WEAVING DRESS

EXPLORING WHOLE-GARMENT WEAVING AS A METHOD TO CREATE EXPRESSIVE DRESS

Linda Dekhla
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ABSTRACT

This thesis investigates whole-garment weaving as an experimental design and construction method. The majority of the current development and research within the field focuses on production efficiency and the development of weaving techniques. Here, the intention is to connect form, material and making.

The aim is to find ways to deconstruct the process of garment making in order to create new knowledge through craft. Within whole-garment weaving, many design processes are dealt with simultaneously, through direct experimentation on the loom. In order to maintain the integrity of the weaving, interferences such as cutting and sewing is limited.

The basics of the practical method is that the cloth is woven as a double weave on the loom. For the practical work, the first objective was to find basic parameters for the project, freely experimenting with weave constructions and bindings. As the process developed, more aspects of garment construction were included in the design process. The combination of bindings, floats and elastic is used to create expressive textile as well as dress, so that the textile surfaces influences the silhouette or the drape.

The result shows the expressive potential of whole-garment weaving through a series of nine examples, each showcasing different aspects of the method. The focus is on showcasing experimental approaches to simultaneous fashion/textile design interaction.

Keywords: whole-garment weaving, textile development, fashion, textiles, weave, form, material, making
INTRODUCTION TO THE FIELD

FORM, MATERIAL AND MAKING

In its broadest sense, this work deals with the connection between form, material and making. Within textile and fashion design, material, form, and making are all important factors to the final expression of the object or garment, but they are not always valued equally. Different aspects of these topics will be described throughout this chapter. According to Merriam Webster Online Dictionary, the noun form means “the shape and structure of something as distinguished from its material”. Shape, as listed on Britannica Academic, means “the visible characteristic of a particular thing”. The noun material means “relating to, derived from, or consisting of matter” (MWOD). In this thesis, material primarily refer to textile materials, i.e. cloth, or yarn, fiber or filament used in the making of cloth. Making here means “to bring into being by forming, shaping, or altering material” (MWOD).

For just as silk, a soft material by nature, can become stiff in the form of taffeta, through a certain thread construction, and linen, a comparatively stiff material, can be made soft in another, so an endless number of constructional effects can produce new fabrics. (Albers, 2000)

The quote above highlights the importance that lies within the construction of cloth. A garment’s visual expression is in direct relation to the characteristics of the fabric it is made of (Aldrich, 2012). For example, a circle skirt cut in cotton twill will have a different silhouette or shape compared to a circle skirt in viscose jersey, even though the cutting pattern is identical for both qualities. The difference here lies within the different thread constructions, how the threads within the cloth are interlocking, which makes for different drape and properties.

FABRIC AND GARMENTS

In fashion design, form is generally described as a garment archetype or as a silhouette (Landahl, 2015). When talking about garment archetypes, we have learned how a garment is supposed to look; a shirt is known to have two arms, and a pair of trousers is supposed to have two legs. (Kawamura, 2007). It is quite common to start the design process with deciding the garment type, which means that the presumed ideas of garments may inhibit the notion of form already at an early stage in the creative process (Landahl, 2015). In her doctorate thesis, Karin Landahl writes about the need for design methods that connects making to expression (2015). She introduces the use of invariants in the design process, to provide a form-thinking that results in a stronger connection between making and expression through their emphasis on seeing form and material as one unity.

There is a strong, inherent connection between textile design and fashion design. On this topic, K. Townsend and R. Goulding discuss three approaches to textile/garment interaction, originally defined by Townsend in 2004: textile-led, garment-led, and simultaneous (2011). The first of the approaches, the textile-led, starts with a specific textile, or with the development of a specific textile. The shape of the garment is designed to highlight and utilize the characteristics and expression of this textile.
Oppositely, garment-led design starts with a specific garment and silhouette in mind, and the quest is then to find a suitable textile for the shape. The simultaneous approach is, perhaps needless to say, where garment and textile are developed and designed simultaneously.

One example of a simultaneous approach to textile/garment interaction is the master degree work of Camilla Arnbert (2017). She explores and defines a new method of garment construction where the print and the shape is dependent on each other. A placement print is cut to pieces and placed on the fabric(s), and the re-assembly of the print decides the construction and shape of the garment (see fig. 1).

CUTTING VS DRAPING

Throughout history, the progress of weaving technology and looms have influenced the way that garments are cut (Tarrant, 1994). As the horizontal loom was introduced to Europe from China around 1000 AD, it became much faster to weave longer lengths of fabrics. The cost of fabrics decreased with the technological and organizational innovations, and thereby it enabled for fabric waste through pattern cutting (Rissanen, 2013; Tarrant, 1994).

Today, cut and sew is the predominant method to create garments within the fashion industry (Rissanen, 2013). Using this method, garment pieces are cut from knitted, woven, or non-woven fabrics and sewn or joined together to create garments. As Bernard Rudofsky writes in his essay in the catalogue from the exhibition ‘Are Clothes Modern’ (1947, p. 138) “[p]ractically all our wardrobe is tailored according to a pattern derived from anatomically fitting clothes”. Rudofsky further writes about the antique dress where “[…] cloth was clothing itself; material and end-product were identical. […] As there was no desire for tightness, no fitting and, therefore, no cutting was necessary. Dress was entirely free of the curse of dress-making” (Rudofsky, 1947, p. 143). Although Rudofsky’s words might be somewhat harsh, it highlights the importance of allowing the cloth to contribute in the shaping of the garment.
SEAMLESS GARMENTS

Within fashion design, knitting is probably the best known way to create shape and fabric at the same time. With knitting you have the possibility to, by hand or using an industrial knitting machine, create complete, seamless garments from yarn, in a one-parameter design process. For woven fabrics, and for cut and sewn knitwear for that matter, there are usually two separate design parameters. The first parameter, i.e. the two-dimensional, existing material, is used to create the second parameter, i.e. the form (Landahl, 2013). Is it possible to link the creation of fabric with the creation of shape with other textile development techniques? And can this lead to more unexpected, dynamic, surprising result, affecting both shape and textile?

