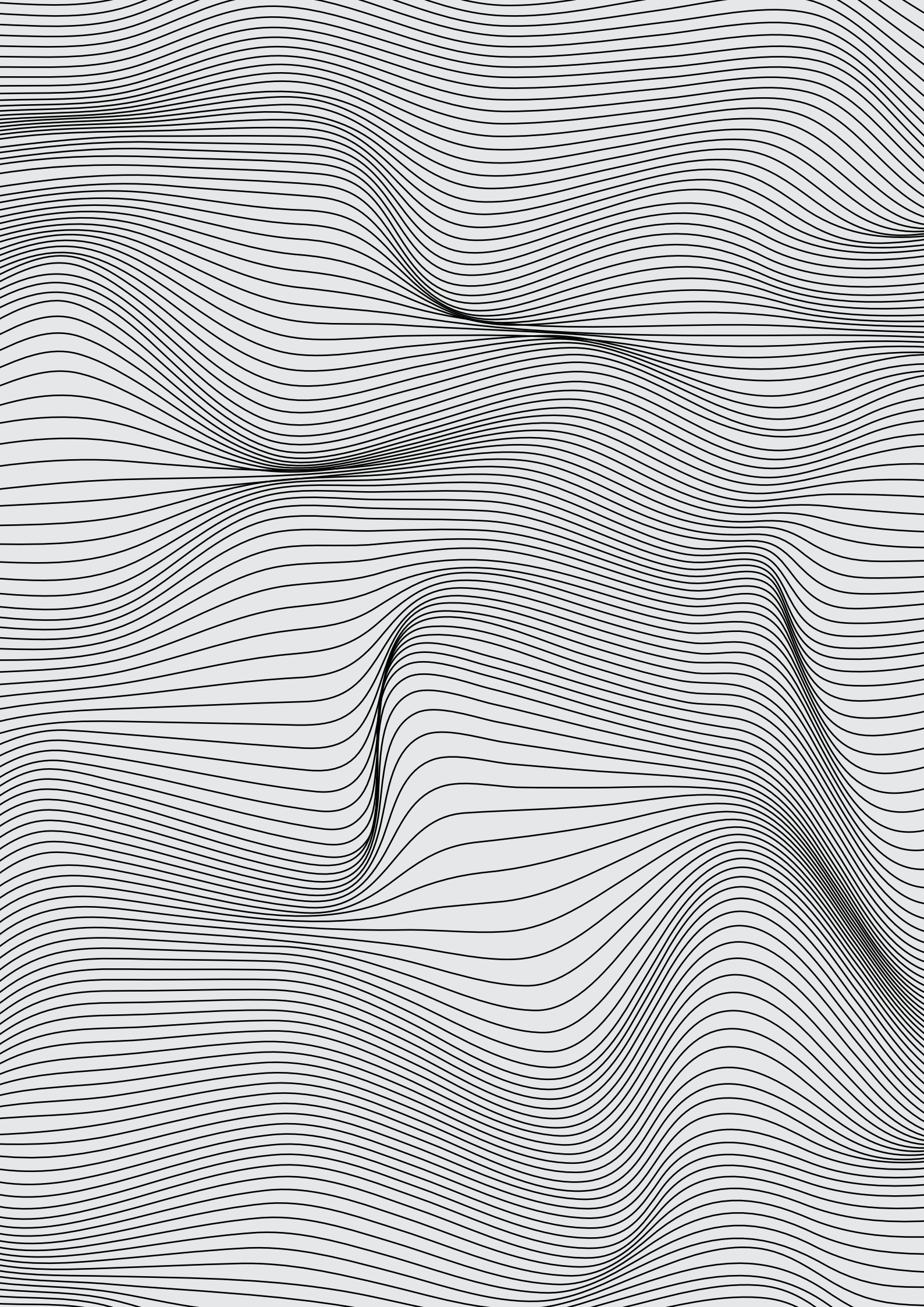

12 Across the Melodies of Change*

Katya Oicherman

A while ago, whilst still a research student combating the uneasy task of reconciling the autobiographic and the academic elements of my writing, I encountered a passage written by Helen Cixous relating to imagination and its significance in writing and in life generally. These words have accompanied me since in different situations and every time anew allow me to become bewildered when facing familiar dilemmas. Bewilderment often makes space for a fresh view.

