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Introducing Sensory-material Aesthetics in Textile Design Education

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ABSTRACT

In textile design education, material expressions tend to be directed toward visual-tactile sensory domains. Yet, materials are perceived by all senses, as the body's experience is mediated through multiple sensory modalities. This paper presents an experiential learning workshop designed to introduce textile design students to somaesthetics as a way to increase sensory competencies and enrich the exploration of sensory-material expressions in textile design. Teaching methods involved a sensitizing exercise, a reflective sense collage, a collaborative sense map task, and a final design task. An evaluative discussion is based on workshop feedback by the students and reflections by the researchers. The main contributions of the paper are guidelines as an inspirational source for introducing sensory-material aesthetics in textile design education.

Keywords

Textile design
Textile thinking
Material aesthetics
Somatic engagement
Sensitizing the body

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Introducing Sensory-material Aesthetics in Textile Design Education

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Developing a strong understanding of material aesthetics is an integral part of textile design education. Such understanding is related to the fundamental textile design notions of material, structure, and expression. While textile design as a field and practice is considerably focused on material aesthetics and functional end-use of the textile, it tends to look primarily at the visual and tactile sensory domains of materials (Albers, 1965; Gale & Kaur, 2004; Moxey, 1999; Steed & Stevenson, 2020). Textile design students generally develop material sensibility through basic foundational education (e.g., learning fiber and yarn qualities and properties), and through repeated visual-tactile engagement when working with materials through techniques such as knitting and weaving (Dumitrescu et al., 2018). Yet, materials are perceived by all of the senses, as the body's experience is mediated through different sensory modalities, not only vision or tactility. Additionally, textiles are conventionally designed for static expressions that change slowly through the natural passage of time and use (Talman, 2019). The introduction of multisensory materials presents a temporal variable that expands upon fundamental textile design variables. In turn, this allows for interactive and performative qualities to be expressed, with attention paid to the embodied experience of textile material interactions and sensorial aesthetics.

The introduction of somaesthetic theory and practices (Shusterman, 2000) within textile design education can result in increasing student's sensory competencies and experience of material aesthetics, thereby expanding the sensory-material palette (Cobb & Orzada, 2018; Karana et al., 2015; Pedgley et al., 2016; Rognoli, 2010). Textile design education could borrow approaches from multisensory design approaches to enrich the exploration, reflection, and discussion of sensory-material aesthetics that prioritize the situated aspects of

the material experience (Giaccardi & Karana, 2015). This opens to other sensory dimensions of materials for textile design such as smell, sound, humidity, magnetic force, and other sensorial discoveries that go beyond the visual and tactile. This enacts textile thinking as a contemporary approach to textile design that employs interdisciplinary methods of design and knowledge-making beyond conventional approaches (Igoe, 2021). As a result, novel design possibilities may open up, forging new pathways in students' textile design explorations.

TEXTILE DESIGN EDUCATION

Generally, textile design education at the undergraduate level entails introducing fundamental notions of textile construction, scale, color, pattern, form, texture, and tactility through the persistent exercising of students' artistic capacities, craftsmanship, and design rationales (Dumitrescu et al., 2018). Yet, over the past decade there has been a shift in textile design teaching methods that moves from textile design teaching using a singular methodology, to *textile thinking* (Hallnäs, 2018, p. 18; Igoe, 2021, p. 31; Valentine et al., 2017), which presents as an inherently interdisciplinary methodology that spends more time in the conceptual and development phases than in traditional textile design education (Dumitrescu et al., 2018; Femenias et al., 2017; Valentine et al., 2017). Textile thinking makes indivisible the "thinking, making, knowing with, in, and of itself, bound up within the agencies of the materials themselves" (Igoe, 2021, p. 42). While training students to be craftspeople in their specific techniques, students are concurrently being taught to work interdisciplinarily, learning new tools and techniques that allow them to conceptualize and design across any number of circumstances (Bang et al., 2020). With textile thinking in design practice, the focus moves beyond the tangible design outcome. It "transcends disciplinary boundaries, even manifesting in immaterial design outcomes" (Igoe, 2021, p. 43). This shift is marked by the inclusion of, for example, smart textile methods (Blaga et al., 2019), co-design (Ballie, 2012), participatory design (Riisberg et al., 2015), and cross-disciplinary design methods (Townsend et al., 2017) to textile design, and a move towards exploring agential material expressions. Multisensory design is one of many interdisciplinary design methods that contribute to expanding students' competencies in textile design within the era of new textile design education.

EMBODIED EXPERIENCE AND MULTISENSORY AESTHETIC EXPRESSIONS

Phenomenology is commonly used as a method to investigate the 'lived experience' (Loke & Robertson, 2011, p. 183). In *Phenomenology of Perception* (2012), Merleau-Ponty states that our understanding of the world is the result of acting in the world. Previously, Dewey had said that when we engage with the world, we

do so through our multiple senses (1934). Dewey has developed the foundations of a theory of aesthetic experience that has been found useful in a several disciplines, including design. Through this, he shifts the understanding of the 'expressive object' of art to encompass the experience of art as a whole (1934). The direct manifestation of the object enfolds through interaction and presents an experience of the body that results in an aesthetic expression. Such experiential qualities generated through acts of expression that constitute an object are therefore constructed temporally and sensorially, rather than through instantaneous and static expressions.