The most common way of producing seamless garments is the whole garment concept of Shima Seiki, introduced in 1995. It was developed by engineers and technicians, bringing principles from hand knitting into industrial production (Landahl, 2015). Japanese designer Issey Miyake’s A-poc project, developed in the 1990’s, uses another technology for making complete garments (see fig. 2). The concept of A-poc, an acronym for ‘a piece of cloth’, is that a single piece of cloth already contains the finished garment when emerging from the loom. The cloth has cutting lines which the customer can follow to cut out the garment, no sewing or finishing necessary (Sissons, 2010; Scanlon, 2004). For A-poc, the development is designer-driven, resulting in a ‘new’ expression for the clothes (Landahl, 2015) Furthermore, with the consumer-design perspective, the cloth is changeable and adjustable for the wearer.

WHOLE-GARMENT WEAVING

As mentioned, seamless knitwear is well developed nowadays, but not as much research has gone into that of whole-garment weaving. Historically, some garments may have been woven to their required shapes. A contemporary example of fully-fashioned weaving can be found in Indian company August, and their fully-fashioned weaving system called DPOL, direct panel on loom (Rissanen, 2013). Just as with fully-fashioned knitting, each garment piece is woven to shape individually and assembled to a garment.

On the topic of whole-garment weaving, Wang et al (2009) writes that “most seamless garments identified in the literature are confined to handicrafts and by two-axis weaving. They are either too flat or too plain to produce diverse silhouettes.” In their research they turn to elastic cloth to create easily realizable and shape-changeable clothing. This makes for garments that offer versatile silhouettes as well as comfort and fit.

Piper and Townsend further discuss this in their article Crafting the Composite Garment: the role of hand weaving in digital creation (2015). Their doctoral research builds on the A-poc concept and combines it with Piper’s experience within hand weaving to construct seamless, shaped garments that are wearable once cut off the loom (see fig. 3). These garments are, instead of using elastic, working with simple weave structures, yarn properties and the concept of zero-waste cutting. The garments are created using single and double cloth weaving techniques.
In their own words, this approach is “eliminating sewing and minimizing cutting waste by producing the textile and garment simultaneously - offering a more sustainable fashion solution than traditional approaches”.

Similarly, Jacqueline Leffert explores fully fashion weaving during her degree work at Royal College of Art (Kolehmainen, 2016). Leffert’s focus is on sustainability and garment production efficiency, and she weaves three-dimensional garments using a jacquard loom (see fig. 4). The garments should be cut and turned inside out before wearing. Leffert’s propose this method as a way to reduce waste material and remove manufacturing processes such as sewing, fashion garment development and finishing from the supply chain.
The main motive is to put textile development at the forefront of fashion development. In other words, this means using textile development as a driver for shape development. By doing so, one can create fashion through textiles instead of textiles for fashion. Trend forecaster Li Edelkoort launched New York Textile Month in 2016, as a reaction to the lack of knowledge concerning textiles in the world of art and design. According to Edelkoort, eyes are now returning to textile development and material processes. In an interview with Dan Howarth for Dezeen.com (2016), Edelkoort talks about an "age of new materialism", where "the making of materials comes first, before form, color, function".

As discussed in the examples above, there is a gap in the research of composite woven fashion garments, with only a few examples or research projects to this day. In both Leffert’s and Piper and Townsend’s projects, it is possible to assume that the aim is to develop the production technique of weaving over exploring the expressive potential in search for new silhouettes and materials. This means that the production technique is mainly applied to and adapted for conventional garment types and silhouettes, instead of utilized as a method to design in a new way for new shapes of dress.

New expressions are one of the fundamentals of the fashion system; the driving forces behind the fashion industry, innovations, creative investigations, and the possibility of having a collection elevated to the status of ‘original.’ ‘Newness’ can be mentioned as a possible interpretation of fashion. (Landahl, 2015)
New ways of making garments can open up for new ways of thinking, which in turn can lead to new expression (Landahl, 2015). This means that there is great potential in looking at alternative approaches to design processes. The method proposed here is intended to be used not as a production method, but as an experimental design method, meaning that the focus is on the methods ability to create expressive dress, as well as expressive textiles.

The objective is to utilize the expressive potential in the combination of different bindings and materials. Starting with the single threads in the creation of the cloth, means that the designer can decide all characteristics of the fabric, and that there can be many different properties within the same cloth. This combination of stiff and elastic, rigid and soft, decides the fundamental shape of the ‘garment’.

**THE AIM IS TO EXPLORE WHOLE-GARMENT WEAVING AS AN EXPERIMENTAL DESIGN METHOD TO CREATE EXPRESSIVE DRESS WHERE FORM AND TEXTILE ARE INTERRELATED AND EQUAL.**
A design program has a core idea that sets the structure for the research and experiments, and it may consist of a range of different activities and projects. As argued by Koskinen (2012) “[p]rogress in research ultimately lies in research programs rather than individual studies. Progress happens when some piece of research adds new knowledge to or corrects a research program. A successful research program generates new content and new problems in the long run”. Design research has to show the strength of the program beyond individual experiments (Brandt & Binder, 2007). The idea for the program is to offer the structure of a research frame, that will enable the practice-oriented research (Mäkelä, 2007).

This design program explores the topic of simultaneous creation of form and material. Is it possible to link the creation of fabric with the creation of shape with other textile development techniques than knitting? The program explores the notions of shape and garment from the perspective of textile development methods, and looks into textile development methods, more exactly weaving and printing, as drivers for shape development. The aim is to use the co-creation of shape and fabric, of surface and structures, to explore diverse expression for shape as well as textile. As mentioned in the motive, Edelkoort talks about an era of new materialism, where materials comes before shape, color and function (Howarth, 2016). What this design program proposes is a simultaneous approach to garment/textile interaction (Townsend and Goulding, 2011), where material making, textile development, is equal with and equal to shape, color and function.

In the first project, ‘Weaving Shape’, the aim was to develop new expression in dress by investigating three-dimensional weaving and the simultaneous creation of shape and woven fabric. The main objective was to establish a close connection between fabric development and bodily shape, by experimenting with different ways of weaving on the body. There were two different tracks: weaving directly on a mannequin, and weaving a piece of cloth to drape with around the body.

The latter track was evaluated as most successful, as it set important shape-parameters already in the weaving stage that could help to escape the torso-like shape that easily happens when weaving around a mannequin. Weaving on the industrial looms, it is possible to quickly produce materials where the design plan of bindings and weft yarns could create unexpected and expressive result. The combination of elastic weft for some areas and stiff weft for others generates volume and ruffles that bulge out in various ways, creating interesting spontaneous three-dimensional form (see. fig. 5). It has some similarities to early body wraps such as Grecian drapes, but the gatherings and volumes created by the yarn combinations and elastics add a new level to it. This could be seen as another take on dress that is “entirely free of the curse of dress-making” (Rudofsky, 1947). The aim was to connect the pieces on the hand looms, inserting the warp floats from the industrial pieces as weft, in order to create seamless, three-dimensional form. This was never explored in full-scale.
The new knowledge that is taken further from this project is understanding regarding the industrial loom, and the impact of letting bindings and weft materials decide the shape of the finished piece. Another aspect to continue working with is the importance of contrast and floats (used here instead of holes for head, torso, leg, arm).