> … The most incredible is to notice to what extent we are all ignorant of ourselves. To what extent we are "stupid", that is to say without imagination. To what extent we are sorts of corks without poetry, tossing about the oceans … yet I am convinced that we all desire not to be corks tossing in an ocean; we desire to be poetic bodies, capable to having a point of view on our own destiny; on … humanity. (Cixous & Calle-Gruber, 1997, p. 12)

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The following collection of notes aims to point out a few reflections and terms that came up during the four years that I worked as the Head of a Textile Design Department and prior to that six more years as a lecturer at Shenkar College of Engineering, Design and Art in Israel. As often happens in both teaching and managerial positions, the tasks and roles eventually become extended beyond the immediate job at hand and beyond the subject taught. Students come to engage in a professional training, which is supposed to deliver income in the future. They come to acquire a profession, but also to discover themselves as creative individuals and—generally—to discover themselves. In a way, this is the essence of all learning, and thus teachers and academic leaders find and discover their own selves as more or less willing guides, addressing much wider planes of human content and growth than those strictly falling under the professional label—in this case, that of "textile design."

Because of many changes, some of which I address in the notes, this very label often loses its significance. This is another reason for the extension and malleability of the planes of content that the contemporary design academy handles. Some of those planes are inherent in the discipline, some are seemingly external, and some are forced and superficial. It seems to me important to see those different planes in terms of their motifs and the motives behind them, keeping in mind that no matter what the label or the slogan is, the key factor in its relevance, realization,

and dissemination is the human agent with all her complexity and the real world of technology, production, and economy. Creating relevance in design or art has to do with personal awareness of the world and its constant fluctuations. Awareness in a student and in a teacher is first of all a matter of motivation, the desire to be aware and alert. What are the targets or the motives of this awareness is a specific choice of every individual; they can be many and various. What keeps relevance alive is the ability to see and feel beyond labels and slogans and to act accordingly.

The notes here are an attempt to pinpoint a number of such motives or reflections that were significant to me over the last four years, those I kept returning to. I do not attempt to offer a comprehensive outline of the field of academic textile design or even raise its "problems" in the academic setting, though I am certain that many of my colleagues in different schools will recognize in the notes the pervasive dilemmas that we face every day. It is a rather idiosyncratic collection of terms, citations, stories, and questions (more than anything else) that for me allows mapping which is both functional and imaginative, and which I hope can be of use or interest for others engaged in the task.

Both teaching design and composing a design curriculum are somewhat elusive tasks, as good things may not be planned and executed but often just "happen." The way to achieve this happening of goodness is far from straightforward. Nevertheless, it is not about the mystery, but rather about openness and alertness, or about "correspondence" or right breathing, perceiving the creative individual holistically as a complex, internally motivated, but externally conditioned and always open-ended organism.

1.

M O T I F
a. a decorative design or pattern.
synonyms: design, pattern, decoration, figure, shape, device, emblem, ornament
b. an ornament of lace, braid, sewn separately on a garment.
c. a distinctive feature or dominant idea in an artistic or literary composition.
synonyms: theme, idea, concept, subject, topic, leitmotif, element; through line
d. [in] MUSIC: a short succession of notes producing a single impression; a brief melodic or rhythmic formula out of which longer passages are developed.
e. [in] BIOCHEMISTRY: a distinctive sequence on a protein or DNA, having a three-dimensional structure that allows binding interactions to occur.
("Motif," n.d.)

M O T I V E
[as] *noun*
a. a reason for doing something, especially one that is hidden or not obvious.
"a motive for his murder"
synonyms: reason, motivation, motivating force, rationale, grounds, cause, basis, occasion, thinking, the whys and wherefores, object, purpose, intention, design
[as] *adjective*
b. producing physical or mechanical motion
c. causing or being the reason for something
("Motive," n.d.)

In a wondrous and illuminating text called "To Unsense the Subjectile" dedicated to the self-portraits of the artist and poet Antonin Artaud, Jacques Derrida ponders on the question: "what is the motif?" (Derrida, 1998, pp. 89–99). This question is discussed simultaneously with the reader and with Artaud. Another party here is Vincent van Gogh, since both Artaud and subsequently Derrida, look at his paintings and write about him. He leaves marks and poses a riddle for both of his successive followers.