Sensory engagement with everyday materials scaffolds the emergence of discoveries and insights, leading to the design of more complex, accessible, and multifaceted experiences that involve the whole body and its emotions (Lupton & Lipps, 2018). Multisensory design deepens understanding of its value, embraces human diversity and sensory knowing, where "light, color, sound, texture, movement, vibration, and smell are ingredients of a full-bodied design vocabulary" (Lupton & Lipps, 2018, p. 123). Approaching materials through an embodied, multisensory experience opens up new ways of working with materials and reveals that much of our engagement with materials does not fit within a single sensory domain; rather, sensorial experience with objects and materials unfolds through our interaction with them (Rognoli, 2010). For textile design students, awareness of multisensory expressions of materials can set the stage for sensuous explorations that move beyond visual and tactile dominance.

In addition, it is relevant to consider time-based form and expression in textile design education, which remains dominated by static, visual, and tactile dimensions. While design researchers have explored temporal and multisensory aesthetics of textiles, for example through sound (Stasiulyte, 2020), smell (Kapur, 2020), movement (Bågander, 2021), and electromagnetic fields (Lewis, 2021), such explorations remain predominantly within the realm of academic research, and only to a limited extent filter into textile design education.

SOMATIC EXPLORATION

A multisensory material strategy was used within the workshop with the aim of expanding aesthetic expressions and enriching the learning process of material exploration. This path takes inspiration from pedagogical approaches such as the one that Bauhaus put into practice (Droste, 2002; Whitford, 1984). Itten conceptualized the preliminary course (*Grundkurs*) for free studio-based experimentation with materials and tools, colors and forms, as an interdisciplinary immersion in arts and crafts (Tóth et al., 2021). Itten's pedagogy was largely based on sensory stimulation, where breathing and relaxation exercises were instrumental to sensitizing the students with regard to receptiveness (Delle Monache & Rocchesso, 2014).

Examining the lived body and felt somatic experiences requires body-based practices such as sensitizing exercises, reflection, and 'bodystorming' (Schleicher et al., 2010). These practices link to two popular methods: the Feldenkrais Method (Feldenkrais, 2011) and the Alexander Technique (Brennan, 1998). These methods invoke embodied reactions and offer routes for exploring materials from various sensory modalities. By increasing body awareness through engaging in various forms of training, it is possible to become more perceptive and aware of the physical world in which one lives, acts, and designs (Höök et al., 2015, p. 28). Therefore, sensitizing exercises such as listening, smelling, touching, and moving while blindfolded were employed within the workshop.

A similar sensitizing workshop approach can be noted in Akner-Koler and Ranjbar (2016), who have integrated sensitizing labs into an educational design process. These labs begin with procedures for embodied exploration that emphasize the important role materials play in the design process (Akner-Koler & Ranjbar, 2016). Sensitizing exercises allow students to become centered and grounded, leading to in-depth, sensuous explorations of materials (Márquez Segura et al., 2016).

METHOD

The teaching methods used in the workshop were based on experiential learning (Kolb, 1984) and learning through construction (Oxman, 1999). These methods are congruent with design teaching, where students' experiences and reflection in the studio work are held in focus, and through these, students are able to construct new design knowledge and competencies (Pande & Bharathi, 2020). Teaching tasks included a Zoom lecture on 'Materials, Sensing, and Phenomena', a sensitizing exercise, a sensory collage task, a collaborative sense map task, and a final design task. The workshop was analyzed by the researchers using reflective analysis methods (Gibbs, 1988).

THE WORKSHOP

The workshop objectives were: (1) to introduce students to somatic sensibilities such as smell, sound, tactility, and taste; (2) to sensitize the senses and focus on the presence of self to explore ways to modify the senses through material interactions; (3) to bring awareness of complex multisensorial expressions of materials and explore relationships between the senses; and (4) to begin to define the aesthetic expressions regarding various phenomena.

The students were not tasked to design textiles in the workshop, rather they were asked to design a sense-modifying tool that conjoins sensory experience with performative actions and material expressions.

Sensitizing Exercise

The workshop was held in April 2021 for 13 students via Zoom. It was situated within a compulsory course for first-year Bachelor textile design students from the Swedish School of textiles, University of Borås. After a lecture on materials, sensing, and phenomena, students were assigned a pre-recorded audio-based sensitizing exercise to perform at home, and a reflective sense collage to be completed directly afterwards.

The sensitizing exercise was developed as an individual listening task presented as a pre-recorded, guided audio exercise due to the online nature of the course (due to COVID-19). Blindfolded explorations of sound, tactility, kinaesthetic, and olfactory engagements were used to introduce and sensitize textile design students to various sensory interactions. The exercise began with settling into one's body, then exploring the space around, followed by exploring certain materials including textiles and garments. Students prepared materials such as an eye mask for blindfolding, two empty glasses, a pillow, and two bottles filled with water. Through the audio recording, the exercises shown in Figure 1 were performed by the students.

Student evaluation

Approximately half of the class completed the student evaluation for the course (6/13). Four out of six students stated that they either strongly or somewhat agree that the sensitizing exercise changed how they perceive their surroundings, body, and senses throughout the exercise.