DESIGN PROJECT II: PRINTING SHAPE

In the following project, ‘Printing Shape’, printing techniques were explored as a method to create or decide shape, to transform fabric from cloth to ‘garment’. The found design parameters for this project are Print design, Dye stuff and Fabric+Fabric placement. These combined should decide the shape of the ‘garments’, and different combinations produces different result (see fig. 6).

This together with the parameters from ‘Weaving shape’ led to some conclusions regarding the definition of shape for this design program. There are three different aspects: outline, three-dimensional shape, and drape. Outline is decided by placement of fabric or holes in the weave and consist of holes, tubes and fabric shape. The three-dimensional shape is depending on yarn and binding combinations, elastic and stiff, and talks more about volume. Drape is the movement on body in motion or the drape around the body, and is dependent on yarn and binding combinations and warp or weft floats for weaving. For printings it depends on fabric combinations and dye stuff.

What if the shape depends on the combination of weave and print? That without print the woven cloth is just a cloth? Can the print unlock shape for the body? This idea was brought forward to the following project.
DESIGN PROJECT III: BURN BABY BURN

With basis in the two previous projects, this project aimed to explore the combination of weaving and printing as a driver for shape development. It quite quickly became clear that burn-out print had the biggest potential to affect the shape of the woven cloth, by creating holes, openings or pockets. The latter, i.e. pockets, are the main focus of this project, and means to separate two layers so that there is a pocket within the weave. The idea was to apply burn-out to a double weave structure, with a cotton stitching thread keeping the two layers together. The burn-out eliminates the stitching thread and separates the layers, making room for the body. This method can be described as reversed sewing; instead of sewing two pieces of cloth together it transforms a single-layer cloth into two layers. The shape of the garment is dependent on the weave structure and its materials, as well as on the shape and placement of the burn-out print (see fig. 7).

After analyzing the result of this project, three pieces that clearly proves the validity of the method but perhaps lacks in refinement, the most important parameters became visible: the weave and the floats (open weave), contrast in the weave, volume and gatherings (elastic).

The idea of using burn-out print to unlock shape for the body seemed to be of great conceptual importance, using invisible print to transform a cloth into a dress. However, it did not have as many expressive qualities as desired, and it is possible to weave almost exactly the same thing on a single-repeat jacquard loom. What if the burnout print is not necessary after all?
fig. 7. Excerpts from workbook, Design Project III: 'Burn Baby Burn'.
DESIGN PROJECT IV: WEAVING DRESS

This project is the starting point of the degree work. It started with the idea to develop and refine the method gained from design project III, bringing forward the most important parameters of that project, with a proper focus on floats. The idea was to try to find a way to include weft floats as well as warp floats, first by using burn-out print, later by weaving the weft floats instead. In this project, all pieces are woven as an open double weave, i.e. a tube, with a tabby ending keeping the layers together in weft direction, and the selvedge closing the layers in warp direction.

There are two different tracks within this project, square-pieces and engineered garments (see fig. 8). The square-pieces focus on the bindings and materials to effect the shape of the piece. The engineered garments are a bit more planned according to desired shape, the two layers are closed within the weave to create different tubes. This means that with the engineered garments there are less freedom after weaving, in body-placement and directions, but it is possible to create more diverse shapes. How to combine these? To get diversity in shapes but not loose the freedom and playfulness from the square-pieces? It is important that the process is not restricted by recreating existing garments.

The result in this project can be seen as prototypes from the experiments, in a search for a refined method and a library of expressions, developed from the construction of dress through weaving. In each of the pieces, the materials/the weave, is truly linked with the shape, as shape and textile is created simultaneously. The shape, i.e. the volume and the outline of the piece, is defined and decided by the bindings and the weft yarns. In that sense, this work succeeds in being an example of a simultaneous approach to textile/garment interaction.
fig. 8. Process pictures from Design Project IV: Weaving Dress.
DESIGN METHOD

THE DIVISION BETWEEN KNOWLEDGE AND CRAFT

In design research, a common debate is that of the traditional distinction between knowledge and craft. The division dates back to ancient Greece and Aristotle, where the concept of ‘episteme’, intellectual knowledge, was placed in a rhetorical contrast to ‘techne’, which translates to practical knowledge or craft (Borgdorff, 2006; Lehmann, 2012). One of the main objectives of the debate seems to be about combining the two concepts, creating new knowledge through craft, episteme through techne. When analyzing a craft and its traditions, one can find keys to reverse or deconstruct the process and thus reach new knowledge (Lehmann, 2012). As an example of this, Lehmann mentions Issey Miyake’s Pleats Please collection, in which whole-garment pleating is explored to create new expressive possibilities for fashion design (Lehmann, 2012; Thornquist, 2014). This is a reversion of the conventional working processes within fashion design, as Miyake prepares the weave before the garment is constructed. “[C]onceptual thinking emerges from an analysis of existing techne” (Lehmann, 2012).

KNOWING THROUGH MAKING

In the article Knowing through Making (2007), Mäkelä similarly explores the notion of knowing through making, seeing the making and the products of making as essential parts of the research. This is supported by Koskinen et al., who argues that it is through the actual doing or making of things that problems and discoveries are noticed (2011). A similar idea is that of the ‘reflective practitioner’, where designers learn and design through ‘reflection-in-action’, in which doing and experiencing are inseparable (Schön, 1983; Binder et al, 2014). Furthermore, in Designerly Ways of Knowing (2006), Cross argues that knowledge is inherent in the activity of designing, as well as in engaging in and reflecting on the activity.