The likeliest answer to the question is: "suffering." It takes the shape of a stroke, a strongly felt, suffering brush stroke. At the same time, it is the name of the artist. It is actual sound, the stroke, the wound in the word, where words cease to be carriers of meaning. It is also the brush's hair, which makes the strokes and at the same time constitutes the red bleeding beard of Van Gogh in his self-portrait. They all—the name, the hair, and the stroke—with all that they bear, suffer. They are one, but divided. The interplay of motifs and their causes—"motivations"—goes on.

In the context of teaching a creative discipline, the question can be reformulated as: "What drives or "motivates" the creative individual?" and "What characterizes her motivations?" or "What shape do they take?" Of no less importance is the relationship between those questions and ways in which this relationship can be manifested and explained. Here the ambivalent closeness of "motive" and "motif" comes in handy. In textile design and in the realm of the "decorative," motifs are common; stylized and abstracted images and shapes form patterns and serve as logos. Turning something into a motif is a fundamental skill of a textile designer. Then, how can we turn our motivations into motifs? How can we manifest them, making

them apparent and communicable? What strategies of stylization or abstraction are needed in order to turn the motifs discovered into patterns?

On another plane, a teacher or a fellow student can notice that there is often an image, or a line of text, a memory or a specific feeling—a m o t i f—that returns, resurfaces in the work of a student (or an artist). It is also something that drives and motivates the criminal and the investigator, as in a detective story. It is important to glimpse them, recognize them, and put them into motion so as to fully explore their motive power in the production of work, their recurring nature as the originators of authentic individual languages—or melodies—motivated by specific, personal experiences and illuminations, and—as with the DNA—to decipher and apply their ability to connect the different pieces of a student portfolio or an artist's life's work.

2.

A Klein Bottle

> In mathematics, the Klein bottle is an example of a non-orientable surface; it is a two-dimensional manifold against which a system for determining a normal vector cannot be consistently defined. Informally, it is a one-sided surface which, if traveled upon, could be followed back to the point of origin while flipping the traveler upside down.
>
> The Klein bottle was first described in 1882 by the German mathematician Felix Klein. It may have been originally named the Kleinsche Fläche ("Klein surface") and then misinterpreted as Kleinsche Flasche ("Klein bottle").
>
> ("Klein Bottle," n.d.).

The image of the Klein bottle is in a sense a twin of the motif. For me, it is a motif in itself. It helps to imagine the illusive entity of a creative individual, a student, even if it is yourself. A three-dimensional object which is all surface, a surface which has only one side, which is at the same time its front and back, or its "right" and "wrong" or "left." It is something that can be experienced in gliding its surfaces, in a glimpse of motion, a vessel that does not contain, because it possesses neither inside nor outside, and yet it is evidently a vessel. It is peculiarly open to the outside, since its every surface is exposed, yet is sealed in itself. It is for me an image and experience of emotional alertness—a necessity in every human conduct, in teaching especially. It is not so much about fragility, the "handle with care" label, for that any glass vessel will do, but the possibility of a repeating, consequential rendezvous, open enough for all participants to change and be changed—to loose borders, and to regain autonomy—to be vessels.

3.

Ernst Gombrich, T H E S E N S E O F O R D E R

> … The organism must probe the environment, and must as it were plot the message it receives against that elementary expectation of regularity which I call the sense of order. (Gombrich, 1984, p. 3)
>
> [G]roping here comes before grasping or seeking before seeing. … [it is necessary] to regard the organism as an active agent reaching out towards the environment, not blindly and at random, but guided by its inbuilt sense of order. (p. 5)

We often talk about "intuition" in classes and personal studio sessions. A strange thing in itself—the creative individual seeks and demands freedom. We do not want to be told what to do. What we do is ours. Often an attempt to reflect and rationalize the creative act is met with objection. "I did this intuitively" often means, "I do not want to, or I am afraid to, explain." The possibility of explanation can potentially be a threat to the creative freedom when it is understood as a fancy: "I did this, because I wanted to do this, and don't make me explain, because in this way, potentially, you might force me to do something I do not want to do."

Once we explain, we are bound by certain logic, thus we are obliged to accept responsibility and control. In this situation, our next step will be defined by what is reasonable within this logic and not solely within the illusive private fancy. Such dialogues and concerns are typical and easily recognizable within any creative learning situation. I do not intend to directly address the discussion on intuition, rather to view this idea of "inner learning" or "inner knowledge" via the prism of "the sense of order" and to further bring up the relevance of motifs and patterns as conceptual tools for learning.

