



Negotiation between the Maker and Material: *Observations on Material Interactions in Felting Studio*

Bilge Merve Aktaş* and Maarit Mäkelä

Aalto University, School of Arts, Design and Architecture, Espoo, Finland.

This article examines the interaction between maker and material in craft making in the case of felting. From the perspective of material agency, the article argues that the craft practice is the result of a negotiation between the material and the maker, and the bodily movements of a practice emerge from this dialogical act. The article investigates felting processes and uncovers how they occur through bodily movements and material transformations. This investigation refers to the processes that a novice maker and two expert makers go through a negotiation. The emergence of the artefact is studied with a focus on the relationship between the maker, material, and practice by examining different ways of interacting with the material and its transformations. The research employed a practice-led approach and participant observation as methods to collect various types of data in various studio settings. The data was collected in the form of reflective diaries, field notes, and videos. Through a meticulous analysis, we examined the movements of the body and the material in felting. This examination enabled us to understand what happens in each contact moment between the maker and the material.

Keywords – Making, Material Agency, Negotiation, Practice-led Research, Visual Documentation, Wool.

Relevance to Design Practice – This research suggests negotiation as a conceptual tool to understand how making occurs and how the maker's intentions engage with the material's agency. Through a practice-led approach, one can gain a profound understanding about the inter-related connections between the body, its movements, and materiality within a certain practice.

Citation: Aktaş, B. M., & Mäkelä, M. (2019). Negotiation between the maker and material: Observations on material interactions in felting studio. *International Journal of Design*, 13(2), 55-67.

Introduction

In craft and design, knowledge of making arises from bodily experiences that are generated through interactions with the material and the environment. As contemporary art researcher Howard Risatti (2007) argued, material transformations are the essence of craft production. Accordingly, the relationship that the maker builds with the material while making has been discussed via different terms, such as a dialogue (Sennett, 2013, p. 167), co-emergence (Bolt, 2007, 2013), dance (Malafouris, 2008; Pickering, 1993), or a negotiation as we propose in this article.

This study investigates the role of the material in generating specific bodily movements to execute the practice. We study the active responses of the material and the bodily movements of the maker that were generated to negotiate with material responses. This article examines the bodily experiences within a practice, namely felt making, from the perspective of material agency to uncover the making process. Felt is a non-woven textile and utilises basic techniques of compressing wool, the main material of the practice. Combining this basic technique with the material qualities of wool, such as its fibre structure and elasticity, creates a homogenous unified surface (Burkett, 1979). As techniques of making remain similar in different modes of production, the maker's interactions with the material alter the artefacts.

The role of the material during creative making has been discussed from various perspectives, such as its contribution to creating artefacts (Barrett, 2013; Bolt, 2004, 2007, 2013; Ingold, 2010, 2012) and its effect on design processes (Aktaş, 2018;

Mäkelä, 2016; Nimkulrat 2010; Splewa-Neyman, 2015). In these approaches, the material's active engagement in making is a common feature, suggesting that the material significantly affects the making. According to sociologist Richard Sennett (2013), this active affecting creates a dialogical relationship through the co-ordination between hand and mind (p. 167). This co-ordination enables thinking through the hands. Through a cognitive process of linking hand and mind, and the body's interactions with the making environment, one builds her/his own embodied knowledge (Johnson, 2007). Accordingly, crafting can be seen as the process of transforming the material into a form through embodied knowledge (Groth, 2017). With a focus on the materiality, this article presents a case study of collaboration between the human and non-human, wool in particular, in the process of practising a craft.

In this article, the material's role in making is elaborated during the various skill stages. We follow the model of skill acquisition proposed by engineering researchers S. Dreyfus, philosopher H. Dreyfus, and Tom Athanasiou (1986). The model

Received March 29, 2018; **Accepted** February 1, 2019; **Published** August 31, 2019.

Copyright: © 2019 Aktaş & Mäkelä. Copyright for this article is retained by the authors, with first publication rights granted to the *International Journal of Design*. All journal content, except where otherwise noted, is licensed under a *Creative Commons Attribution-NonCommercial-NoDerivs 2.5 License*. By virtue of their appearance in this open-access journal, articles are free to use, with proper attribution, in educational and other non-commercial settings.