Researchers' reflections

The individual sensitizing exercises proved a useful introduction to this experimental topic area, where students could begin to sensorially understand the notions they would be working with. However, students had to start/stop the recorded audio in order to conduct each exercise, which was disruptive. It was a challenge to time the instructions of the recording, which would be played in each person's dwelling. For example, the time it takes to walk across the room would be different in larger apartments versus smaller ones. It was challenging to evaluate students' engagement with the exercise as it was conducted individually, therefore a future workshop should be either in-person or held over a mobile phone that allows for ease of playing an audio file while moving around. Broadly speaking, with some additional refinements, this exercise is promising so as to have students centered in their senses for the next exercises.

Figure 4: Sensitizing exercises. Source: Workshop documentation by Vidmina Stasiulyte.

Cover your eyes with eye-mask or shawl
(keep it on throughout the exercise)

Sit down
breath slowly
smell the room
how does the room smell?

breath slowly
listen to your room
your body

stand up
listen to your room
your body

walk towards the window
open the window
listen to the outside
smell the outside
what smells and sounds do you notice?

go to the corner in the room
listen to your room and body merging with the outside sounds

take an empty glass and put it close to your ear
listen
what do you hear?
how does it change the sound you perceive?

take a pillow and put it close to your ear
listen
what do you hear?
how does it change the sound you perceive?

take an empty glass and pillow and put it close to both ears
listen
now switch the objects
listen
feel the difference

put your palm on your throat
say "mmmmmmmmmmmmm" in different volumes and tempos
what differences in vibration do you notice?

take an empty glass and bottle filled with water
slowly fill the glass with water
listen while you pour the water and stop
when you think the glass is filled
touch the top of the glass
Is the glass filled up to the top?

take the filled glass with water
fill another glass of water with warm water
hold the glasses in your palms
feel the difference

put your hand fingers into the glass with water
caress your cheeks with your fingers
feel the difference

move towards the fridge and open it
choose one food item
touch it
sniff it
taste it
eat it
what kind of taste is it?
what kind of texture is it?
what is it?

Move towards your closet
open the closet and choose two garments
explore them while
touching
smelling
listening
how different are these two garments?
can you recognize the chosen garments?

Sense collage exercise

The sensitizing exercise led to the sense collage exercise, where students would reflect on their present feeling. The sense collage was inspired by the 'Sense Inventory' workbook (Patterson, 2019), where artists choose sensory details that represent what their reality feels like in the present moment. The sense collage consisted of four senses: taste, sight, sound, and smell, and an overall feeling, which students were asked to describe visually using representative images, drawings, and written descriptions. This exercise was chosen for its capability to capture students' experience visually, not only as written text, with the understanding that what is felt in the body can be challenging to describe in words. Figure 2 shows examples of the students' sense collages.

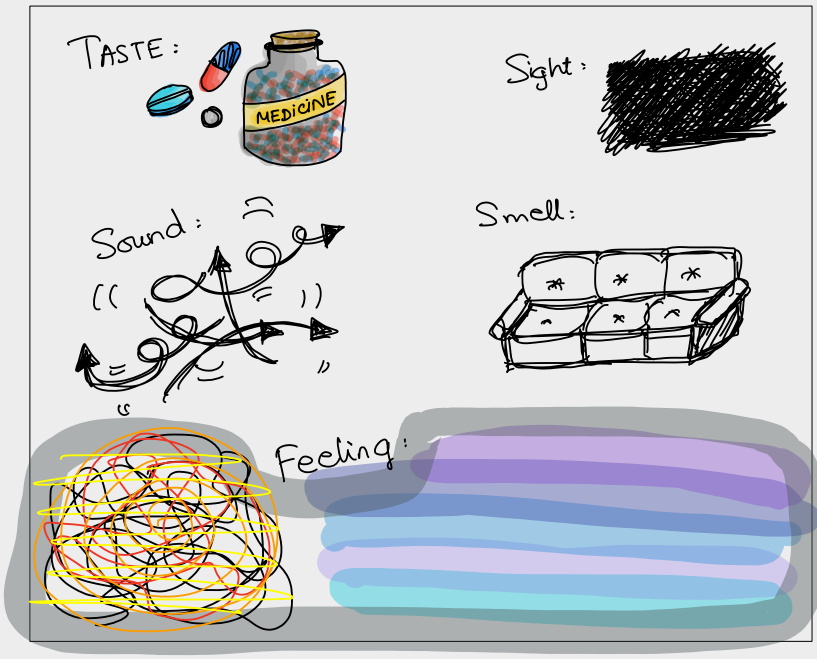

Figure 2: Sense collage submitted by Student Two. Source: Documentation submitted by Student Two.

Student Evaluation

Five out of six students felt that the sense collage was an appropriate reflection tool following the sensitizing exercise. However, four out of six students found it challenging to describe their senses/feelings in the exercise. A comment from one student stated that the sense collage was "a good way to think deeper into what you were feeling during the previous exercise. But because the sensitizing was so hectic you sort of forgot some of the feelings".

Researchers' reflections

The sense collage was a useful format to reflect upon one's present feeling after the sensitizing exercise. It was critical that the reflection was made directly after sensitizing, lest sensations are forgotten. Students' collages often made use of memory recall, from recent memories to childhood memories, and often breakfast tastes were described. It is noted that the sense collage in its current form is directed toward visual representation and written description, and it is thought that in a future workshop students could have the option to involve a broader range of media, such as an audio or smell collage.