When we recognize and create motifs, how can we know the way to put them together in a pattern? What tells us that our design (of a fabric, of an exercise, of a lesson, of a course, of a curriculum, of a year

in life) is "right"? Our sense of order can be trained, and it is not about being "correct." It is far from the crude survival—it is the necessary aesthetics. In part it is inscribed in us, in part it comes from the "outside," while the inscribed is the mode of action we take when we encounter a new situation. This mode is constantly changing and evolving. This is how "rhythmically" we produce new patterns freely, yet guided by experience and formed by the new encounters, which always involve more than just ourselves.

4.

ORNAMENTS are more than narratives, much more. They are cultured, i.e., made in the scale of human beings, expressions of patterns, of repetitive structures, of actions and behaviors present in nature in every one of its endless performances. Yet the idea of "nature" in itself is a constantly changing human invention, as nature is defined and perceived through the eyes and bodies of human beings, and even this perceptual and conceptual modulation is ornamental, patterned.

Narratives are finite and pretentious. They lay claims: this and not another meaning, the plot and its frame, a superficial frame that is perceived and made to be thought of as a "natural" one. Ornaments are endless; they overcome every possible frame. They can exist in the absence of frames and they can cover or erupt them, when frames do not comply with the ornament's structural rules (this can be noticed when the scale and rhythm of the ornament and those of the object it covers do not correspond). An ornament can include in itself countless frames that become its elements.

The arbitrariness of the rules of ornament is not based on the pretense of meaning, but on visual "genetics" or on a code/imprint which is not human in the narrow sense ("human" as original, as one and only, as external to "nature"). On the level of design and of perception, the ornament—founded on a system of rules (geometry for instance)—works through a never-ending oscillation between the detail and the whole. It is perceived by gliding of the gaze in the attempt to discover the rule in the ornament and thus the rule in the beholder herself—as a beholder, as an experiencer, as a perceiver—directed and guided on the one hand, and free to focus on a specific detail on the other (Grabar, 1987, p. 189). It is another kind of freedom—the ability to concentrate on the detail and to discover the rule in it. It unleashes the potential of endless development and growth, both into the inside (the depth) and into the outside (the surface). This strange freedom is aware of the pattern and does not argue with it, but invents every time a new experience of it.

These ruminations gain additional relevance when applied in the context of digital communication, to which we have grown so quickly accustomed. What if we were to adapt a bird view on those texts and images that we produce and reuse, encompassing our loves, glories, sorrows, and pursuits? We produce and view them each time as a single narrative chain of frames provided by the specific technology (e.g., Messenger, WhatsApp, email, etc.). Yet the accumulation of such chains grows inside endless screens of interlinked devices, erupting, overcoming the single consistent narrative. Our devices communicate with each other via hidden electronic nerves, maintaining the entire ornamental system of feeling and reason, unfolded in the depths or the surfaces of the World Wide Web. Each singular frame—love, glory, sorrow, pursuit—an endlessly variable formula, a detail to concentrate on in the unfolding field of the carpet.

5.

INDUSTRY

Textiles are connected with craft and industry. This is a plain reality of the field, of the profession. This is an ingrained sense of our identity, nurtured by generations of teachers, practicing designers, women (for the most part) of materials and patterns. But since the very idea of "a profession" in our time becomes rather redundant, while "the industry" is globalized and malleable, other motivations come into play.

What is ours? What is not? In terms of "the profession," what is organic within it? What seems artificial? Is it important to distinguish between them? If yes, for what end? Is it a yearning for identity that is certain and accountable, for a world that is no longer fully with us? Are certainty and accountability still among the values that motivate our creative effort?

DIGITAL technology is undoubtedly related to those concerns. The question is: in what ways? The scores of commercial shows are collapsing under heaps of hastily produced collages, often so uniformly designed that the technology and its poorly realized potential appear as the driving force of mass taste. On the other hand, the above average studios talk of a revamped interest in the unique touch of the silkscreen, digitized eventually, yet keeping the specificity of the semi-industrialized process. It is a new type of nostalgia, as we are looking not only for the

handmade (which when taken lightly becomes one of the most common design clichés), but also for the mechanical, the processed, and the mediated sign. The accessible mediation, one that can be visually perceived and decoded, is valuable.

