Knowledge making in fashion and textiles
15.1.2024

- 13.15-14.00 Lecture on practice-based research by Emmi
- 14.00-14.15 Intento – example of situatedness in
- 14.15-14.30 Coffee break
- 14.30-15.00 Sofia, Kasia and Leonardo - introductions
- 15.00-16.00 Panel discussion (Sofia, Kasia, Leonardo, Emmi)
- 16.00 → Group task introduction and final words

Practice-based design research
- Knowledge making through reflective weaving

15.1.2024

Agenda

- Practice-based design research
  - Experimental scientific research vs. practice-based research
  - Textile thinking in practice-based design research
  - Role pf prototypes in practice-based design research
- Case “Layered Approaches”– knowledge creation in practice-based eTextile development
- Few words about situatedness and researcher’s positionality

How is practice-based research different from experimental scientific research?

Practice-based research vs. experimental scientific research

- Scientific knowledge building starts from constructing a hypothesis based on precise and established theories, carefully designed and executed experimentation which produces evidence to either support or oppose the hypothesis, interpreting the implications of the research findings to propose knowledge claims, and eventually exposing the claims to scrutiny and opposing theoretical arguments (Driver, 2000)
- Produces results independent from their producer, verified by different characterization and analytic tools
- practice-based research can be understood as “an original investigation undertaken in order to gain new knowledge partly by means of practice and through the outcomes of that practice” (Linda Candy, 2020, ch. 6)
- generates new knowledge through creative practice and its outcomes, by acknowledging the influence of embodied knowledge and reflective practice in knowledge creation, and partially subjective relationship between the researcher and research outcomes
- → Both approaches base on experimental approach, but have different principles on how knowledge is constructed

Practice-based design research

- In design, practice-based research approach has many names → Research through Design, constructive design research, practice-based design research

- Constructive design research – design experiments → The experimental process follows three key phases of hypothesis construction, experiment(s), and evaluation, and aims to ensure both knowledge creation, as well as relevance (Krogh and Koskinen, 2020)

Role of prototypes in practice-based design research

Prototypes can play a number of roles (Stappers 2010).

- Prototypes evoke a focused discussion in a team, because the phenomenon is ‘on the table’.
- Prototypes allow testing of a hypothesis.
- Prototypes confront theories, because instantiating one typically forces those involved to consider several overlapping perspectives/theories/frames.
- Prototypes confront the world, because the theory is not hidden in abstraction.
- A prototype can change the world, because in interventions it allows people to experience a situation that did not exist before.

Elizabeth B.-N. Sanders & Pieter Jan Stappers (2014) Probes, toolkits and prototypes: three approaches to making in codesigning, CoDesign, 10:1, 5-14, DOI: 10.1080/15710882.2014.888183

Prototypes are many things

Anatomy of prototypes

Several prototypes can be used as **filters** to investigate different aspects of a design project

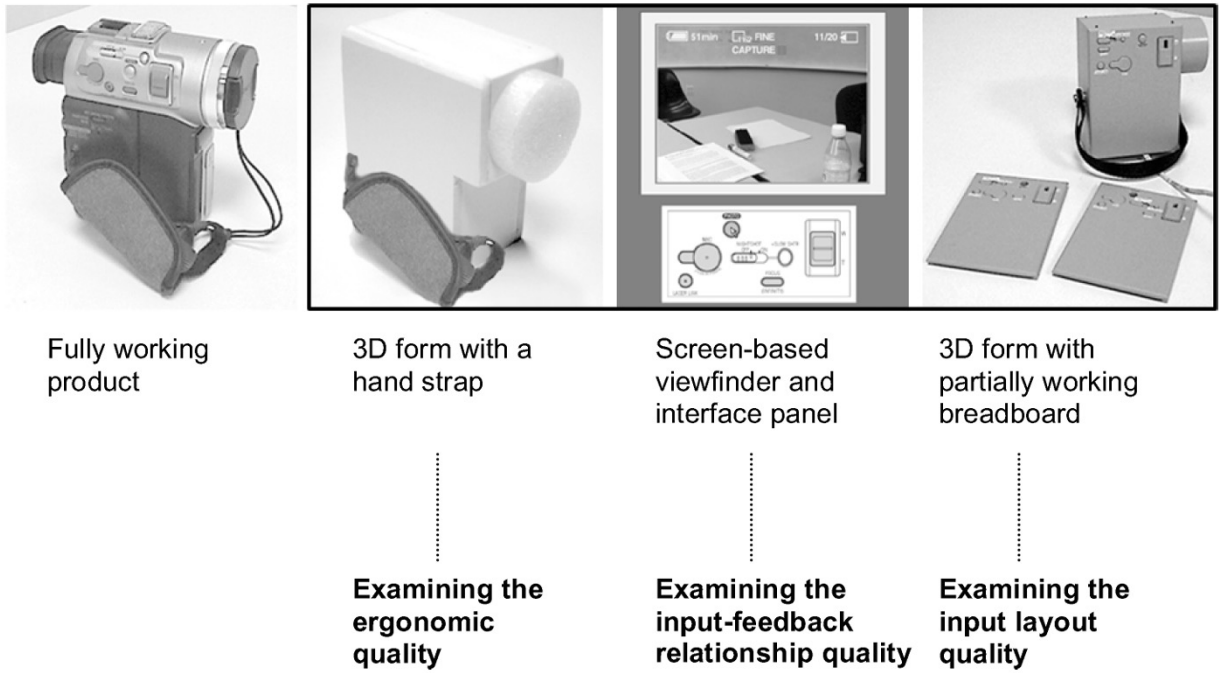
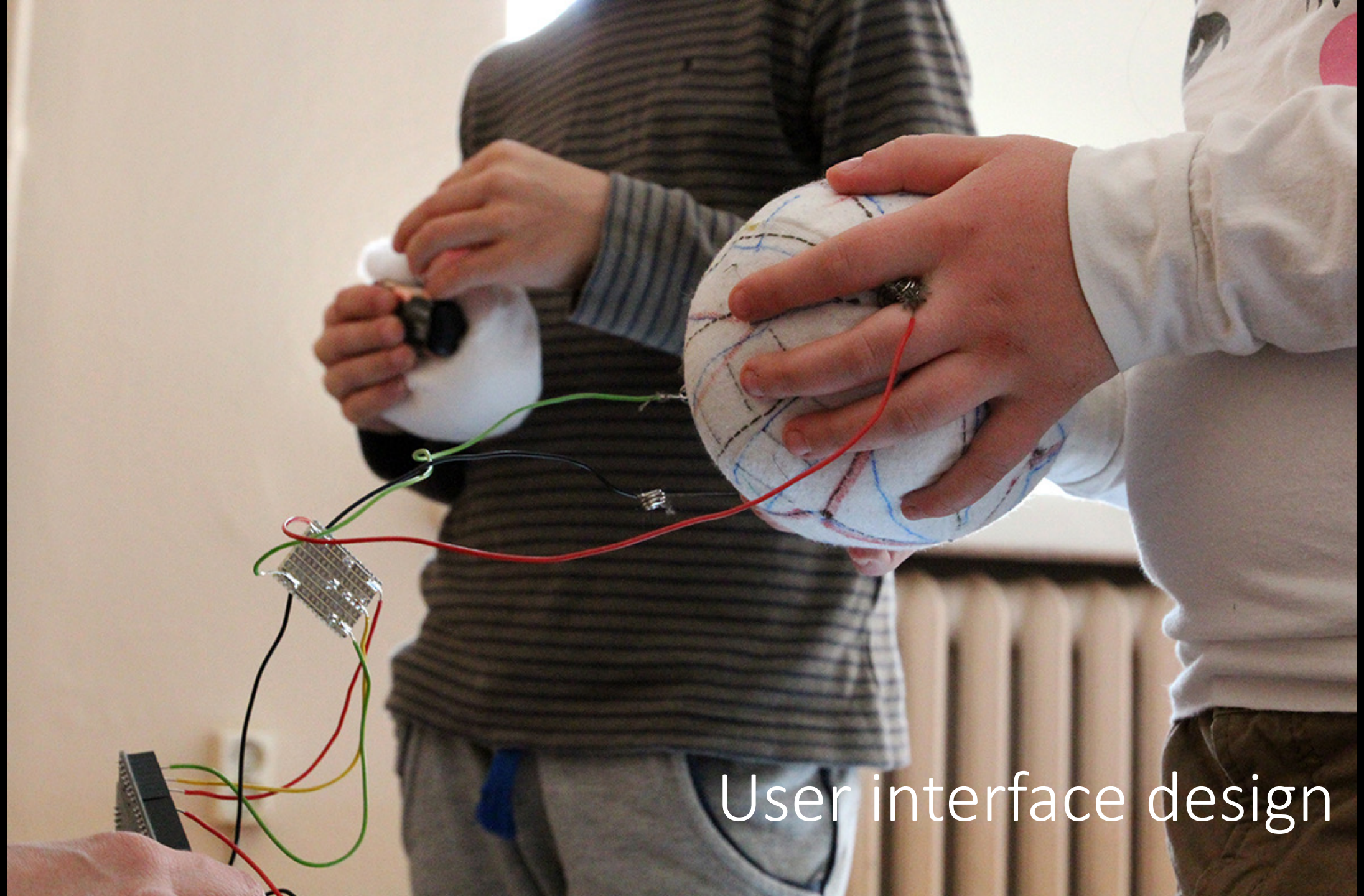