Collaborative sense map exercise

Material exploration exercises were conducted via a collaborative task. Students were given a brief introduction to the online collaborative platform Miro[1] and were asked to explore basic materials from multisensory perspectives. Students were invited to add image/video representations of a material and draw connecting lines to the sense nodes of sound, smell, haptics, visual, magnetic, and electric on the map. Nodes could be modified, added, or deleted at will. The lines drawn contained a text field and were to be populated with the students' descriptive terminology. Different conditions of the material or sense could be identified, such as a piece of paper that was flat and wet, or a piece of paper that was dry and crumpled. Performative movements linked to different sense nodes. The visual results (Figures 3 and 4) show the material conditions and expressions on the connections linking material and sense nodes of the map.

1 See https://miro.com/

Student evaluation

The following information was gathered through a post-workshop evaluation. Five out of six students found Miro easy to work with. All student respondents found that being able to see other groups' material expression maps in Miro had an impact on the map development of their own group. Four out of six students found it somewhat challenging to build the material expression map, and four out of six students found that they needed to construct new descriptions for what they were sensing.

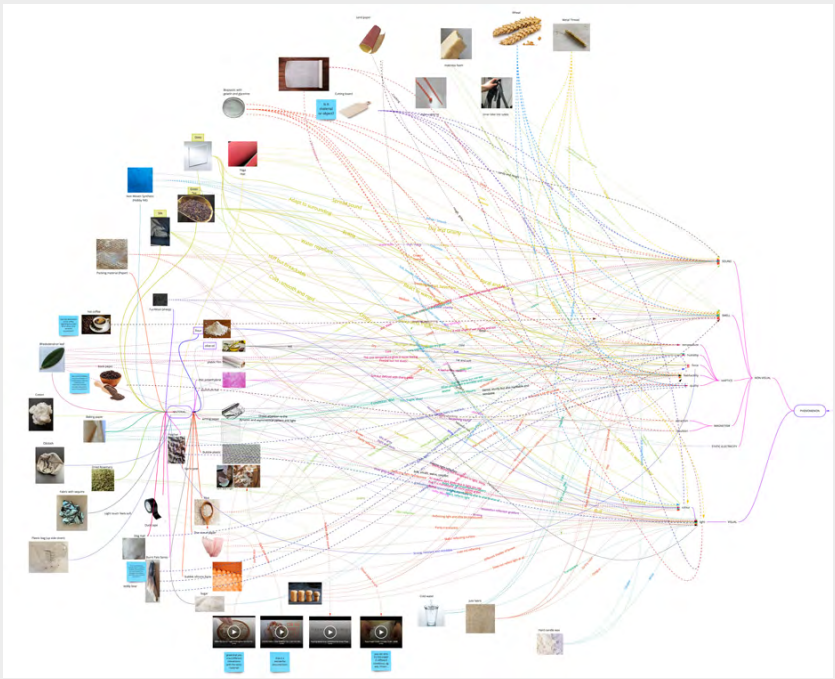

Figure 3: Mapping sensory-material expressions in sense map exercise. Credits: Erin Lewis. Source: Digital group map on the Miro board.

Figure 4: Detail of descriptive terms used in the connections between nodes in the sense map. Credits: Erin Lewis. Source: Digital group map on Miro.

Researchers' reflections

The objectives of this exercise were to define aesthetic expressions of materials in relation to senses and to expand their descriptive vocabulary for what may be entirely new relationships and expressions. Initially, sensing and material expression were directed more towards the visual and the tactile, however, with time, other areas of the map became populated with non-visual material expressions and other sense modalities. It appeared that working in a collaborative environment helped students to see how others were approaching the assignment. Although the map got complicated quickly due to the high degree of content, students had the ability to zoom in on their particular connections or hide other connections and users' cursors in order to focus on their own. Upon reflection, this could have been clarified at the onset to address issues with the map feeling 'messy'.

Many descriptions were based on the physical properties of materials rather than the aesthetic qualities the relationships suggest. Therefore, while aesthetic descriptions were present, the researchers had hoped to see a greater number of them. Student descriptions included: "very vague, a bit like dry grass" (smell: baking paper) and "sounds like trees moving in the wind" (sound: rhododendron leaf) (Figure 4). It is thought that with more direction at the onset, students would be able to open up to describe the materials in more poetic ways based on their interaction with them. Broadly speaking, the exercise was successful in practice but needed some better alignment to the objectives, and this could be achieved through a clearer instruction at the onset.

Sensory tool design task

As a design task, students worked in small groups to design an object that modifies the perception of a chosen sense or combination of senses. They were asked to map their process work using Miro and had one and a half days to complete the task. Group One's map shows students working through relationships of sensing to emotional expressions, exploring the polarization of material experiences (e.g., sound can be calming or stressful), and methods and locations of tickling on the body (Figure 5). Interestingly, there is a dominance of tactile sensations in their map, which suggests that the students continued to lean into one of their dominant senses. In the final object design, the students strategically evoked the emotion of disgust/repulsion through tactile engagement. The final design was a plastic box worn on the foot as a shoe (Figure 6). The plastic box was filled with oil and the wearer was bare-footed. The disgust/repulsion derives from the combination of the slipperiness of the plastic material with that of the oil, and the instability of walking on slippery surfaces, the displeasure of the bare foot immersed in oil.