The ability to draw, to possess full control over the creation and stylization of images and compositions, to master the freedom and awareness of the hand and the eye holding a drawing tool is valued by "the industry." This ability in itself is (still) beyond technology and remains within the human body. A good draftswoman will easily master the digital pen, without necessarily neglecting the analogical tools.

It is interesting to reflect, though, on the situation when the digital pen is mastered before the graphite pencil or a brush. One of the most significant aspects of the reality where digital imagery is ubiquitous and pervasive is a commonplace superficial familiarity with visual languages. It is an important and characteristic basis for the development of drawing sensitivity. It challenges the idea of originality of an "artwork"—even if it is just a pattern for sale—because all layers of such pattern have already been seen elsewhere and are known to have been seen by its creators as much as by its consumers. The status of a mark in this superficial layering is evermore precarious, because when originality stops being the trademark of good design, authenticity becomes one and making an authentic expression in a medium which is sampled in its entirety is a worthy task.

The question of medium exceeds technicality per se; it is a question of a technologically-driven format that constitutes the culture of a mark. Culture in textile design is immanently related to patterns. What sustains the motivations and the motives behind the marks that maintain the patterns of our time?

6.

T R A D I T I O N is a term used a lot in textile design. In the academic context, a student of textile design is allowed to turn to "tradition" possibly more than in any other creative discipline. Textiles are often addressed and read as "ancient," one of the first crafts developed by the mankind and thus having an air of romance with an Orientalist lure. On the other hand, the word "innovation" is used relentlessly in university brochures and commercial catalogues, sometimes justifiably, but often as a must-have label that is supposed to stimulate sales, or admittance.

I N N O V A T I O N often is a slogan that we automatically use and reuse, a flatly modernist approach of valuing the new for its own sake or rather for the aura that it produces, a label for which we are ready to pay and demand payment.

Is tradition an anchor to grip in times of uncertainty or is it another trap that we salute when we feel insecure and alone? Do we really understand tradition or, for the most part, conjure up an idea of tradition which makes the understanding of ourselves more solid, controllable, and solacing in the sea of shabby images and wobbly concepts that disintegrate faster than a jellyfish on sand? Can we conjure tradition in the spirit of Hobsbawm's (1983) "custom" as "motor and fly-wheel" (p. 2) of a way of life? It is a way to handle—to craft—this straightforward and everyday sense of living through the most disturbing and miraculous thing—the world that is changing, "... possessing the faculty of continuing to improve by its own inherent activity, and of delivering down those improvements by generation to its posterity, world without end!" (Darwin, 1796, p. 505)

7.

Tim Ingold, M A K I N G

> To **correspond** with the world, in short, is not to describe it, or to represent it, but to answer to it. ... [It] is to mix the movements of one's own sentient awareness with the flows and currents of animate life. Such mixture, where sentience and materials twine around one another on their double thread until ... they become indistinguishable, is of the essence of making. (Ingold, 2013, p. 108, emphasis is my own)

Making is an issue for the creative individual. Maybe it is the issue. When we discuss the "thing" that the students "do", what is it about? Is it the "concept" that matters? Is it "the creative act"? Is it about "the message"? "Playing with materials"? Is it the ever illusive "process"? Is it about "the handmade"? And what of "the industrial" and the "mass-produced"? Can this be "commercial"? Is it "artistic"? Is it "innovative"? Is it about "style" or "handwriting"? Is it "green"? What if it is "ephemeral" and there is no "materiality" to it?

In critiques, we frequently repeat these words. They become conventional labels—in fact empty of meaning. Students learn them very quickly and they repeat them as something, which is supposed to justify their making—as if it needs justification. As a result, our speech becomes redundant. This does not necessarily mean that "the thing" becomes redundant. Are we asking the right questions?

Here, Tim Ingold's book comes in handy. It encourages us to look at our practices, our making. It takes in the widest possible sense in terms of means and disciplines, including both teaching and learning as a continuous transformative activity whose motivation (desire, love, energy, principle) is cultivated by a correspondence with the world.

Ingold's "correspondence" helps us to ask different questions about a reciprocal relationship between the creative individual and the world. They are questions that are outside the familiar clichés, closer to the actual making that happens, and in full awareness of and responsibility for the other parties involved in the making. We can ask how we correspond with the world in critiques or tutorials, in syllabi and faculty meetings, in the way the entire curriculum works. We ask and learn.