Fig. 1. A series of prototypes that represent different qualities of interest to a designer to filter out different aspects of a design [Lim 2003].

Lim et al. 2008. https://doi.org/10.1145/1375761.1375762

Usertesting

Testing the user experience

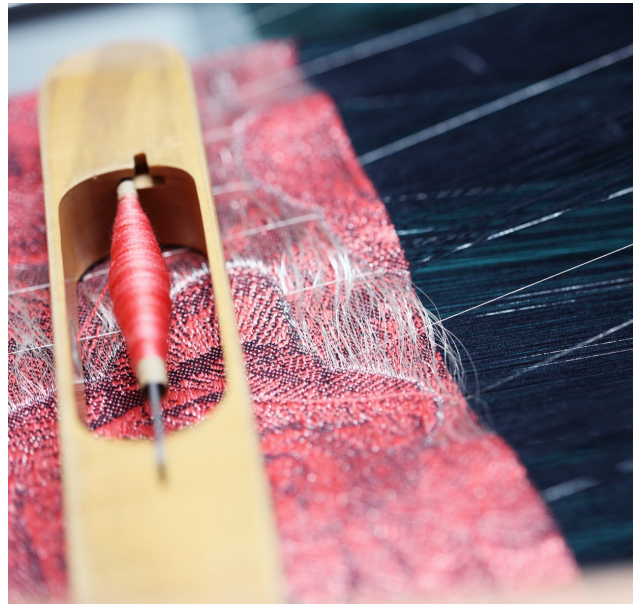

User interface design

Applied textile thinking as a method

- Textile thinking
  - "the understandings developed through the practice of using textiles to explore new concepts and design challenges" (Lean, 2020)
  - embraces the role of embodied knowledge, embedded in the textile design practice and its outcomes
  - What differentiates textile design from other design disciplines equally emphasising the role of making and embodied knowledge, such as ceramics (Groth, 2017), are the specific properties of textile materials (Philpott and Kane, 2017). The sensitivity to textile materials
  - Another distinguishing feature specific for textile thinking stems from the characteristics of textile techniques applied to construct, treat and decorate textiles

- E.g., in my PhD - woven textile design practices
  - research focus typically on the interdependency of different structural and material variables, and generates knowledge on how those influence for example the visual, tactile, technical, and functional characteristics of woven textiles, or their construction process

Layered Approaches



Every practice-based design research project is unique → Layered Approaches as an example

Research questions

- How can weaving be used to explore new concepts and design opportunities for eTextiles?

- Sub-questions, e.g:
  - How can the orthogonal yarn architecture of woven structures enable the integration of electrical circuitry?
  - How has weaving been used in eTextile research across various related research fields?
  - How can weaving be applied in interdisciplinary eTextile material development?

- → All these questions require different approach, selecting methods and what data to collect based on RQs!