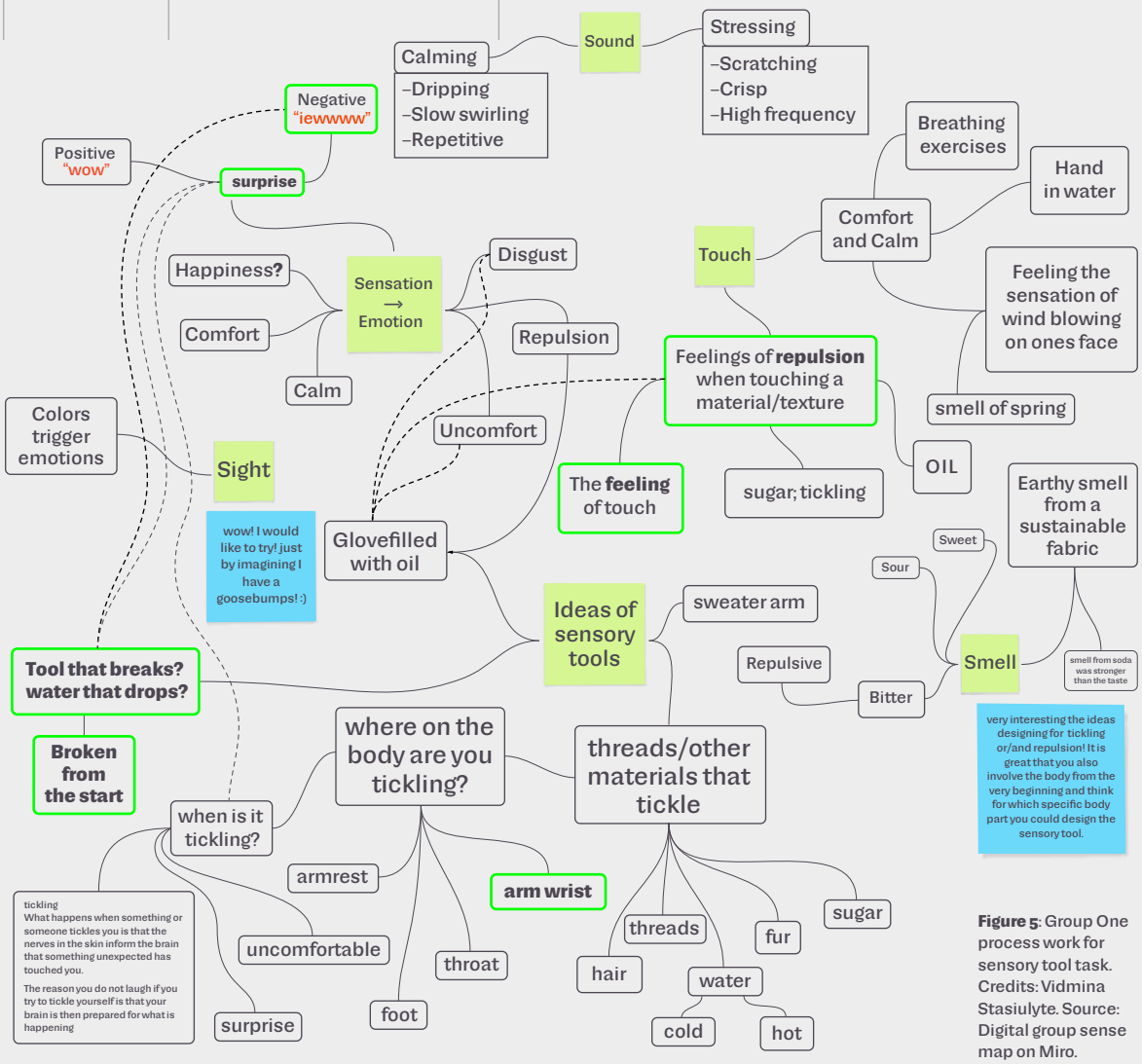

Figure 5: Group One process work for sensory tool task. Credits: Vidmina Stasiulyte. Source: Digital group sense map on Miro.

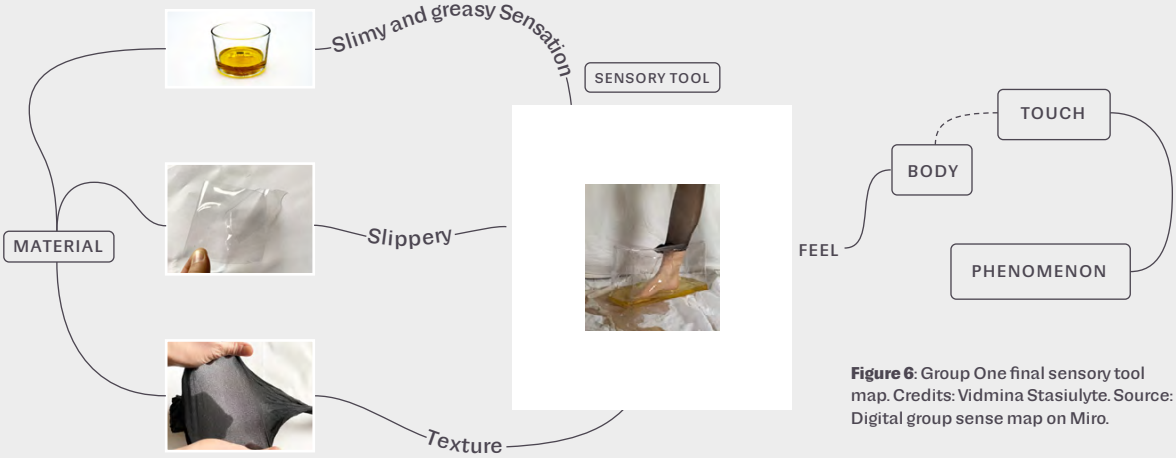

Figure 6: Group One final sensory tool map. Credits: Vidmina Stasiulyte. Source: Digital group sense map on Miro.