THE ROLE OF THE ARTEFACT

Cross (2006) and Mäkelä (2007), as well as Koskinen et al., (2011) all discuss the idea of the object, artefact, or prototype, as the probable embodiment of theory, collecting and preserving knowledge. Mäkelä writes that “without the artefact, there is just assumptive theory, which is separated from the actual process of making” (2007, p. 159). In his article The Role of the Artefact in Art and Design (2002), Biggs highlights the problem of using the artefact as “an argument for interpretation by the viewer”. He proposes to use appropriate contextualization in order to communicate the result, described in words or text, or to some extent by “several objects in juxtaposition” (ibid). This is further supported by Mäkelä, who argues for the importance of giving a voice to the otherwise “mute objects” by interpreting an artifact in a certain context (2007).
THE EPISTEME OF WEAVING DRESS

Anni Albers reasons that the best way to explore weaving is through direct experimentation on a loom, in order to be connected to the craft itself (Smith, 2014). In whole-garment weaving, the central design tool is the loom. Using the loom as the tool means to also adhere to its restrictions. It does not necessarily means a restrictive mindset, but the settings of the used loom(s) will affect the process. A jacquard loom offers more shaping possibilities than a dobby (shaft) loom, but the constraint of the rectangularity of the warp has to be a present parameter in the design process (Piper and Townsend, 2015).

Lehmann (2012) proposes that “the integrity of the weaving”, the episteme of the craft, can be maintained using limited pattern cutting, seams or darts, i.e. to not disrupt the integrity of the woven piece with extensive structural intrusion through cutting and reassembling. This idea is also present when implementing a simultaneous approach to textile and garment interaction. When dealing with whole-garment weaving “multiple textile and fashion processes take place in parallel; requiring a combination of experimentation, open-mindedness and embodied knowledge, to understand the potential of materials, processes and modes of production, and to exploit the opportunities of simultaneous textile and garment construction” (Piper and Townsend, 2015).

DESIGN OF EXPERIMENTS

Moving on, to the design of the experiments. See figure 9 for an illustration of the flows of experimentation, and see below for description of the practical design methods and design of experiments.

WEAVE IDEA AND LOOM RESTRICTIONS

The process starts with an idea for the weave. This can be a development of an earlier experiment, or what is seen as next necessary knowledge, or a shape idea based from a sketch. The loom restrictions are also taken into consideration. For this project, two different types of jacquard looms have been used. One has a white cotton warp, with four repeats á 40 cm. The other one has a black and white polyester warp, and five repeats á 31,8 cm. These restrictions are seen as guidelines for the design of the cloth, to work with or against.

PLANS AND PROTOTYPES

The weave idea is followed by a rough idea of the areas or surfaces of the weave, such as elastic, semi-elastic, or stiff, matte, rough or shiny. The yarns are then decided based on the desired surfaces, and the colors are picked from the appropriate yarns. In some cases, if the “garment construction” calls for it, it is necessary to make prototypes out of ready-made fabrics. For trousers, for example, the challenge has been how to deal with the crotch areas, based on a four or five repeat loom. The amount of repeats in the looms are guiding principles for the garment construction, but some stitching is allowed to recreate a single-repeat weave if necessary.
BODILY CONTEXT AND EVALUATION

When the weaving is finished, the cloth is put into a bodily context by placing it on the body in front of a mirror. This is done while filming the session, in order to see the potential of shape as well as to see how the color pattern created by the weft yarns abstract or highlight the body and shape. The draping sessions are filmed so that every trial is documented, not only the ones found successful. During this step, a first evaluation of the weave composition (yarns, colors, pattern) is done and noted for further development. After reviewing the videos, one placement is decided for. It has been easier to find 'good' shapes when placing the piece on the bias, because this creates asymmetry and breaks up the weaving lines. Therefore, in some cases it has been necessary to strive for a horizontal or vertical placement to get diversity within the experiments. Occasionally, an idea for the shape has been set before the weaving, but needs to be reviewed and altered after the video evaluation.

OPENING AND DRAPING

After the woven piece has been opened according to the selected placement—meaning to cut away the selvedge yarns or to cut away the tabby edges—a new on-body draping session is carried out and taped. Are there any other possibilities to wear it than how it was intended? Are openings big enough? This is adjusted if needed. In some cases, manipulating the piece by sewing is okay if necessary (see Plans & Prototypes).

EVALUATION WITHIN LINEUP (OVERALL COMPOSITION)

Finally, the final piece is evaluated: Colors? Yarns? Texture? Shape/Placement on the body? Enough contrast? Movement? Most importantly, the piece is evaluated within the lineup, considering the overall composition...
and expression of the collection. Does it fit as intended into the collection? Does it bring something new in terms of shape, textures, construction or color? The idea for the lineup is to build an overall expression that shows the concept and depth of the research.

**DISCARD, REWEAVE OR REPURPOSE**

If the piece does not fit into the collection, it can be discarded, rewoven or repurposed. Reweaving might be necessary if yarns need to be exchanged, or if the planning/weave design needs to be adjusted in terms of densities, lengths or design. Repurpose means to drape with the discarded pieces again, perhaps place them differently on the body, cut away parts or choose parts to be rewoven into a new piece.
DEVELOPMENT PROCESS

STAGE ONE - TECHNICAL EXPERIMENTS

DECONSTRUCTING EXISTING PIECES
This was the first set of experiments conducted during the degree work. The aim was to look at discarded pieces from previous projects to explore simplicity and complexity within the piece, i.e. how distorted the piece could be from its woven square shape, without disrupting its integrity. Simplicity can be found in the grey ‘dress’ in figure 10, where no elastic or complex patterns are used to alter the shape of the piece and the construction is simple, just cutting the selvedge to allow the body to enter, and cutting away the tabby edging in specific places to open up for arms and leg movement. Using the same woven piece, but wrapping it around the body as can be seen in figure 11, shows how an overly complicated wrapping or construction can take over the expression of the woven cloth.

CONSTRUCTION PROTOTYPES
For this set of experiments the idea was to try out some sketched ideas of construction principles that could be manageable using a four-repeat jacquard loom. For the first test, the idea was to see if a curved shape could appear if the head and legs would exit on the same side of a piece. A first trial of this was executed, but the result was too draped, possibly distorting the expression of the weave (see fig. 12).

A second experiment focused on the idea of creating a one-piece body suit, as can be seen in figure 13. With the prototype it was possible to explore how much one could cut away and into the weave without ruiniing the expression, but providing best possible shape and movement.
FURTHER EXPLORATION OF S-FLOATS IN DIFFERENT MATERIALS

For the first weaving session with the technicians, the idea was to further explore weft floats in an S-shape, as described in figure 14. In the first experiment, figure 15, more S-shapes per repeat was tested, in a soft material and in a plastic yarn combined with elastic. The effect of the weft floats for this piece was mainly as surface decoration for the soft yarn, and decorative, messy texture for the part where plastic and elastic is combined.