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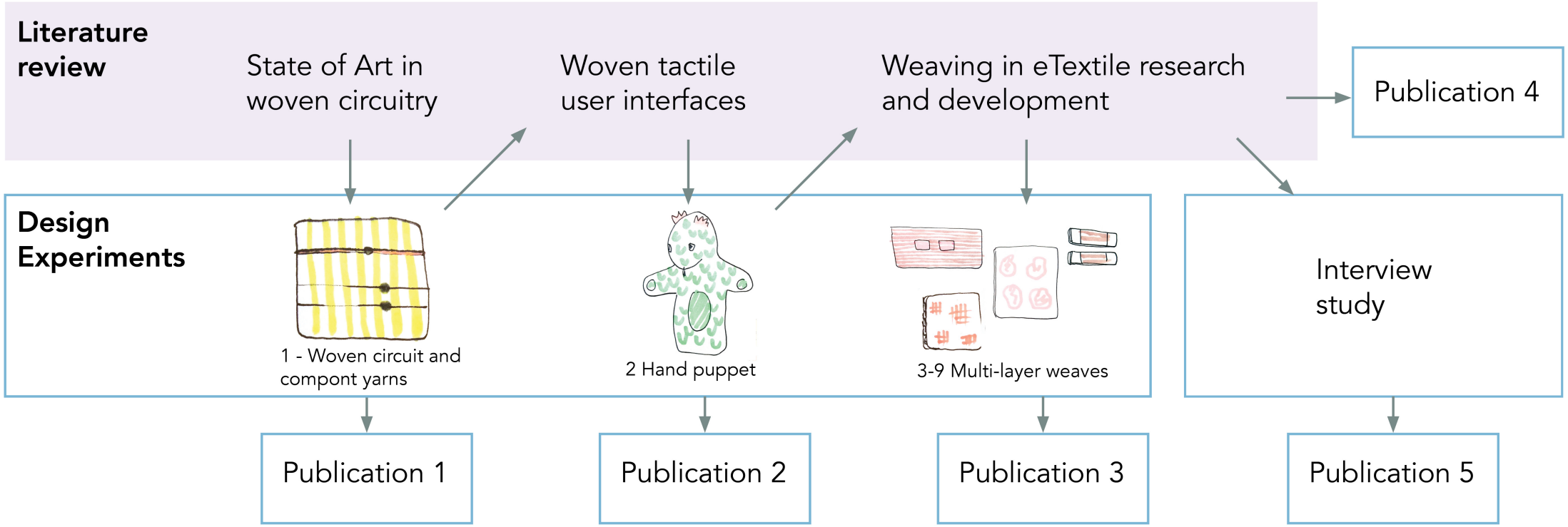
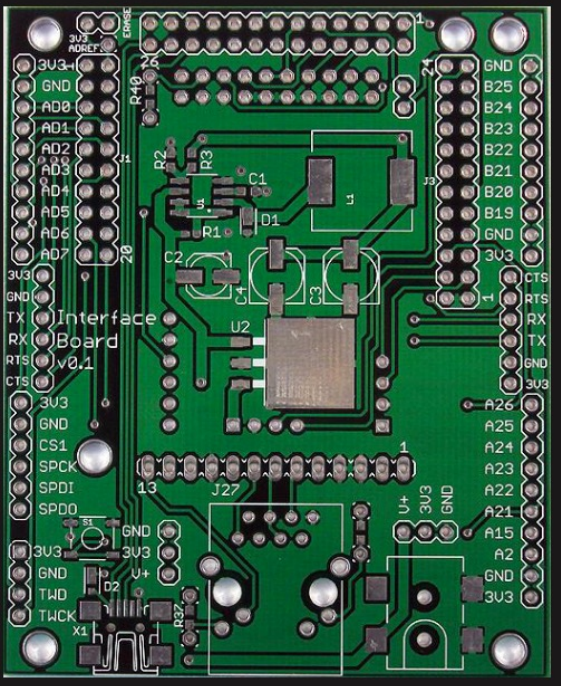
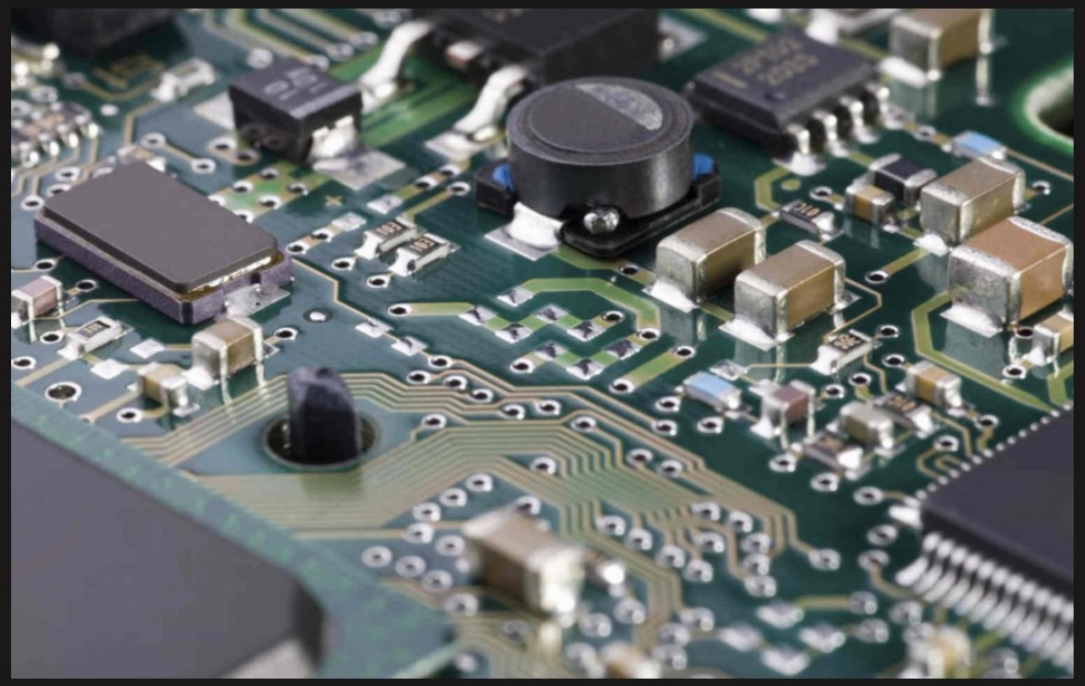
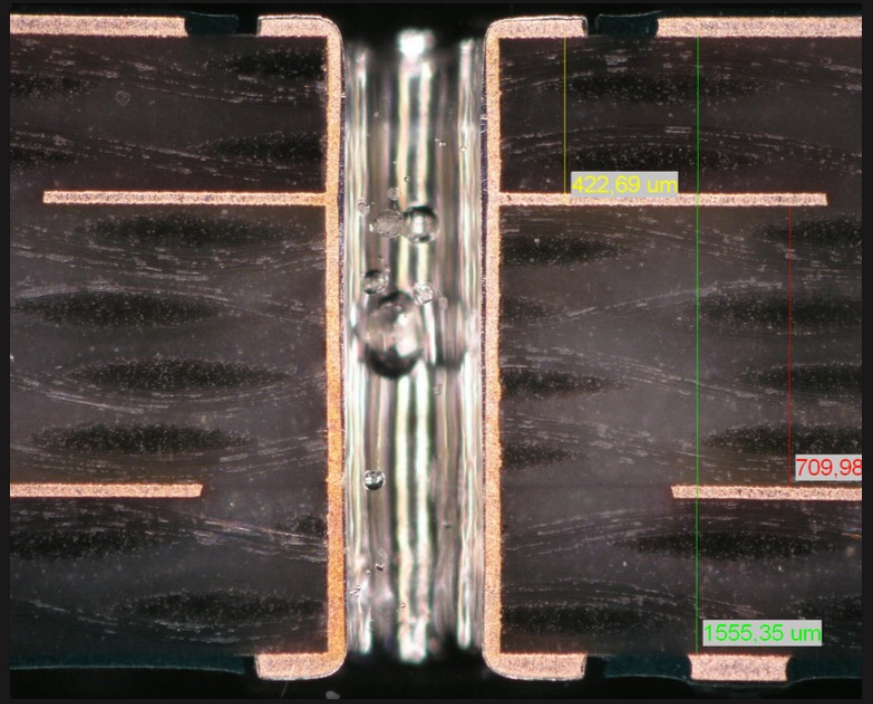
Research process