8.

THE HEROES

Greek myths are of use in teaching. In textile art and design departments, Ariadne, Arachne, and Penelope are popular characters because of their direct connection to the subject. Yet here I wish to evoke two other heroes, two kings who seemingly do not have much to do with textiles per se, rather with certain facets of the creative individual. They also stand as reflective signs of the general situation designers are part of and inexorably have to deal with. They are both defiant, yet very different heroes—Sisyphus and Tantalus.

Often candidates for textile design studies and current students mention Sisyphus in relation to the character of their work or their state of mind: "I am Sisyphean." The word is certainly overused, just as its recurrent associate "obsessive." During my time teaching, I have met very few individuals who actually respond to such "titles." It is curious to observe how elementary industriousness and patience—positive qualities on the face of it—become associated with sickness or at least extravaganza. Some kind of imagination is at work here—I will try to address it.

Sisyphus—the king of Ephyrae, the craftiest and slyest of all men, he chained death itself when it came for him and people stopped dying, but was forced to release it and as a punishment for his hubris he pushes a huge stone to the top of a mountain only to watch it roll back. According to Albert Camus (1991), happiness is found in the very effort: "Each atom of that stone, each mineral flake of that night filled mountain, in itself forms a world. The struggle itself toward the heights is enough to fill a man's heart. One must imagine Sisyphus happy." (p. 119)

Tantalus—the king of Phrygia, proud and unbelieving, disrespectful of the divine hospitality he enjoyed on the Olympus, he challenged the gods with a maleficent sacrifice, for which he is punished. Standing thirsty in the stream of water he cannot reach it to drink, shrouded by branches with fruits he cannot pull them off to satisfy his hunger, a stone hanging above him threatens to crush him at any moment. So he stands in the midst of plentitude ever unsatisfied and fearful.

Sisyphus is a model of absurdity and the heroism of human effort. He is a proud role model in the full sense of the word—because of his immanent skill, industriousness and tenacity, due to his awareness of the hopelessness of his own task, and for his ability to withstand the challenge and the failure. He is an exemplary craftsman, who is industrious, tenacious, unbreakable, conscious, defiant, and able and eager to perform the most labor-intensive and time-consuming task—a modern ideal.

Tantalus, on the other hand, is defiant, evil, and perverse, one who kills and cooks his own children only to poke fun at the gods, for a stupid joke, maybe for a Facebook picture of the gods' disgusted faces to gather as much as a million of likes. Two millions? Three? Insatiable—everything is within his reach, at his disposal, but nothing is enough, he is still hungry and thirsty. No effort is demanded of him, but to consume, to indulge, yet he is ungrateful, fearful, self-centered, and is never at peace. Helpless and unaware, he is afraid. Unable to fully enjoy the plenitude, nevertheless he cannot imagine his life without it. This is what he does for the most part—he imagines. Plenitude turned punishment, like in an HBO series—a pleasure to watch. Sounds familiar?

In a large part, this is the contemporary world where the creative individual and the design school are. Often this is how they are. How bad is that? We may well wonder what it is good for. Because we need them both—while Sisyphus is skillful and tenacious, Tantalus is so infinitely and indulgently imaginative. In many incoming students every year, I notice this imaginative infantile desire, the thirst for pink "castles in the air," fluffy unicorns, and blazing bugs. It yearns for the unrestrained and simultaneously the safe (unrelated to anything but itself) manufacturing of "evil" images that almost automatically perpetuate and arrange themselves in patterns, which form a closed world of nowhere. I do not intend to condemn this or to suggest remedies, but rather to point to this mechanism, which is "Tantalian" more than narcissist by nature, as a resource to be explored.

9.

P R I S O N S O F I M A G I N A T I O N is a series of sixteen etchings produced by the master etcher and theater set designer Giovanni Battista Piranesi (1720–1778) in the second half of 18th century, showing fantastic elaborate spaces of incarceration and torture, inhabited by people and animals. Extraordinary in terms of their visual inventiveness and complexity, they invoke the edges of the contemporary virtual reality and its seemingly all powerful tools, especially apparent in the design and production of movies, animation, and computer games, but relevant in all visual and material practices.