For the second trial, the idea was to test diagonal weft floats, with irregular shape and curves. The weave was conducted with one stiffer, chenille yarn and one soft, matte cotton yarn. Perhaps the chenille yarn would need higher density to create three-dimensional shape using the weft floats, or maybe the pattern does not work because the floats are too long (see fig. 16).
EXPLORING WEFT AND WARP FLOATS TO CUT TO FRINGES

For the first trial (see fig. 17), the aim was to test warp floats in stripes to be cut for fringes, using lurex and plastic yarn for different densities and difference in repeat size. However, the plastic yarn did not seem to work with this specific weave pattern. Therefore, the end result is a piece made almost completely out of golden lurex weft, with thin elastic stripes for shaping. This piece is very simple color wise, but the shiny, perhaps some would say tacky, lurex is disrupted by the cotton warp floats. Cutting the warp floats into fringes makes it possible to make the gold more visible in certain areas.

The second trial focused on weft floats in a check pattern, with the intention to cut some of the floats (see fig. 18). This was done with different yarns and densities. It seems like the check pattern does not shape the plastic in the same way that the S-floats does, possible because of long floats combined with too small areas of woven. On the body it does appear a bit more shaped. Cutting the floats makes the piece very instable and in risk of falling apart. The lurex and elastic combo makes for an interesting, hairy surface.

The third piece aimed to try weft and warp floats combined within a check pattern, as well as trying warp floats in the front and satin in the back. Also here the cloth is very fragile. The ‘warp floats in front, satin in back’-combo did not work as intended, since a mistake in the planning led to the warp threads from the bottom layer of the double weaving to float on the top layer, causing the weave to close. Also here, the float-intense areas are very fragile, creating a very drapey fabric (see fig. 19).
fig. 17. First trial of warp floats cut to fringes.

fig. 18. Second trial, weft floats in check pattern.

fig. 19. Weft and warp floats in check pattern.
THE MONOFILAMENT LOOM

The aim for this session was to test the monofilament loom, a jacquard loom with a ‘transparent’ monofilament warp. The idea was to see if this could add some depth to the expression of the collection, since the warp floats are one of the most important parameters. What would happen if they are almost invisible? This can be seen in figure a 20 and 21. However the visual effect was not good enough to make up for the extreme weft slippage, which almost causes the cloth to disintegrate.
EXPLORING PLEATS
The main objective was to test pleats as an alternative to elastic areas, building on a pleat experiment from Design Project IV. This was done through experimenting with big pleats in lurex and in plastic (soft and stiff) and small, uneven pleats in plastic and shiny polyester (stiff and small). The contrast within the piece was perhaps not perfect, it would have been better to combine pleats with larger areas of plain satin or floats, but all pleats work as an interesting alternative to plain elastic. The most interesting part is where the plastic pleat is combined with the shiny satin part, and placed on the bias on the body so that the break of the pleat, the change in direction, is visible (see fig. 22). It seems like the key to mastering the pleats is to work with a lot of contrast, where the pleats are stiff enough to work as a flat, hard surface in contrast to something more drapey.

EXPLORING LAYERS
This experiment aimed to try layered weaving with elastic in the bottom layer, to see if that could create a greater impact of the layers, making them more visible (see fig. 23). It did not really turn out successful, possibly the bottom layer elastic needs to contract more, so that the difference between the top and bottom layers is bigger.
STAGE TWO - COMPOSITIONAL EXPERIMENTS

DECIDING PARAMETERS, ANALYSIS OF EXPERIMENTS

For the second stage of the process, the important first step was to look over all previous experiments, from both the degree work and Design Project IV, to see what parameters to continue with and to build the lineup/composition from (see fig. 24). Looking at shapes and surfaces, as well as constructional principles, such as placement of the piece on the body and the amount of cutting, the following parameters were chosen:

- Floats: warp floats both on surface as fringes and as a gap in the weave, weft floats as decoration and as agent of shape
- Elastic: plain elastic, elastic combined with floats, and pleats in different qualities
- Material qualities: stiff and soft, shiny and matte.
- Cutting: different complexity of cutting into and cutting away
LINEUP

After the analysis, several sketches or ideas for lineups were drawn, a composition balancing the different parameters and the complexity and combination of them. The lineup sketches are mainly done through Photoshop collages, using photos of real prototypes but adjusting them in size and color to fit together in the overall composition. The aim for the lineup is to show the depth of the research in a balanced way, showing the potential of the method. After numerous trials with different composition and styling, one lineup is chosen for continuation but will be revised as the research proceeds (see fig. 25).
Since this has been an experimental process, where it has been necessary to experiment using the correct types of yarns from the beginning, the colors stems to a large extent from early experiments and from the availability of yarns.

The green color originates from the very first weaving project, Design Project I: Weaving Shape (see page 9), and have been used throughout the projects (see fig. 26). This depends on the quality of the yarn, a flat polyester yarn that can weave shiny, stiff and sharp surfaces. This yarn was only available in this green color. After thorough research together with the technicians, an identical yarn was found and ordered, but this time in a golden beige.

Also the purple color stems from a previous project, from Design Project IV: Weaving Dress. It derives from a purple chenille yarn, that is used for its ability to weave dense, matte surfaces. This brighter purple is combined with a softer lilac, in both matte and shiny yarns.

The yellow color originates from a bouclé-like yarn that was used for its density and matte texture (see fig. 27). The yarn is not present in yellow in the collection, but the soft shiny yellow polyester that was sourced to match it is, as well as the golden lurex.

Black was added to create some depth and contrast between the samples, used on the polyester loom with black and white weft.

fig. 26. The green polyester yarn in Design Project I, III and IV.

fig. 27. The evolvement from yellow to gold. The dress to the left is from Design Project IV.
When planning the weave, colors have been secondary to yarn properties. That means, that the types of yarns are decided first, and then the colors have been based on the available yarns. However, when reviewing the cloth in relation to the body, the colors are of much greater importance, considering how the colors guide the eyes to understand the shape. In early experiments, there were often a bigger contrast between the colors, but it was found to distract too much from the form (see fig. 28). Therefore, for the majority of the final pieces, the color range is much softer, letting the white lines of the tabby or warp floats direct the eyes. This means that the above mentioned colors, green, beige, purple, yellow and black, are used in similar hues and tones within the same outfit. See figure 29 for final colors.

Fig. 28. Left: Lines of colors, warp floats and tabby distracts the eye. Right: Somber colors lets the warp floats be in focus.