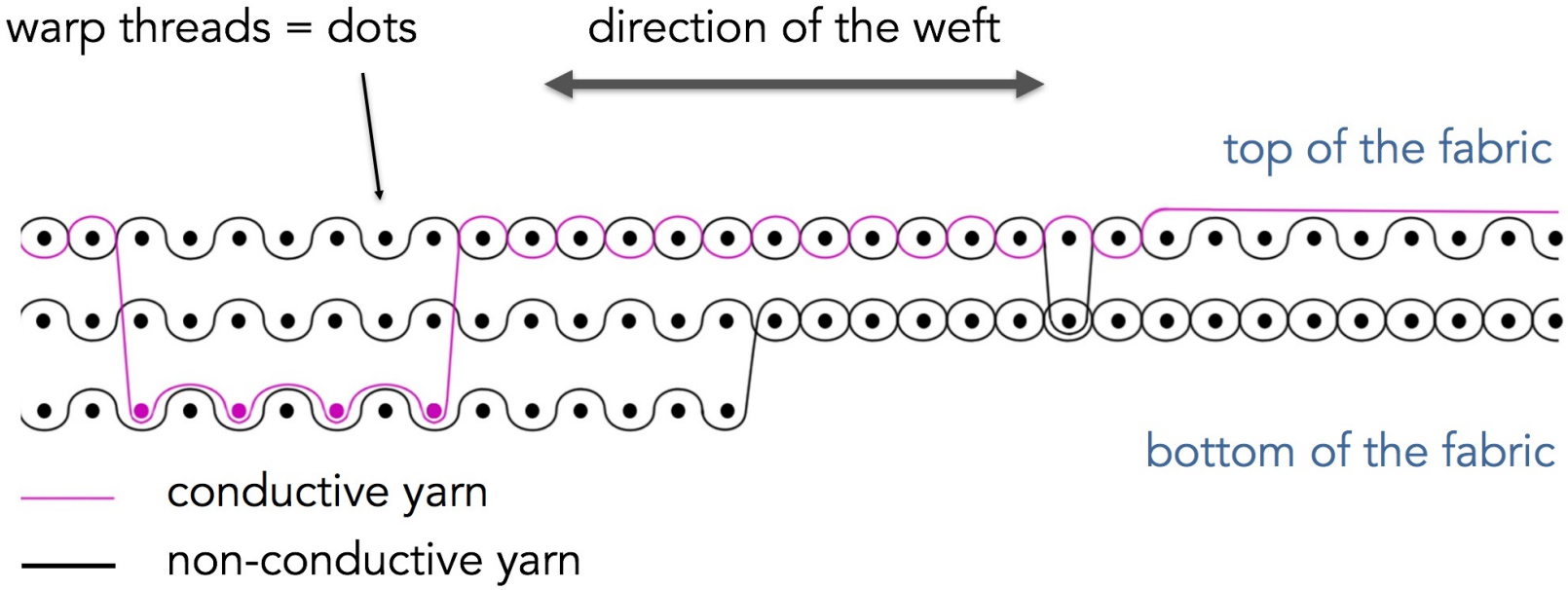
Starting point - a circuit board

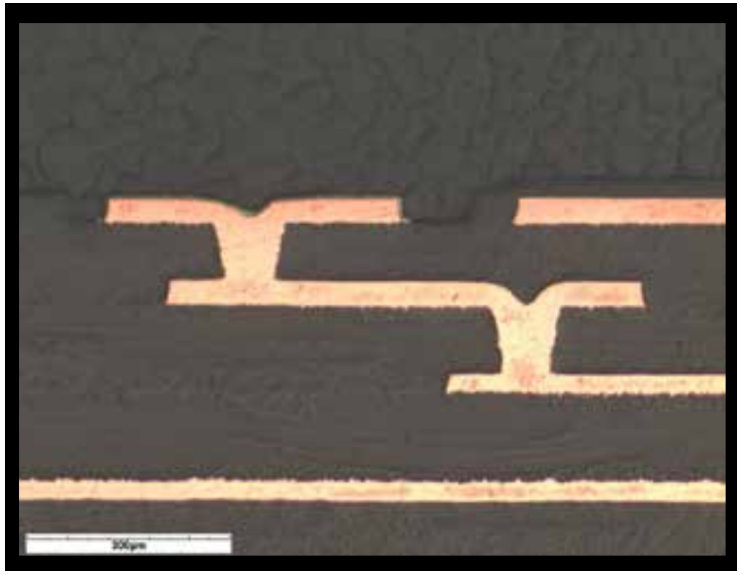


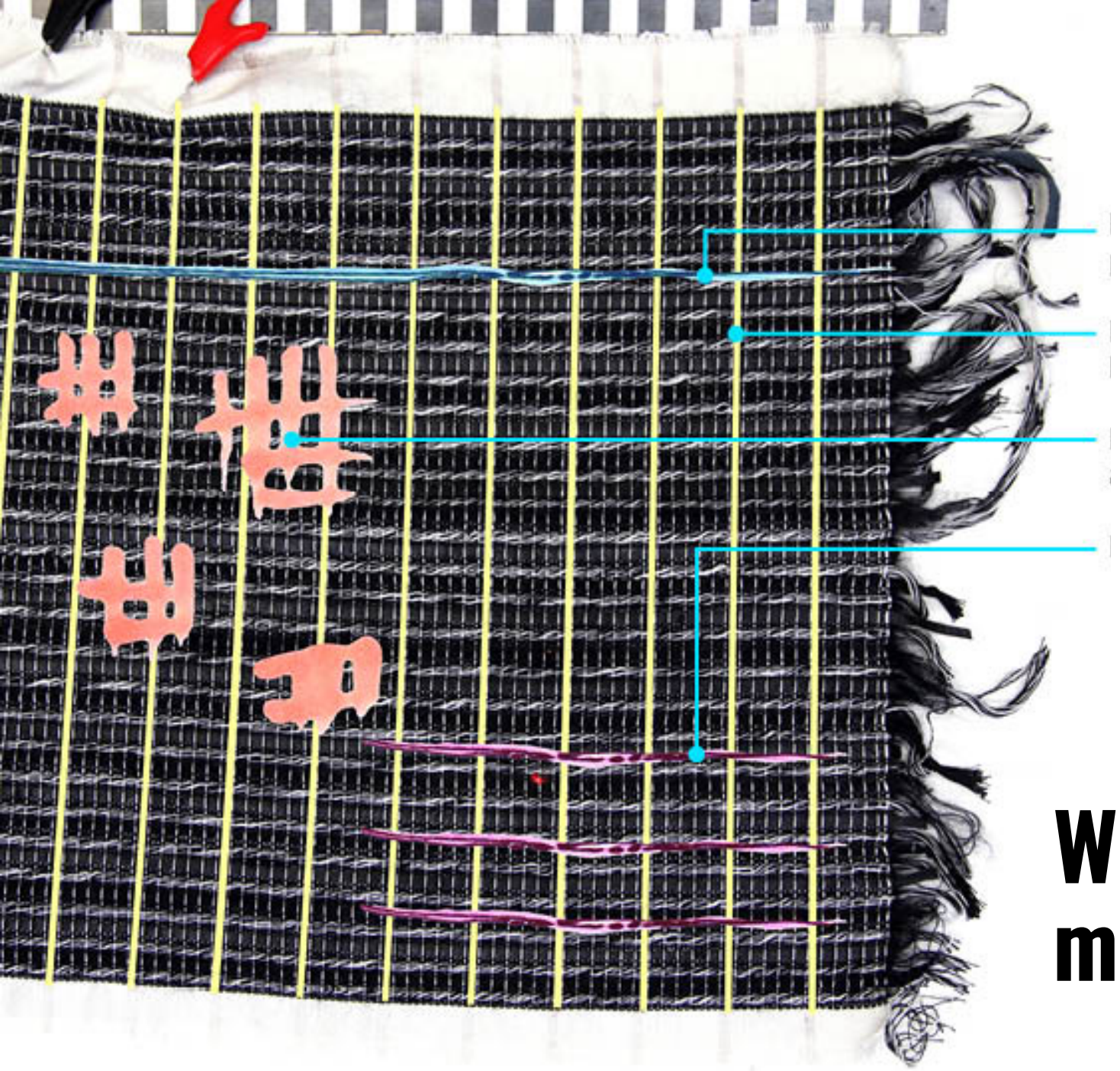




Applying woven structures into electronic circuit design







Computational power integrated into the fabric, e.g. processor suitable for soft structures

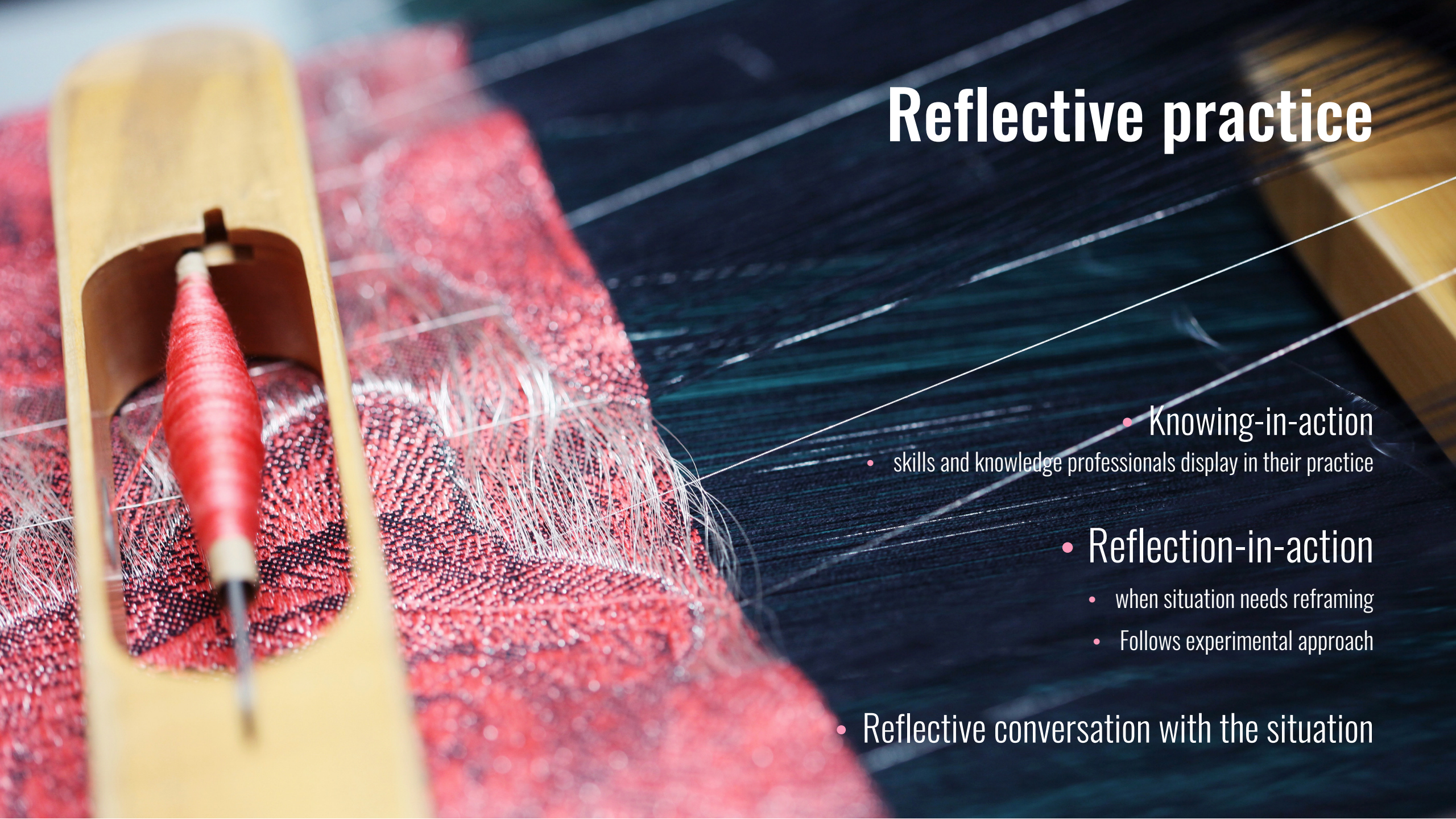
Soft conducting wires for connecting different components