At the same time, the bare fact that those wholly "immersive" etchings, almost disturbingly up-to-date in terms of their language and content, were designed and produced "simply" by mind and hand using a straightforward analogical technique, suggests to be vigilant towards the use of technology only for the sake of its "abilities." Yet with the digital and the virtual, the world of imagination and fantasy is more open than ever, and it is important to linger in it, to explore it bravely, even though it can turn into a prison. But such imprisonment can and should be explored and celebrated, just like in Piranesi's etchings.

To my mind, the critical trait of those potential explorations is an absurd, raging sensuality of spaces and surfaces, all the more perverse, since fleshless. It is a hyper sensitivity to texture and a virtual tangibility, a propensity of the image towards touch, which has nothing to do with realism, but is all about the lack of the "real," the given, the solid, the embodied—it is "Tantalian." It is all in the fervent and feverish imagination, yearning to touch and at the same time reinventing touching as if operating with some new sensory organs, fully aware of the imag(e)inary potential. These organs are not nostalgic in nature, they are truly brave, but they are broken, corrupted in a sense by the a priori virtuosity of their abilities, which renders their quest for touch empty. Thus, they rage, and yet they are contained, ironic. They are aware of emptiness as the essence of the imaginary, and they look at their own rage and its exquisite manifestations from aside, multiplying or making patterns of the spaces, the prisons ad infinitum, or at least as much as the operative memory allows.

On the other plane of this somber phantasy, in the wholly constructed virtual visuality of movies, TV-series, and games, the sensitivity and demand for patterns, textures, and wise color use are apparent. To notice this, it is enough to examine the design of subtitles of a blockbuster such as "007 Skyfall" or a DreamWorks Studios' animation, such as "Kung Fu Panda." Textile design training and practice nurture this very specific and unique sensitivity, and it seems that a step has to be taken towards finding alternative applications of this classical sensitivity.

10.

Y o (u) s e o u r h a n d s

What are we to do with our hands in times when they verge on the obsolete, at work and in pleasure? The handmade has become the trademark of dreams and phantasms, the place of "fairness" as much as of deceit and manipulation (hands manipulate), a pull of remedies for anxieties and disorders, as much as the origin of those—the playground of Sisyphus and Tantalus. Were we to establish the *Order of the Hand*, what would its codex be?

Codex of the Order of the Hand:

Hand is desire
Hand is desire realized
Hands are empty
Hands are full
Hands are eyes
Hands are lucid
Hands are blind
Hands pray
Hands revolt
Hands betray
Hands hide
Hands endure
Hands release
Hands tie
Hands sing
Make them—as long as they make you

Can we think in three or four or seven interlinking categories? Is black and white so important? Can we move beyond the gray and the idea of a linear gradient? Can we operate between more than two points of departure and arrival? Can we meditate on journeys that take us gliding on our own surfaces in ways that we become remote, foreseeing without leaving ground?

How brave can we be?
Can we imagine ourselves as poems crafted and un-crafted by our own hands?

P.S.

These notes present an attempt at a different vocabulary—as if when standing on the shoreline, we find the spoils and trophies of the waves—stones and seashells; seaweed and dry fish; pieces of plastic and glass; drift wood, scraps of nets, and ropes; bottles, corks, and cans. Maybe, they are remains of our own boat. They motivate us to collect them and to discern where they came from and what happened to them on the way. In a sense, each of them is a question and an answer, while their combinations (and there never is one which is the only right one) can assist in reimagining the boat upon its rigging, cargo, crew, and map of future sailings. We need to acknowledge the potential of the changeable world and stop issuing prescriptions as if the world is steady and fixed—that is to keep relevance alive and answer the world.

* *Whether I sit down at my table or turn a book in my hand, the flow of visual information which I receive will suffice to make me perceive the "invariant" shape of the table or the book* ***across the melodies of change***.
* (Gombrich, 1984, p. 4, emphasis is my own).

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Soft Landing is a collection of essays that pinpoints where fashion and textile education is today and where it may shift in the future. Initiated by Cumulus's Fashion and Textile Working Group, the essays in this volume address critical questions for fashion and textiles. They shed light on different ideas, approaches, problems, and solutions from teaching and research, as well as contemplating the future trajectory and evolution of fashion and textile education. *Will the landing be soft or with turbulence?*

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