***Corresponding Author:** bilge.aktas@aalto.fi

follows the development of one's embodied knowledge in relation to skill acquisition in five stages. This five-stage model starts with the notion of the *novice* performer who follows rules and makes sense of the practice in a given context. The middle stage is *competence*, in which the performer works with several situations at once and can decide which perspective to adopt. On the competence level, the performer is emotionally involved and takes responsibility of failure or success. Dreyfus (2004) describes that in this stage "[t]he point ... is not to analyse one's mistakes and insights but just to let them sink in" (p. 179). Finally, after continuing performing, the performer reaches the final stage and becomes an *expert* and can make decisions intuitively.

In our research, we adopt three stages of this model to structure our inquiry, in which we examine the making processes of novice, competent, and expert makers. As a novice maker, we examine the first author's felt-making in the context of practice-led research by relying on self-documentation and reflection. This part of the study enabled us to define the research question: What are the inter-related connections between the body, its movements, and materiality? After defining the main area of interest, the first author conducted a field trip to two felting studios in Turkey as an intern to observe the experts. In this part of the study, we employed the participant observation method to understand the relationship between the transformations in material and the expert maker's bodily movements. After the field trip, the first author continued practising felting in her own studio setting, and as a result of the experience she gained in felting, her status as a maker changed from novice to competent. Within this research design, we examine how making occurs to understand the role of the body and the material in the process of making. By studying felting from the perspectives of novice, competent, and expert makers, we examine how making occurs, and especially what are the roles of the body and material in this process.

Next, we discuss the notions of embodied knowledge and material agency, and their relationship to the material and working environment. Then, we present our empirical data that includes field notes, videos, diary writings, photographs, and

voice recordings, and how we examined them. Finally, we present the results by discussing in detail how the interaction between material and maker happens.

Towards the Notion of Material Engagement

In craft practice, the maker generates a form as a means of transforming the material through bodily movements, sometimes accompanied with tools. Various making processes have been studied to understand how form-giving and related ideas occur, and the common finding of these studies is that making is a collaborative act between mind, body, and material (Groth, Mäkelä, & Seitamaa-Hakkarainen, 2013; Malafouris, 2013; Nimkulrat, 2012). This article contributes to this discussion by analysing the making process step-by-step to uncover how this collaborative act of making occurs.

In making, various elements, such as maker, material, tools, and making space are entangled. For this reason, the making process is usually examined holistically. In this holistic approach, two significant elements are embodied knowledge and interactions with materials. Previous research has demonstrated the important relationship between the mind, body, material, and the artefact, arguing that through this dynamic relationship, we think and make sense of the world (Johnson, 2007; Mäkelä & Löytönen, 2017; Pickering, 1993).

To understand *how* things affect our becoming, archaeologist and material culture researcher Lambros Malafouris (2013) suggested the Material Engagement Theory (MET) as a methodological stance. According to Malafouris, thinking happens *between* brains, bodies, and things. To understand how it happens, he proposed focusing on material engagement in relation to three concepts: extended mind, enactive sign, and material agency. He claimed that as a result of constant material engagement, our minds are extended and affected by people, artefacts, space, and time. Therefore, these four elements can gain various agencies in relation to our engagement and shape the way we think and act.

Philosopher Mark Johnson (2007) argued that meanings emerge from "deeper explorations into the qualities, feelings, emotions, and bodily processes" (p. x). Accordingly, embodied knowledge guides the making process by cultivating abstract meanings for and within the practice. These processes can be understood through experiential interactions which occur between the maker, material, and making environment (Johnson, 2007).

In both Malafouris's and Johnson's approaches, the body, making and material are approached as complementary entities, and therefore, it is difficult to discuss these elements separately. Similarly, Sennett (2013) described the formation of embodied knowledge as body's becoming integrated with the material which allows the maker to predict the next shape of the material and accordingly the next action of the body (pp. 228-230). In this "becoming," tools can gain crucial roles as well. As architect Juhani Pallasmaa (2009) argued, makers embody tools and material, and internalise materiality in a way that eventually transforms the makers themselves into material.

Bilge Merve Aktaş is a doctoral candidate in the Department of Design at Aalto University, Finland. She holds a BSc degree in Industrial Product Design from the Istanbul Technical University and a MA degree in Design, Technology and Society programme from Koç University in Istanbul. Her master work examined the interaction between women crafts, namely knitting, and maker movements from a designer's perspective. For her doctoral research, she is examining human material interaction in various skill stages from the perspective of material agency. Her research investigates the activeness of material and its role on human experiences and the development of experiential knowledge. Her research interests cover issues like textile crafts, design processes, practice-led research, material interaction, material agency, and experiential knowledge.