Soft, textile-made sensor and actuator structures

Other input / output components

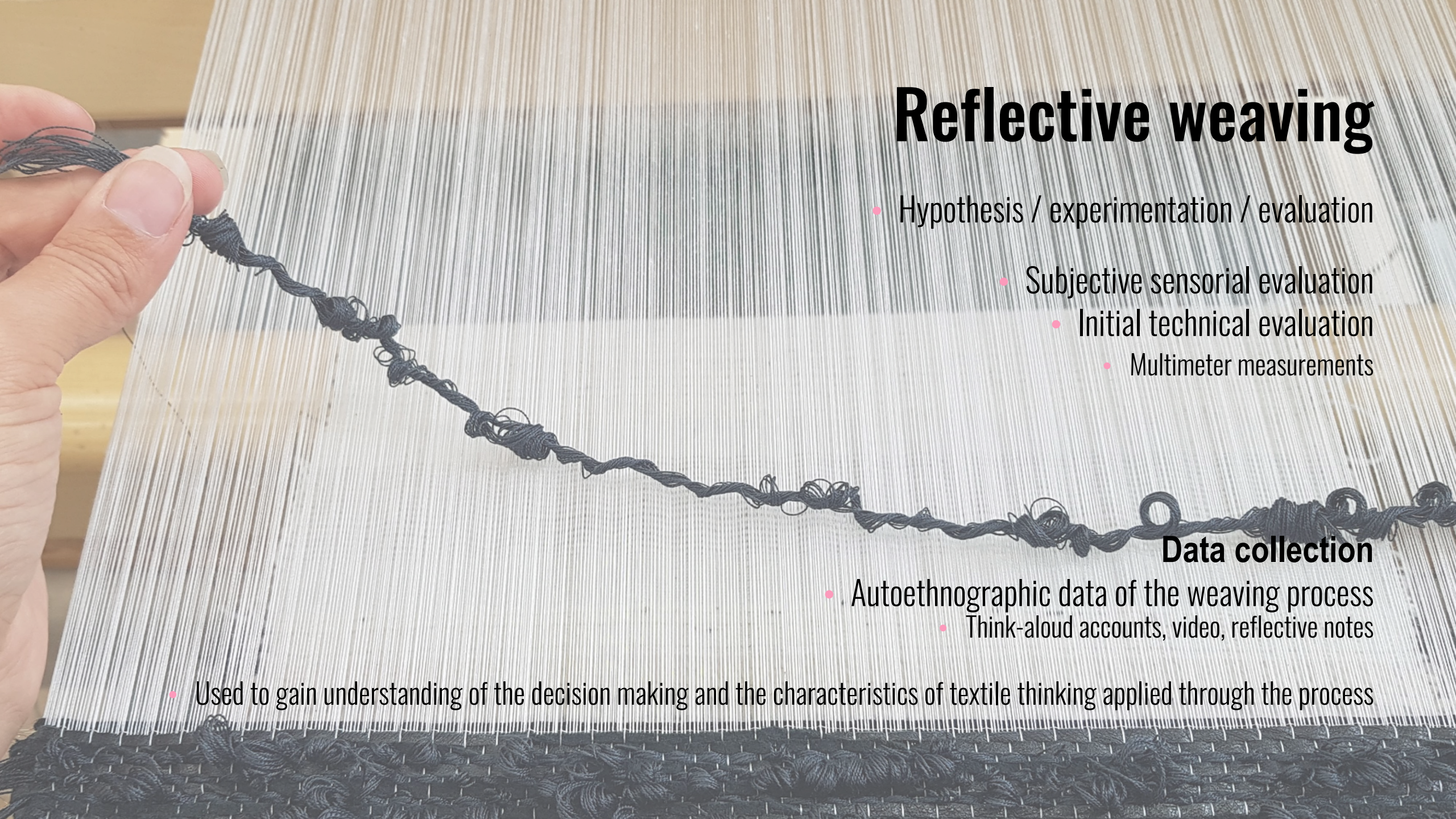
What could this mean in practice?

Design experimentation through reflective weaving



Reflective practice

- Knowing-in-action
  - skills and knowledge professionals display in their practice
- Reflection-in-action
  - when situation needs reframing
  - Follows experimental approach
- Reflective conversation with the situation



Reflective weaving

- Hypothesis / experimentation / evaluation
  - Subjective sensorial evaluation
  - Initial technical evaluation
    - Multimeter measurements

Data collection

- Autoethnographic data of the weaving process
  - Think-aloud accounts, video, reflective notes

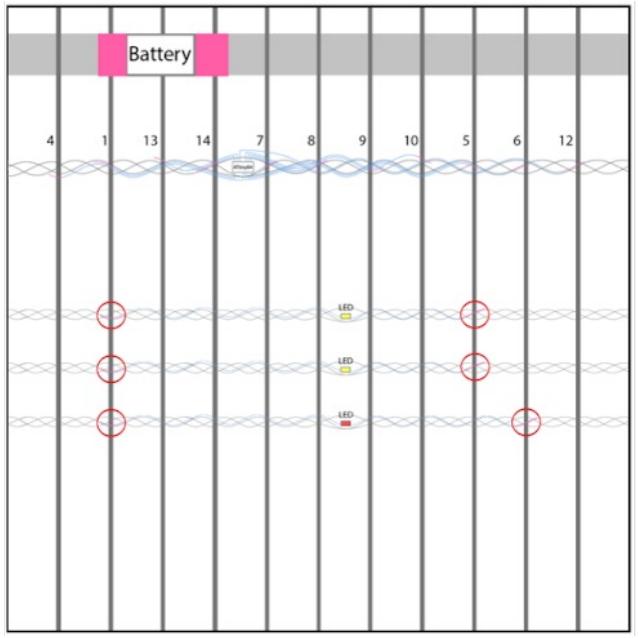
- Used to gain understanding of the decision making and the characteristics of textile thinking applied through the process