Group Two's map presents synesthesia as a topic. Students investigated sensorial illusion as a driver for their sensory tool design (Figure 7). The exploration started by mapping different smells and tastes and how they merged and contrasted each other. The chosen strategy for the sensory tool was to use strong smells that would disguise or lessen taste. Ultimately, the group chose four different smells: coffee, curry, cinnamon, and orange oil. The tool, 'Sniffly', covers nostrils and makes the wearer smell something else (Figure 8). This tool modifies the way of tasting things by tricking the close connection between the two senses. When the wearer changes the sense of smell, the taste feels different. Sniffly can be used to modify the idea and expectations of a specific taste or smell.

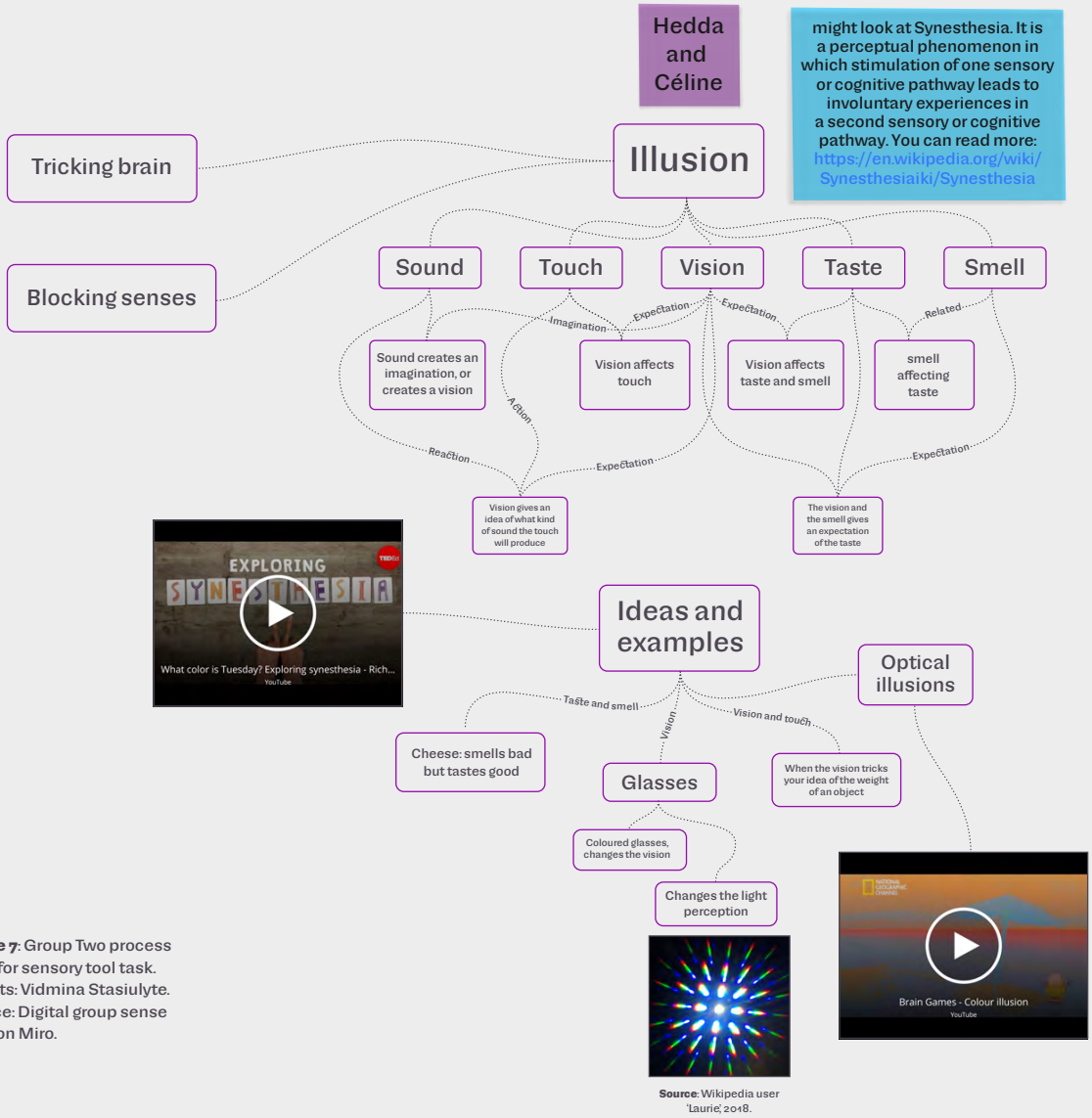

Figure 7: Group Two process work for sensory tool task. Credits: Vidmina Stasiulyte. Source: Digital group sense map on Miro.