Maarit Mäkelä is an Associate Professor of Practice-led Design Research at the Aalto University School of Arts, Design and Architecture, Finland. Her own creative practice is located in the context of contemporary ceramic art. Her doctoral study was a practice-led research, where visual representations of femininity were produced during the research process by artist-researcher herself. The works were shown in a series of three exhibitions, and this series formed a central part of the study (Mäkelä, 2003). She is interested in creative processes and, in particular, how reflective diaries and visual documentation can be utilized for capturing the personal process. She is initiator of *The Art of Research* conference and co-editor of the anthologies *The Art of Research. Research Practices in Art and Design* and *the Art of Research II. Process, Results and Contribution*. In addition, she has published widely in international arenas.

As the relationship between making and thinking contributes to constructing our general thinking and making sense of the world, becoming integrated with the material and developing one's own embodied knowledge generates idiosyncratic languages that are not limited to verbal explanations. Sculptor Jyrki Siukonen (2010) perceived this situation as embodied material knowledge of the maker, which is developed through the co-operation of the working hand and the mind and can be transferred nonverbally through the process of making or in the form of artefacts. Similarly, a study with deaf-blind people indicated that the non-verbal language of embodied knowledge can be used for transferring one's craft knowledge to another person by using material qualities as informants, and the hands as tools to perceive their surroundings (Groth et al., 2013).

As material becomes a medium to reflect the embodied knowledge, it actively informs the making and conveys information. In these kinds of approaches, the material is not perceived as a static element but as an active participant which has the power of performing an action (Mäkelä & Löytönen, 2017). Studying the active relationship between the maker and the material is important because through such we can understand how we engage with the material world and how our constant interaction with the materialities, such as things, materials and humans, continuously nourishes our thinking and understanding.

In recent research discourse, the role of materiality has gained remarkable attention. It has been proposed that due to its significant impact, material should be acknowledged as an active participant, rather than a passive nonhuman thing. Accordingly, material becomes an active agent as a result of its power to affect our thinking and making. Political theorist Jane Bennett (2010) proposed that material should be understood as a vibrant entity, and that different materialities have different powers, which allow them to gain agencies within their independent or collaborative existences.

In the context of making, the concept of agency refers to the capacity and the power of the material to affect the making and designing processes. Considering the material's agentic power and the relationship between material and embodied knowledge, studying the transformations of the material can convey new insights about the knowledge of making. As sociologist Andrew Pickering (2005) proposed, the reciprocal co-working between humans and non-humans not only results in the co-emergence of a certain artefact, but by overcoming material resistances in various conditions with various methods, it also constitutes a basis for new material development, new knowledge production, and new social configurations (p. 175).

In creative processes, as anthropologist Tim Ingold (2010) proposed, although makers may begin with preconceived ideas, the form is the result of following the flow of the material. He perceives material things as processes which can be transformed by the maker-reciprocally, material things also transform the maker. Ingold (2012) further claimed that communicating with the material allows the maker to translate the material's movements and properties into the practitioner's knowledge (p. 434).

Similarly, artist and art theorist Barbara Bolt (2007) argued that an artwork is co-emerged by the maker and the material. According to Bolt (2004), art works are collaboratively created by the elements related to the making of that specific artwork, including the preparation processes, environments, and outcomes. From a similar perspective, textile artist and researcher Nithikul Nimkulrat (2010) suggested the notion of *materialness*, arguing that material can become a determinant element in the creation of form, content, and context. She claims that makers can shape their intentions by considering the materialness in their practice.

Pointing at its multi-dimensions, psychologist Vlad Glăveanu (2014) perceived creative making as a distributed, dynamic, socio-cultural, and developmental phenomenon, that goes beyond an individual's work. In this inter-relational process, the material can facilitate or constrain the process, and accordingly change the perceptions of the makers, users, or viewers. Glăveanu (2012) claimed that the dynamic process of creative making is initiated with intentions and formulated between the people, artefact, culture, and time. This dynamic relationship is a developing project, and affordances of nonhumans, or the ways they enact making, can affect the development of the project (Glăveanu 2014).