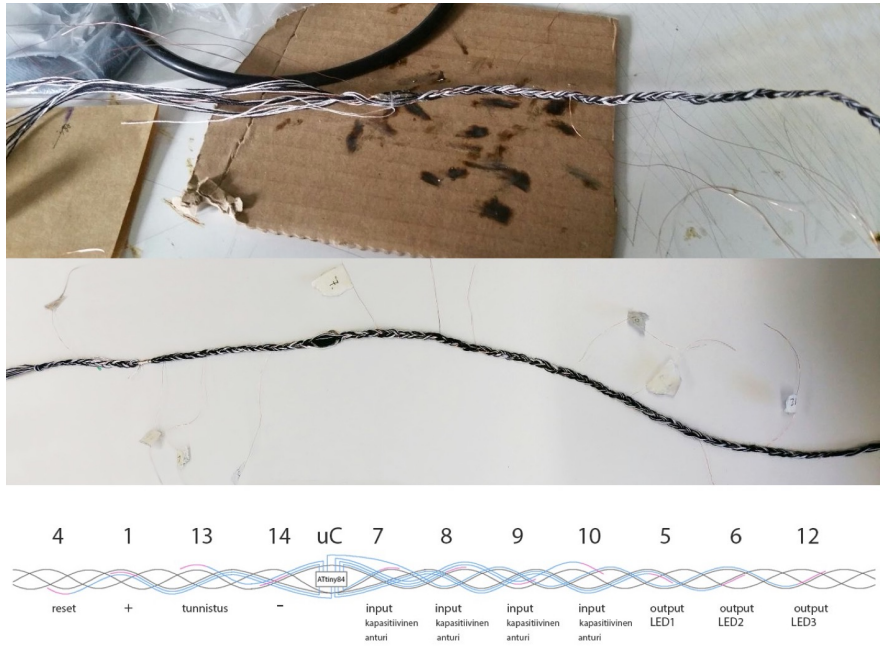
Design experiments / after weaving

- Technical evaluation
  - Testing the functionality of eTextile samples in lab setting (controlled environment)
- Structural analysis
  - Examining crosscuts and unraveling weft and warp yarns
- Subjective sensory assessment
  - Evaluating the textile hand of the prototypes
- User testing in lab
  - Behavioural data of people using eTextile user interfaces
  - Video, think-aloud, semi-structured interviews

Experiment 1

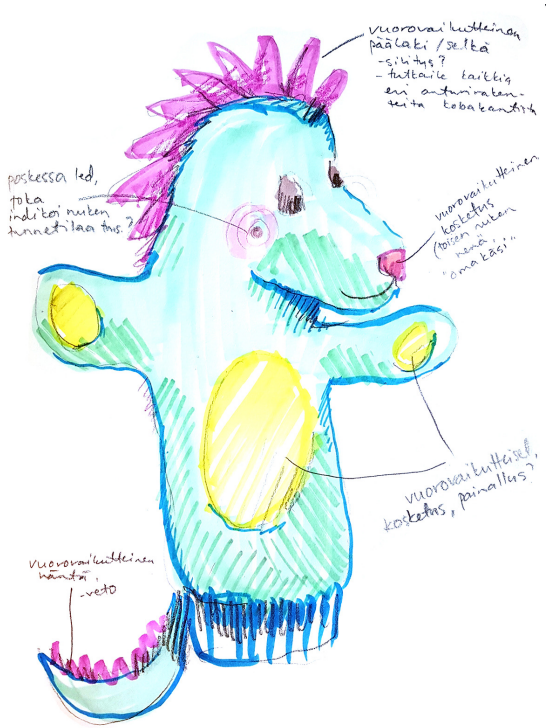
•How can the orthogonal yarn architecture of woven structures enable integration of electrical circuitry?

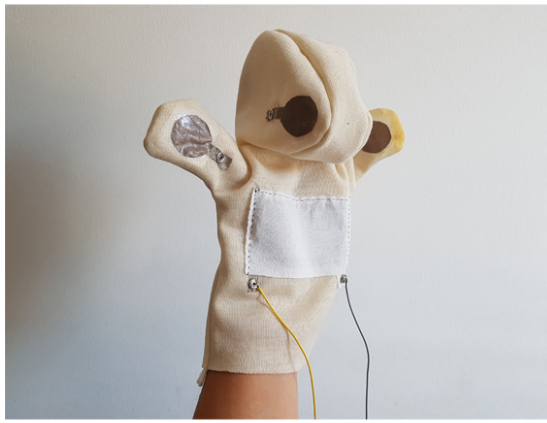


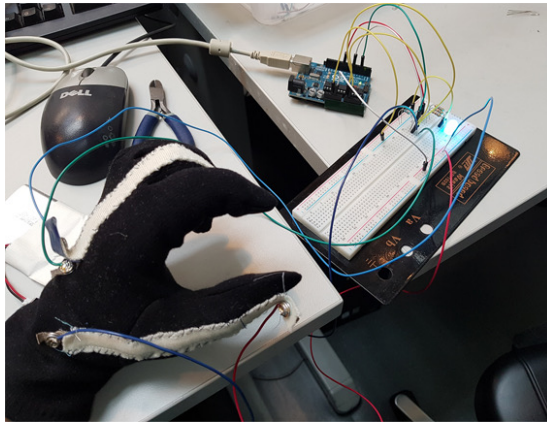


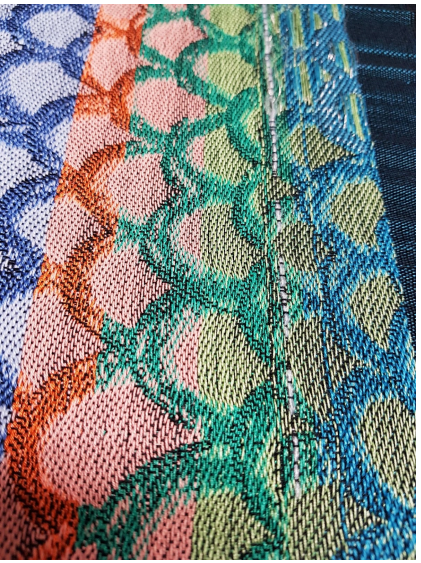
Experiment 2

• How can functional woven structures and visual surface characteristics be merged in woven interface design?