Fig. 29. Final colors.
The idea for the first volume-piece came from a previous experiment, using lurex and plastic combined with elastic and floats for great volume. Unfortunately the plastic yarn turned out to be really tricky to weave this time, and so the weave plan had to be changed during the session. The result in the end was a piece with floats that were too long and volume in the wrong place. After draping with the piece, which was difficult because of the amount of fabric to handle, the piece was separated into two pieces, one with plastic volume on a diagonal from the hip to the knee (see fig. 30), and one plain piece with lurex, elastic and fringes.

For the second trial, the weave was woven on another loom to succeed with the plastic. With this loom, it is possible to program the design with different weft densities, which means faster weaving.

The piece was also made smaller, in a closer size to the original piece. However, this one turned out a bit too small and wrong in composition, especially the sleeves should have been further down on the arm. Color wise the piece turned out interesting, as the use of the black plastic with floats, creates a very black surface combined with the lime-colored green (see fig. 31).
SIMPLICITY

The first idea was to make a clean piece, without elastic, showing the simplicity of the method, but add fringes for a more interesting surface (see fig. 32). Three versions were woven: the first one has warp floats, cut to fringes at the shoulder part to show both the cut and the uncut fringes and their impact on the glittery base. The second one has weft floats in the same color as the base weave, cut at the top which makes the fringes fall with a distance from the base. The third has weft floats in a contrasting yarn, cut at the bottom to fall straight down.

Another simplicity piece can be seen in figure 33, the cut-off from the volume piece discussed on the previous page. This piece represents the same simplicity in construction, but has more striking textural components.

fig. 32. First simplicity piece.
ADD-ONS: ADDITIONAL GARMENTS/OBJECTS

The first type of additional garment tried was the cotton blouse, see figure 30. The idea was to bring in the cotton tabby structure from the endings, but in a more simple blouse format. The construction principle is to weave four blouses at a time, and then cut them into desired shape with a setup similar to that of A-poc (see figure 34).

The above construction principle was later developed into the golden piece in figure 35. This piece also consists of four tubes, but here they are separated differently, which makes for fewer but more different-looking garments.

The cotton tubes and the golden tubes were also tested in different ways on the body, as leg-pieces, loose sleeves and head pieces, see figure 36, in search for new types of complimentary garments or shapes.
JACKET PROTOTYPES

This was another attempt at proving the validity of the method— is it possible to create a jacket or a coat with this principle? The construction is based on the four/five-repeat jacquard loom but with some additional sewing as allowed by a single repeat jacquard loom. Here it was once again necessary to make prototypes before weaving to evaluate and adjust the construction, see figure 37 for prototypes.

fig. 34. Cotton tabby blouse.

fig. 35. Golden blouse.

fig. 36. Testing the pieces differently on the body.

fig. 37. Jacket prototypes.
**STYLING/COMBINING/REPURPOSING**

Styling or combining of different shapes/pieces is done at several stages during the process, using on-body combinations that are filmed to see the movement. Occasionally, it has also been done using ‘wall styling’, which enables to see the entire collection at the same time to see how the pieces fit together, see figure 38. If a new combination of pieces in one outfit is discovered using wall styling, this needs to be tested on body as well. Likewise, repurposing of finished and discarded pieces is also a continuous process. This means to drape with the discarded pieces to see if there are other possibilities than intended.

**ENGINEERED, CUT INTO**

See figure 39 for the first woven test of the one-piece jumpsuit. It is based on a construction idea, the previously mentioned toile prototype, and the principle of cutting into and cutting away (the extra legs). However, as there is no elastic creating volume, this piece stands out from the other pieces, because both pants and top are flat in shape. Therefore, for the second test it was decided to not cut away the extra legs but to leave them for volume and movement. The plan was to leave the extra legs hanging at the sides. The top is adjusted slightly with a one centimeter wide elastic part over the sleeves, which creates some extra ruffles and volume, marrying the expression better to the others. However, when comparing this outfit to the other examples in the collection, the flat volume of the pants in combination with the top made the expression too different from the others.

**S-FLOATS FOR VOLUME**

This piece is based on one of the pieces from Design Project IV: Weaving dress, where S-shaped weft floats in plastic yarn breaks and bends the silhouette. After a new on-body draping session with the old piece, the placement was decided to be right below the shoulders to create a big distance from the body. This was combined with long warp floats, to add to the movement of the piece (see fig. 40).
fig. 39. Engineered two-piece.

fig. 40. S-Floats dress.
**PLEATS AND PLASTIC**

This piece derives from Design Project IV: Weaving dress, although the placement is slightly altered, see figure 41 for repurposing drape session. This piece represents a simplicity in construction which generates a strong expression. It is placed as a bustier across the bust, with soft purple drapes on the left hand side, and a big, bulgy, plastic volume on the right hand side. The volume is created through pleats that gathers the plastic and then releases it into its full width.

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**SWEATER**

This engineered sweater is a variation of one of the jackets prototypes described on page 32, but here it is not cut open in the front, see figure 42 for weave plan. It is woven with the inside out, and meant to be cut and turned before wearing (see fig. 43). This piece has been in and out of the final lineup, but finally left out in favor of other pieces. However, it is still a strong piece, being both conventional and conceptual with the simplicity of the construction combined with the pointed shoulders that refers to the square of the loom.

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**fig. 41. Repurposing of dress.**

**fig. 42. Weave plan for sweater.**
WEFTFLOATS AS SHAPE DISTORTER

This piece is brought directly from the previous Design Project IV: Weaving dress. It is chosen for how the shape is distorted by the weft floats, bending the shape in smooth, vertical waves. The body is placed in weft direction, with an opening for the head in the center of the piece, and one opening for each arms. The openings are symmetrical. The elastic on the left hand side contracts the piece and causes the stiff, green polyester to bend according to the weft pleats on the right hand side. A small stripe of the green polyester highlights the shape and bends even more. The weft floats in the shiny, soft, grey yarns are purely decorative. This piece has been styled and restyled to see if it needs something more, but found to have enough expressive qualities in its own rights. See figure 44 for styling attempt with trousers. This dress has also been in and out of the final lineup. It is a clear and strong example of the square-piece garments, but is too different from the other pieces in the collection and is therefore left out.

fig. 43. Sweater before and after cutting and turning.

fig. 44. Weft floats-dress together with trousers.
STAGE THREE - FINAL PIECES (DESIGN RATIONALE)

PARTY DRESS/GOLDIE

Short and tight, the “party dress” in figure 45 is a piece to prove the diversity within this method. The dress is from the experiment of warp floats to cut to fringes, as described on page 22. The warp floats are cut and cut away in some areas to reveal the glittery golden surface. The dress is paired with loose sleeves in plain gold lurex combined with chaotic weft floats in plastic. The white ruffle of the dress is re-occurring in the sleeves. The sleeves are based on the exploration of several s-pleats in repeat as described page 21, creating a messy surface of plastic fringes that contrast the sleek dress. The first woven sleeves were not messy enough, due to a misinterpretation of the original experiment. For the second test, the weft floats are longer and the bound areas smaller.