Source: Wikipedia user 'Laurie', 2018.

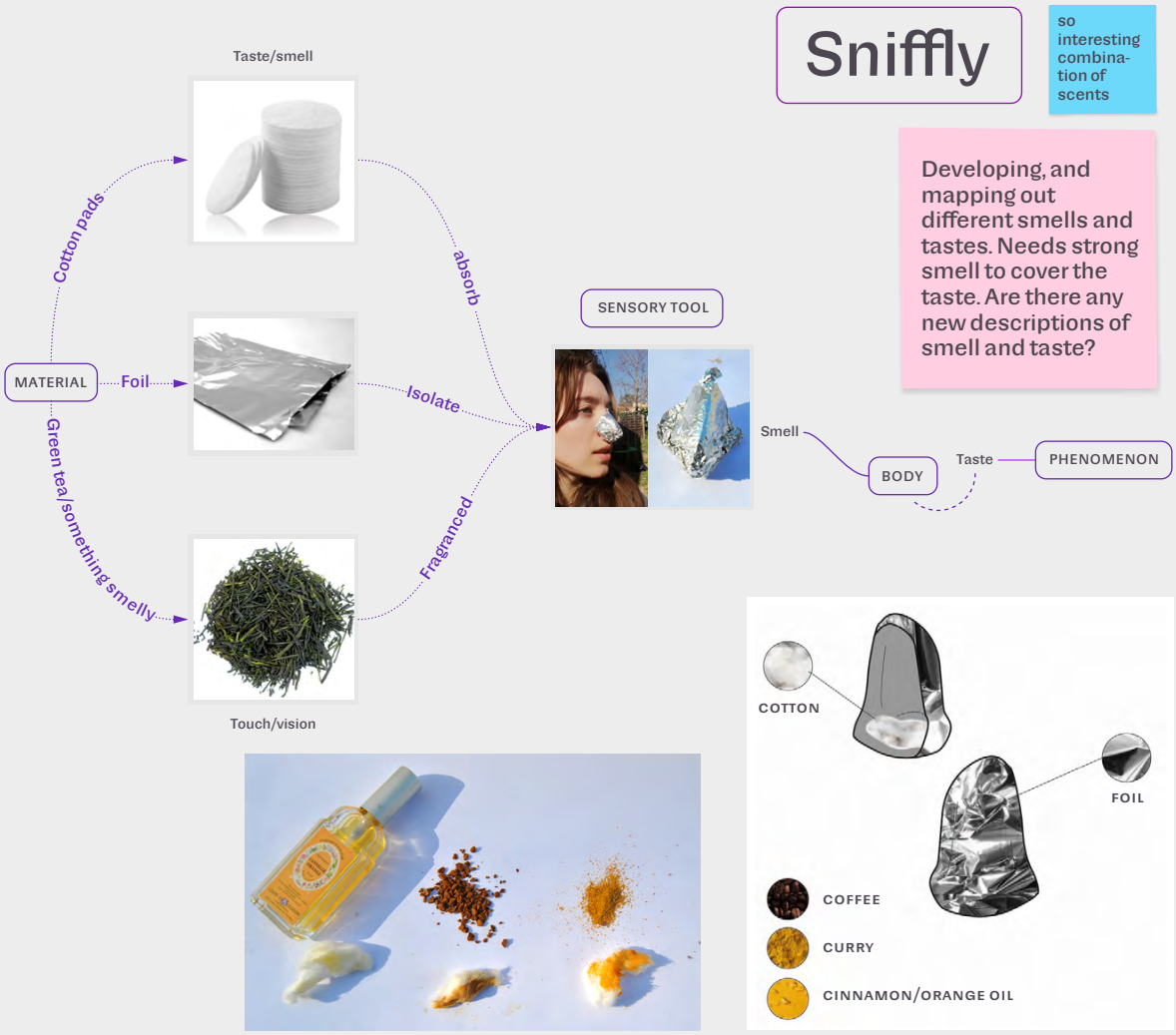

Figure 8: Group Two final sensory tool task. Credits: Vidmina Stasiulyte. Source: Digital group sense map on Miro.

Student Evaluation

Five out of six students found that in order to use their sensory tool, performative and gestural aspects of the body were used throughout the ideating, designing, and prototyping process. For half of the students, challenges in the design process were attributed to a lack of materials, space, and tools at home.

Researchers' reflections

In reflection, the results of sensory tools showed that students were encouraged to identify and investigate the relationships between senses and different ways of interacting while modifying sense(s). The task expanded their

knowledge on non-visual material experiences, as well involved different aspects of the user's experience — emotional, physical, and psychological response. This assignment broadened students' understanding of alternative design variables that could be used for their future design practices. The framework of the sensory tool (material-body-phenomenon) supported their analysis and creative part of the assignment. It also worked very well with the previous task, sense map, thus, the knowledge of analyzing material expressions, phenomenon, and how the body interacts with them was reinforced.

Student workshop feedback overall

Generally, students felt that the workshop opened their minds to designing with the senses, and that design utilizes much more than the visual domain. Some students felt that while the topic was 'abstract', to work together in groups during some of the tasks helped them to feel grounded. A request for increased supervision throughout the workshop was also made.

Some students stated that clearer instructions would have been beneficial, and a clearly stated objective to the task would have helped. Still, some students struggled with making the connection between designing with the senses and textile design practice.