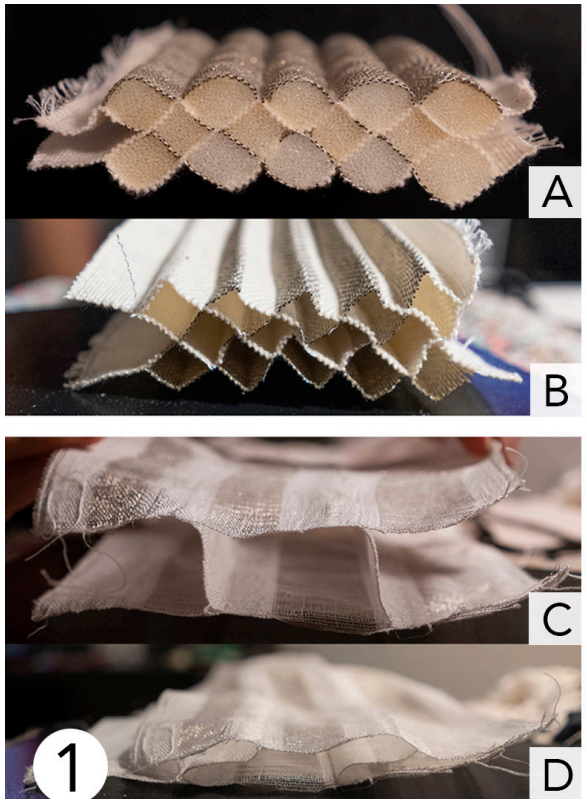


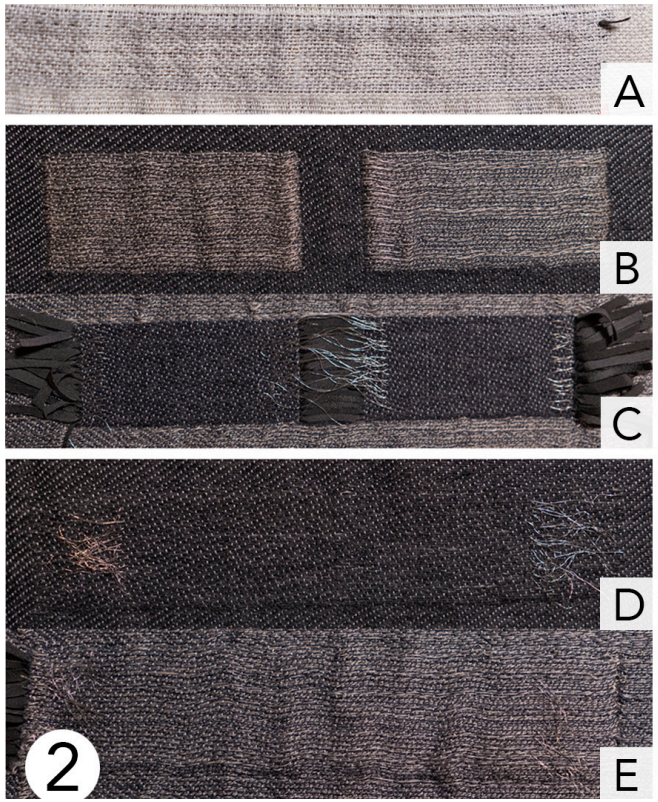


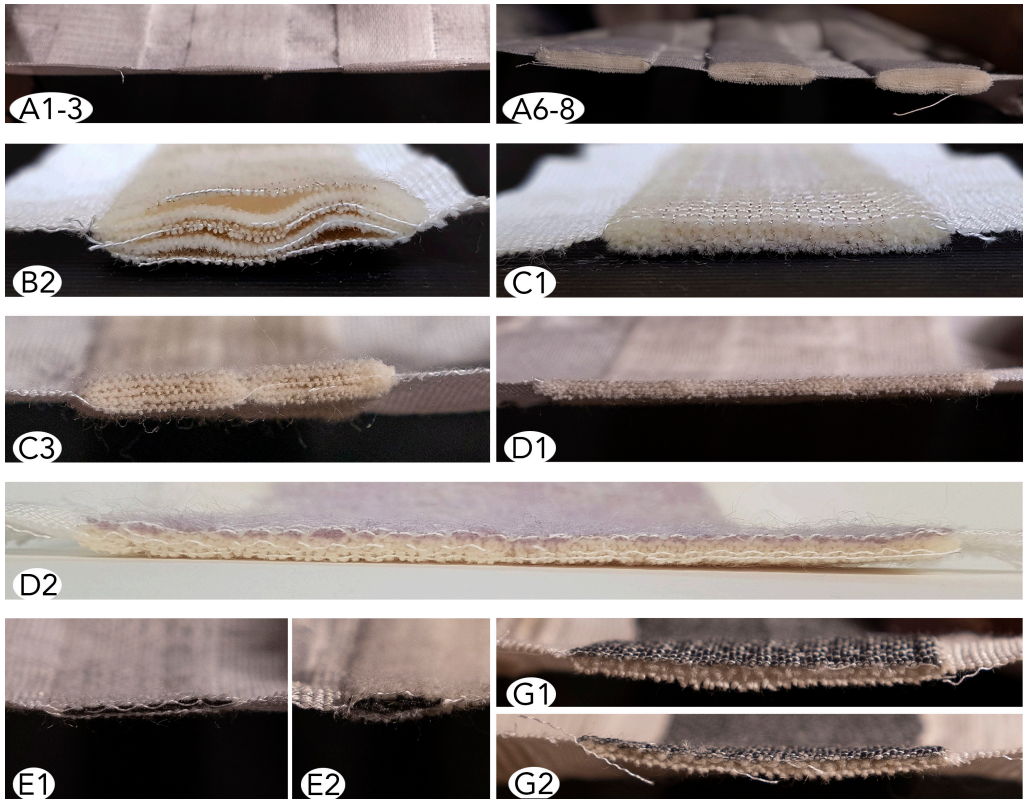


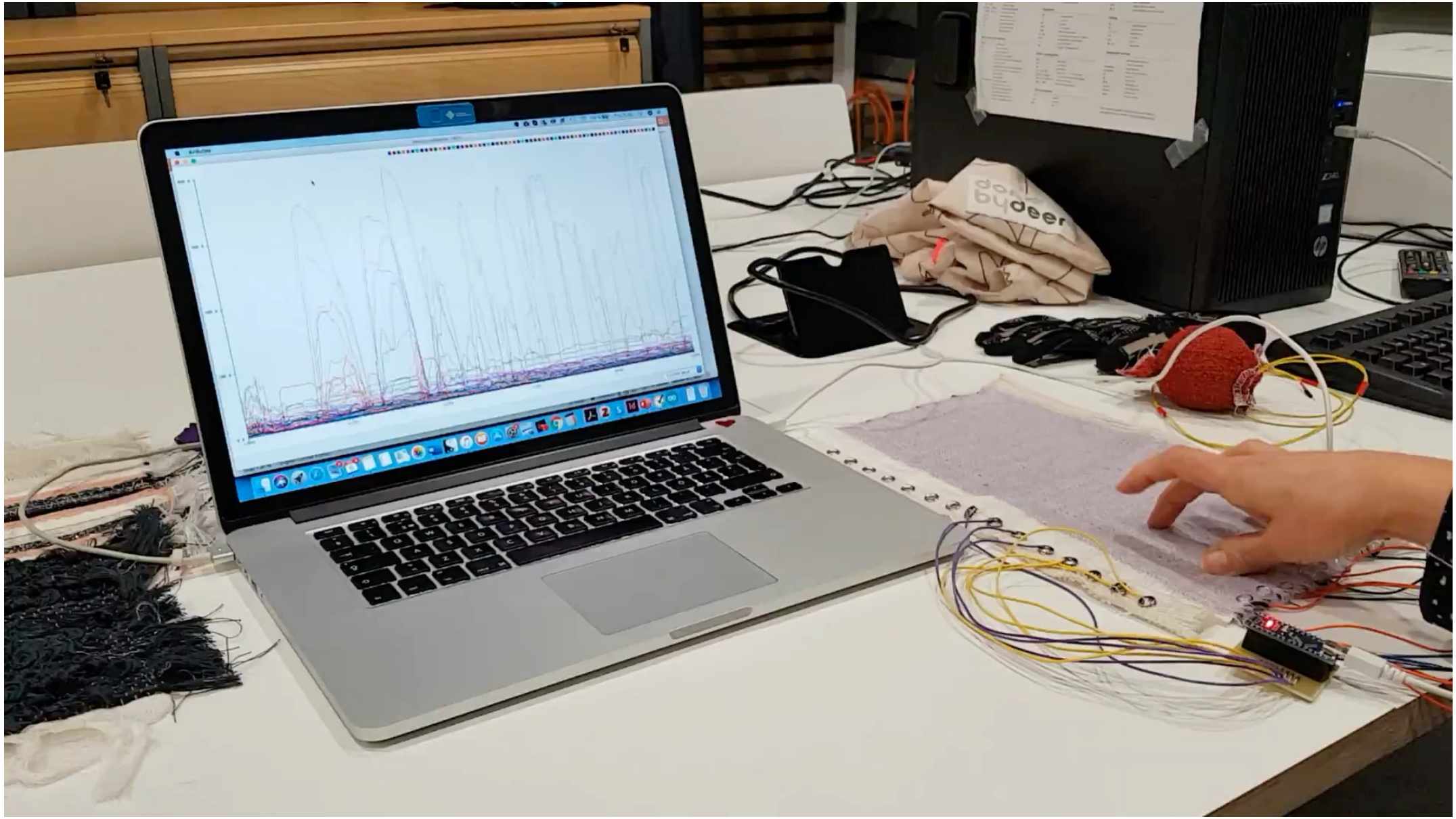
Experiment 3

- How can woven multi-layer structures be used in eTextile prototyping?