PLEATS

The pleated examples are brought from a repurposed piece made during Design Project IV: Weaving dress, where there are two areas with stiff pleats divided by an area of floats. This creates an interesting break in the pleats. After a new draping session with the old piece, it was decided to make a skirt with the stiff pleats on one side and a soft ruffle on the other (see fig. 46).

The yarn used for the pleats is a stiff, flat polyester yarn in golden beige, chosen for its ability to create really sharp and stiff pleats. This is combined with a lime green lurex yarn, for a soft and drapey contrast to the pleats. In addition, a bright yellow section highlights the ruffle on the side for the skirt (see fig. 47).

The idea was to combine the skirt with a similar top to truly focus the silhouette on pleats. This made a rather beautiful silhouette from the side (see fig. 48) but in order to achieve diversity in the collection it was later decided to separate the two pieces. The top was instead combined with a pair of trousers from Design Project IV.

The trousers are the first attempt at making trousers using this technique. They were planned through idea sketching, within the limitations of the loom and its 40 cm width repeat size. Then the plan was tried and adjusted with a prototype, and finally planned for and woven. After weaving, the ‘trousers’ were cut open according to the plan. To refine the shape, a side seam was added to the piece. The side seam is not possible to weave on the 40 cm repeat jacquard loom, but for a one repeat loom it would be. The elastic area over bum and waist makes for comfort (see fig. 49).
fig. 46. Repurposed piece from precious project and sketch.

fig. 47. Skirt with ruffle.

fig. 48. Combination of top and skirt.

fig. 49. Trousers combined with pleated top.
CHECKFLOATS DRESS

After a repurposing session with the volume/plastic piece described on page 29, this example shows the piece placed over the bust as a dress, with the black plastic areas draping along the sides. The heaviness of the plastic makes it interesting in movement, bouncing up and down on the sides of the body (see fig. 50).

L-SHAPED DRESS

The L-shaped dress is an example of how the placement of the openings can shape the dress as a garment. Here, the opening for the left arm is on the short side of the cloth, followed by opening for head and right arm on the long side. The leg opening is on the opposite short side, see figure 51 for explanation.

The piece derives from an earlier piece, but is rewoven in colors that better highlight the shape of the dress (see fig. 52). The bright green lurex stripe is put in focus, guiding the eye. Furthermore, a small section of floats combined with elastic gives the dress a fringe detail that adds movement.
VOLUME PIECE, REPURPOSED

This dress comes from the volume piece described on page 29, with plastic volume in a diagonal from the hip to the knee. The first idea was to combine stiff volume with fringes, with long fringes added for movement. It also had fringes on the right hand side of the body, tied together instead of a seam to show the functional aspect of the fringes (see fig. 53). However, the fringes of this piece were deemed to be too messy in expression. After another repurposing session, the dress was changed into a skirt (see fig. 54).

Another important aspects for this piece is the combination of contrasting colors. The black plastic and the yellow polyester yarn contrast and highlight each other.

The idea was to combine the volume of the skirt with a simpler top, to focus the silhouette on the skirt and its movement. See figure 55 for the development of the pleated top.
fig. 54. Repurposing of fringe dress to volume skirt.

fig. 55. Development of the pleated top to go with skirt.
COAT TURNED DRESS

For this piece, the idea was to weave a coat with weft floats cut to fringes. The construction of it is based on the jacket prototypes described on page 32. In order to reach a good mix of yarns and directions for the fringes, a sample of the sleeve part was woven first, see figure 56. This coat is woven on the polyester jacquard loom with possibility to plan everything already in the weave-file, but a mistake in the weave-file resulted in mixed up densities, which also changed the intended proportions of the coat (see fig. 57). Too long and too loose, some changes had to be made from the original plan. Because of the looseness of the weave, the floats could not be cut into fringes, since this would cause the cloth to fall apart. The heavy bottom of the dress in comparison to the loose top also made it difficult to cut the coat open, instead it was only cut for a head opening. The dress was too long to walk in, dragging on the floor. In order to keep the stiff bottom plastic part intact, it was decided to fold the skirt part instead of cutting. All in all, this piece did not turn out as planned, but adds to the diversity of the collection as it is.
**GRADIENT JACKET**

This jacket is based on one of the jacket prototypes described on page 32. It is patterned with a gradient to add a simple pattern into the collection, and combine different colors in one piece. It is basically woven as a square with elastic at the top and elastic at the bottom. Three cuts transforms it into a bomber-like jacket (see fig. 58).

Since the jacket is notably garment-like, it needs to be combined with something that abstracts it slightly, something that adds some movement to the silhouette. During the last styling session, the jacket was combined with the pleated skirt described on page 37. This composed a striking pair, where the gradient of the jacket continues down to the skirt, see figure 59.
**COAT & SIMPLICITY TUBE**

This is the second attempt at weaving a coat. This time, the coat was woven on the cotton jacquard loom, where the densities of the weave is set and can be adjusted manually. A combination of light green plastic and golden beige polyester was decided for, as weaving with only thick yarns would make a denser weave that would remain in shape after cutting it open. The coat was also woven with the inside out, which means that it should be cut and turned before weaving (see fig. 60). The coat was styled with numerous garments before finding the right match to highlight the shape and movement (see fig. 61).