Researchers' workshop reflections overall

In reflection, these first-year students needed more guidance in the exercises, and perhaps encouragement to approach the tasks in an abstract and poetic manner. Increasing the clarity of instructions can boost students' confidence. An additional solution is to include, in the lecture, examples of artists, designers, and researchers who have worked with the topic. Such examples were not initially included in the lecture to avoid interfering with the students' artistic processes. However, it is considered that the students are first-year Bachelor students, and perhaps, with more time and experience, the ways in which this knowledge applies to their practice can be revealed.

Though the workshop was challenging, as it introduced alternative ways of designing, it is valuable and necessary for introducing intangible, non-visual forms and expressions, and time-based variables into their education from the very beginning. Bringing awareness of the textile thinking process encourages students' openness to various, inclusive, sustainable forms of design practice that they could further within their education. This creative alternative workshop contributes to the concept of changing, adaptive design, which employs time as an important element of design thinking and design practice. Also, this introductory workshop on multi-sensorial-material aesthetics can be seen as a foundational basis for universal design (Steinfeld & Maisel, 2012).

GUIDELINES FOR INTRODUCING SENSORY-MATERIAL AESTHETICS IN TEXTILE DESIGN EDUCATION

As a result of our reflections on this workshop and the tools and methods developed within, we propose the following guidelines for introducing sensory-material aesthetics in textile design education (Table 1).

TABLE 1: Guidelines for Introducing Sensory-Material Aesthetics in Textile Design Education

#	Activity	Method	Objective	Reflective analysis
1	Introduction	A short lecture of the topic (delivered in person or online).	To provide context and scope of the workshop, definitions, and audio-visual examples.	This lecture could include such points as: senses alter our perception of materials; senses overlap; bodily movement and interaction with the material alters our perception of materials; intangible phenomena may be considered a material; and the definition of material for design is permeable. The lecture would contribute by adding examples by textile designers who are working with different senses.
2	Sensitizing exercises	Embodied exploration (individual exercising).	To introduce students to somatic sensibilities such as smell, sound, tactility, and taste. To sensitize the senses and focus on the presence.	Ideally this is an in-person exercise but it can also be conducted by students in their homes using a pre-recorded audio file. If the latter is used, the audio should be played from a mobile phone that allows for ease of playing audio while moving around a space, and that provides an opportunity to stop the audio file so one could do the task at his/her own pace.
3	Sense Collage	Reflection (individual exercising).	To encourage an immediate reflection on the sensorial experience.	Different ways of presenting the reflection could be explored, e.g., as audio or olfactory collage.
4	Sense Map	Collaborative sense-mapping exercise (small group exercise using a common document platform such as Miro).	To document connections made through sensory-material experience to define the aesthetic expressions regarding various phenomena. To inspire new connections. To document visually and abstractly and to analyze their explorations. To broaden the dictionary of sensory-material expressions.	Adding the descriptions of sensory- material expressions broadened the vocabulary of expressing the materials in sonic, olfactory, and other ways that go beyond traditional visual-tactile definitions of materials. While some students found it easy to work with, others found it challenging. Lengthier introduction to basic features and ongoing live support can assist in making it less complicated for students.
5	Sensory Tool	Design task (combination of small group and individual designing).	To apply their new knowledge to a design task. To formulate an expression of a sense- modifying tool.	Could be directed toward textile design, though does not have to be. Ongoing supervision via group check- in is useful.
6	Final group discussion	Reflection (group exercise).	To address questions, thoughts, revelations, etc.	Here it is important to discuss how this newfound knowledge could expand their textile design work. What went well, what could be improved.

Credits: Vidmina Stasiulyte. Source: The authors.

DISCUSSION AND FUTURE WORK

This paper contributes with creative exercises for introducing textile design students to somatic exercising and multisensory material explorations. It offers a perspective where textile design thinking is enacted within the curriculum by employing interdisciplinary approaches of somaesthetics and multisensory design. This workshop has been introduced because it challenges textile design students to think critically about their engagement with textile materials and textile designs. It suggests that new textile design aesthetics can be found when one moves past visual and tactile dominance.

Combining sensory-material aesthetics with textile design education is an indicator of a shift in the field, away from conventional single-methodology teaching to textile design thinking that is marked by its multidisciplinary approaches. The authors reflect that the workshop may reach different depths and perspectives when brought to other levels of education such as Master's, doctoral, and postdoctoral students, researchers, and educators within textile design and related design disciplines such as fashion design and interaction design. A collaborative sense map task is seen as a primary foundation for developing a taxonomy of sensory-material aesthetics, thus, it could be developed further within the workshops with professionals. In addition, strategic engagement with select combinations of the senses could lead to enriched sensorial-material expressions (Tsaknaki et al., 2019).

Further, teaching sensory-material aesthetics remotely during a pandemic is challenging. All teaching was remote, and students did not have access to weaving or knitting labs that would allow them to explore certain notions in combination with tangible textile design processes. The development of a distance education toolkit could provide an additional level of framing for the material explorations, where all participants receive the same set of materials and are encouraged to explore them in multisensory and performative ways, leading to more focused investigations. Ideally, this workshop would be run in person with all required materials, tools, and labs made available to students. Nevertheless, the experience proved useful for the expanding realm of online courses. ◘

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