Synthesis

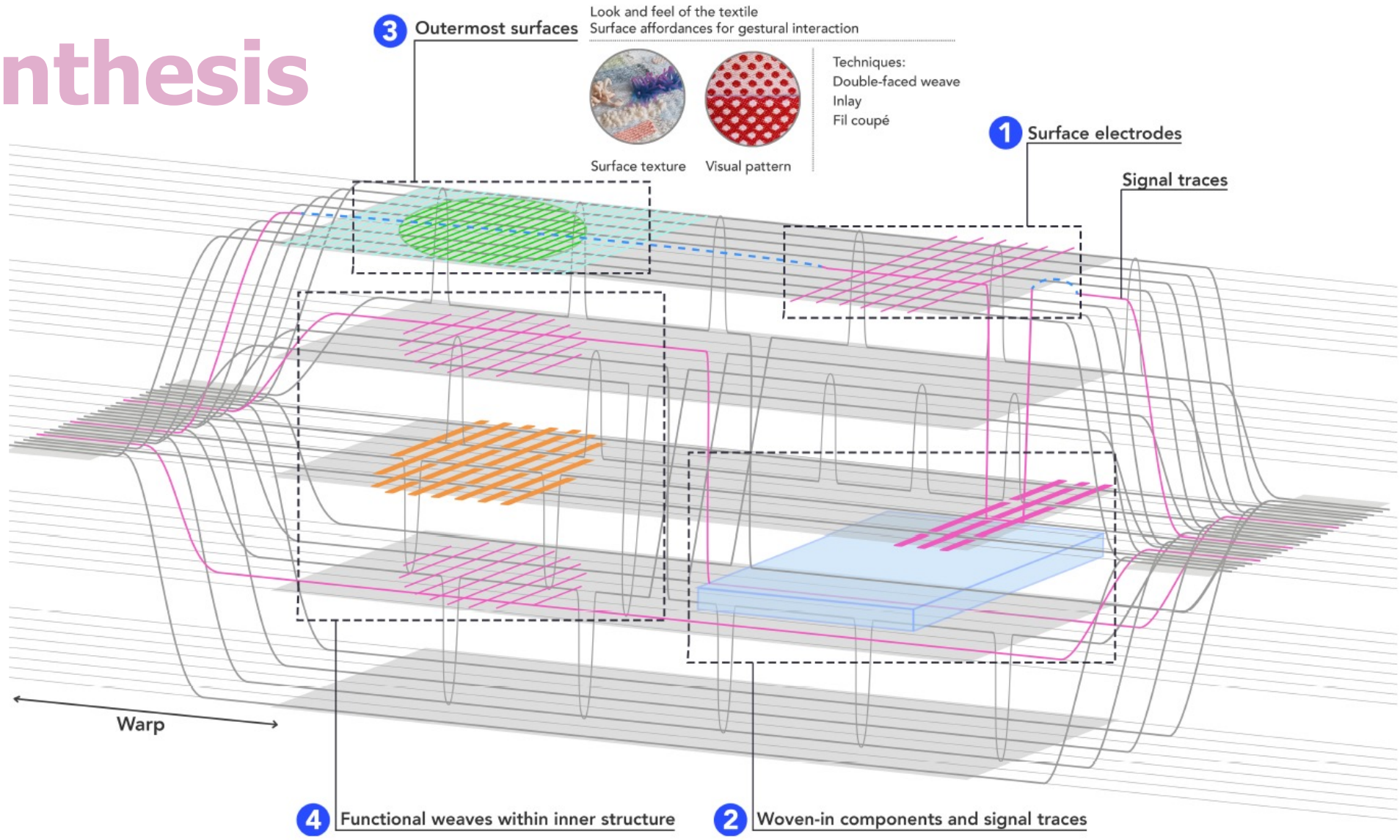
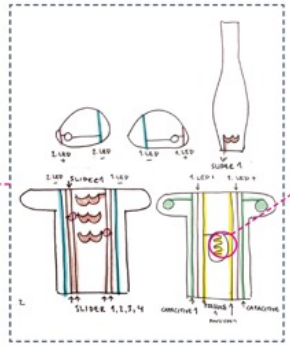
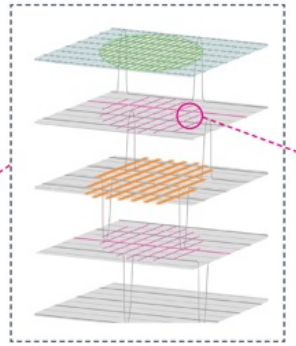
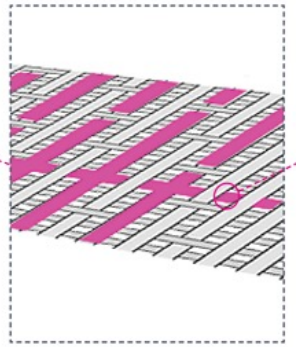
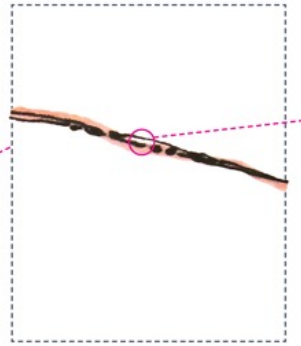
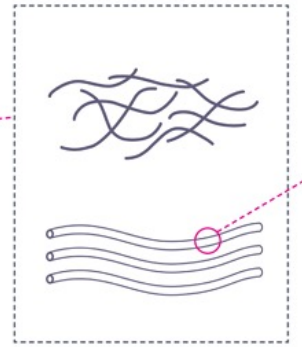
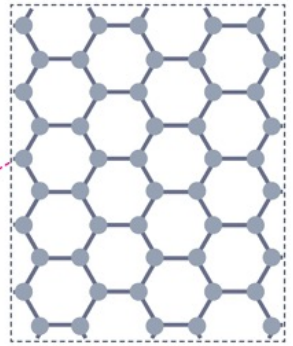


Fig. 17. Unified viewpoint: Woven multi-layer textiles can provide a platform for integrating complex circuit topologies within the textile structure.

Structural hierarchy in woven eTextiles

Application	Layout	Multi-layer composite	Woven structure (single layer)	Yarns	Fibres and filaments	Polymers and macromolecules
						
Design considerations						
• User experience • User interface design	• Circuit schematics • Sewing patterns • Figurative pattern design	• Component design • Multi-layer structures • Material combinations	• Yarn densities • Weave / yarn interdependency • Two-sided layers	• Fiber and filament combinations • Passive and electrical material properties • Component yarns	• Properties of natural and artificial fibres • Polymer combinations	• Manipulation of atoms and molecules • Polymer network structures

Situatedness

- Situatedness refers to the idea that understanding or knowledge is situated within a particular context. It recognizes that the meaning of events, actions, or phenomena is shaped by the specific circumstances (e.g. environmental, social, and cultural factors) in which they occur.

- In various fields such as philosophy, cognitive science, and sociology, the term is often used to highlight that knowledge or meaning is not detached from its context but is, instead, shaped by the particularities of the situation in which it arises. It underscores that different situations can lead to different interpretations or meanings, and the significance of something may vary based on the context in which it is situated.

- Situatedness is frequently understood in contradistinction to a traditional cognitive science approach that characterizes the mind as an essentially interior entity, one that is conceptually separated from the environment. - In contrast, situatedness argues against a strict dualism of mind and world.

- In research, situatedness implies that findings and interpretations are context-dependent. What is true or meaningful in one setting may not be the same in another. Researchers need to consider the context of their study to understand and interpret the phenomena accurately.

Researcher’s positionality

- Positionality refers to the researcher's social, cultural, political, and personal identity, which can influence their perspectives, biases, and interpretations. It acknowledges that researchers bring their own subjectivity to the research process.

- Researchers' positions in terms of gender, race, nationality, and other social factors can shape their understanding of the research topic. It's important for researchers to reflect on their positionality to recognize potential biases and how their background may influence the research process and outcomes.

- Acknowledging one's positionality is a form of reflexivity—a process by which researchers critically examine how their background may affect the research. Reflexivity helps researchers navigate the complexities of situatedness and promotes a more nuanced understanding of the study context.

- A researcher's positionality can influence how they interpret data and phenomena within the situated context. Different researchers with diverse positionalities may offer distinct interpretations of the same set of observations.

Thank you!

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