The simple tube dress was initially intended as a simple skirt to wear with the gradient jacket, bringing forward the simplicity, tightness and twist from the “party dress”. It did not work with the jacket but the simplicity of it made for a good contribution to the coat. The tube is opened in warp direction on both sides, worn as a strapless dress. Once again, the tabby ruffle highlights the direction of the twist (see fig. 62).
ENGINEERED DRESS

For this engineered dress, the idea was to combine a more abstract skirt part with an engineered top (see fig. 63). The top part is based on the same principle as the gradient jacket, but woven inside out and not cut open in the center front. Another focus for this piece is the combination of colors. The gradient travels from dark green to a bright green that is contrasted with a bright purple for the skirt part. This way, this dress is color wise working with both subtle harmony and harsh contrast.

fig. 61. Styling with different garments, tube dress to the right.

fig. 62. Tube dress with gradient jacket and on its own.

fig. 63. Sketch, yarns and almost finished dress.
RESULT

The result of the investigation is showcased in a collection of nine examples, see figure 64. The final pieces have been selected to have an overall balanced composition regarding complexity of construction, shape, and texture. This means that there are some more garment-like pieces, and some more abstract shapes of dress. The aim is to show the depth of the research and the potential of the method, hence each outfit represents and showcases different aspects of the method.

An important note is that all garments within the final lineup is whole-garment woven. Throughout the process it has been debated whether or not to include conventional garments, cut-and-sewn or fully-finished. The reason to do so would be to connect the overall collection to the industry, making it easier to read for the viewers. However, the collection might be more interesting when operating within its own field of whole-garment wovens. Instead of combining a skirt with a simple jersey top, it is combined with a woven piece reminiscing a singoalla top, a simple piece within the realm of whole-garment weaving. This connects and juxtapositions the pieces to each other instead, which might further prove the validity of the method.
OUTFIT 1

DRESS WITH WARP FLOATS, LOOSE SLEEVES

LOOM: VAMATEX/GROSSE ELECTRONIC
WARP: White cotton
YARNS: Gold lurex, lime green plastic, white cotton, white lycra
OUTFIT 2

DRESS WITH WARP FLOATS, FOLDED AT BOTTOM TO ADJUST LENGTH

LOOM: DORNIER/STAUBLI CX860
WARP: Black and white polyester
YARNS: Black plastic, black polyester bouclé, black polyester, white cotton, white lycra
OUTFIT 3

JACKET WITH GRADIENT PATTERN, SKIRT WITH PLEATS

LOOM: VAMATEX/GROSSE ELECTRONIC
WARP: White cotton
YARNS: Yellow polyester, gold lurex, lime lurex, olive polyester, beige flat polyester, white cotton, white lycra
OUTFIT 4

DRESS IN L-SHAPE CONSTRUCTION, WEFT FLOATS FOR DECORATION

LOOM: DORNIER/STAUBLI CX860
WARP: Black and white polyester
YARNS: Lilac synthetic yarn, bright green lurex, lime green plastic, black polyester bouclé, black cotton, white lycra
OUTFIT 5

STRAPLESS DRESS WITH BOUNCY BLACK PLASTIC AREAS DRAPING DOWN THE SIDES

LOOM: DORNIER/STAUBLI CX860
WARP: Black and white polyester
YARNS: Black plastic, lime green lurex, white cotton, white lycra
OUTFIT 6

ENGINEERED DRESS WITH GRADIENT PATTERN AND PLEATED SKIRT

LOOM: DORNIER/STAUBLI CX860
WARP: Black and white polyester
YARNS: Dark green lurex, bright green lurex, purple chenille, white cotton, white lycra
OUTFIT 7

TOP WITH PLEATS, ENGINEERED TROUSERS WITH LONG WARP FLOATS

LOOM: VAMATEX/GROSSE ELECTRONIC
WARP: White cotton
YARNS: Lime lurex, beige flat polyester, green flat polyester, light green polyester, white cotton, white lycra
OUTFIT 8

SKIRT WITH PLASTIC RUFFLE, PLEATED TOP

LOOM: DORNIER/STAUBLI CX860
WARP: Black and white polyester
YARNS: Black polyester bouclé, black plastic, yellow polyester, white lycra
OUTFIT 9

ENGINEERED COAT WITH LONG WARP FLOATS AND DECORATIVE WEFT FLOATS, SIMPLE TUBE DRESS WITH TABBY RUFFLES

LOOM: VAMATEX/GROSSE ELECTRONIC

WARP: White cotton

YARNS: Beige flat polyester, lime plastic, olive polyester, lime lurex, white cotton, white lycra
DISCUSSION

The connection between form, material and making has been the very core of this degree work. As mentioned in the motive, the idea has been to connect these aspect in a way that enables for the creation of fashion through textiles, instead of textiles for fashion, or simply fashion out of ready-made fabrics. The belief that this simultaneous approach to cloth-garment relationship will lead to new expression or shapes of dress have been the guiding principle throughout the process.

Form and material has been argued for throughout the process, but how is the aspect of making visual in the collection? Most importantly, the presence of the square shape points back to the making of the cloth. This is visible in the abstract square pieces and in the pointed shoulders of the engineered garments. Likewise, as a trace of the loom, visible warp floats are used as an important factor for shape and movement. Furthermore, the restricted cutting means that “the purity of the surface is maintained to highlight the principles of making” (Lehmann, 2012). This is also highlighted to some extent through the use of stripes within the weave as guidelines for the viewer, trying to give the viewer an idea of how it is made and put expressional focus on the aspect of making.

Undoubtedly, this degree work puts equal focus on textile and shape development, but it also concerns the development of garment construction. Dealing with the square shape of the loom as a guide for construction, two different aspects were developed: the square pieces and the engineered pieces. The square pieces are freer, and allows the textile to take more space and control the expression. This pushes the boundaries for new shapes of dress, defined by the bindings and yarns of the weave.

On the other hand, the engineered, garment-like pieces shows the potential of the method in connection to the industry. Although not aiming to replicate garments, the engineered garments concerns and develops conventional garment functions, showing that it is possible to construct dresses, jackets and trousers with this method. For these pieces, the final shape is more or less in the hands of the designer.

For the end result, it was important with a lineup consisting of both garment-like and abstract pieces, to present the diversity and overview of the method. However, the two tracks could be developed further if focusing more on one of the aspects. This could be to go deeper into the square-pieces as an experimental design method, or to refine and further define the engineered garments, focusing on finish and manufacturing methods. As they are now, the garments within this collection are not ready for mass-production (which on the other hand is not desirable for this project). At this stage the work is mainly experimental, which means that it does not concern the reproducing of garments but asks how a garment can be made using whole-garment weaving, allowing the material and the loom to shape it.
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Fig. 3: Author’s own illustration of Piper’s Hand Woven Dress and Jacket from 2013

Fig. 4: Author’s own illustration of Leffert’s woven top from 2016.

Fig. 5 - 63: Author’s own photos and illustrations