In this research, we examine the relatedness of intentions and agency through analysing the empirical data. We base our study on Malafouris's (2013) argument that we make sense of the world through our material engagement, in which a constitutive intertwining between the human intentionality and the material affordances occur (p. 18). According to Malafouris (2008), our making may begin with prior intentions, but because of the material agency, the relationship between the maker and the material generates intentions-in-action. Therefore, he argues for a distributed agency, in which various agents enable and constrain each other for the becoming of the artefact, referring to this as the dance between the maker and the material.

In this article, we conceive craft making as a collaborative practice between the human and nonhuman participants, in which agency is distributed among the maker and the material. We argue that, during crafting processes, the material actively responds to the movements of the maker in a way that creates a negotiation between the human and nonhuman entities, resulting in the artefact.

Next, we examine certain dimensions of the making process in detail, to gain an understanding on the ways in which the material affects making, and how the negotiation between the maker and the material occurs. In this article the data was entirely collected and partially produced by the first author. The second author contributed to the theoretical discussion and the analysis of field notes, working diaries, and visual documentations.

Context of the Study and Methods of Examining the Negotiation

In our study, we examine the negotiation between the maker and the material by employing a case study methodology in felt making. The case study methodology enables us to conduct deeper analysis in one complex field while generating an understanding

that can be applicable in other fields (Muratovski, 2016). Case studies investigate a topic in its real-life context by providing concrete examples to answer *how* questions (Yin, 1981). To conduct an in-depth examination of our case, namely felting, this research employs two methods and various types of documents: practice-led approach and participant observation.

We selected felt making as the case study since felting utilises basic techniques of making with a single material, it allows us to conduct deep observations and analysis on the material's role and transformations. Also, due to its long history, felting provides traditional ways of making that are strongly attached to the direct, manual manipulation of the material. Throughout history and within different social communities, the technique of felt making has remained almost the same, one that is based on putting pressure on the wool, although tools and material qualities may vary depending on the context. Often, making starts by spreading the wool out on a surface larger than the desired size, as the piece shrinks while making, then this flat and thick wool layer is covered with water and rolled in a cylindrical form. Finally, through continuous movement of the rolled wool back and forth, the wool fibres are entangled to each other and a unified surface is created. During the iterative process of making, when the wool is half felted, soap is added as an adhesive due to its acidic feature.

In large scale productions, spinning the rolled wool is done by a simple machine at felt studios. The machine makes the cylindrical form whirl around itself to compress the whole piece simultaneously. In the absence of a machine, the maker whirls the wool around itself by hand. In this case, it is important to divide the pressure equally by changing the position of the hands. In both machine and hand production, the final adjustments still require hand work.

We selected Turkey to conduct the field trip since the first author is from Turkey and was able to communicate with the expert makers in their mother tongue during the field trip. In Turkey, through the long history of felt making, the practice has been utilised to make artefacts for indoor and outdoor uses—both with utilitarian and non-utilitarian purposes. The finished artefacts include carpets, cushions, shelters and garments, as

well as artworks (Atiş-Özhekim, 2009; İnalçık, 2011). Despite the different areas of use, the procedures of making felt remains almost identical.

Our research design utilises felt making in three different skill stages: novice, competence, and expert. By examining the practice at the three different stages, we comprehensively investigate the material's role, and how the skill emerges through material engagement. The examination was conducted in three studios: one studio utilised the practice-led approach to examine the first author's practice, while the other two utilised the participant observation method to examine the expert makers' practice. We selected these studios based on our initial study, according to their differences and similarities (Aktaş & Mäkelä, 2017). Next, we describe the studios, where the research took place.

Context of the Research: *Three Studios and Skill Stages*

The first studio was where the first author started felting. It is located within a university setting and shared with a ceramicist. The space was originally established as a ceramics studio and designed accordingly. The interior of the space was not changed upon being used by the first author; rather, she adapted to the environment. This situation limited the area that was dedicated to felting: large artefacts could not be produced. The wool was purchased online and was specifically treated for felt making. Having clean wool and making small artefacts reduced the material interaction time. In this studio, she could only make felt by hand (Figure 1).

This studio setting was used in the beginning and at the end of the study. In the beginning of the study, the first author had no profound understanding of felt making, and at this initial stage we considered her as a *novice* maker. In the later stage of the study, when continuing the practice in her own studio after her internship at the two studios in Turkey, we considered her as a *competent* maker.

The second studio was İlyas's studio. His studio is located in a craft neighborhood in Tire, Turkey, where he sometimes collaborates with other makers. The studio was established



Figure 1. The setting of the first author's own studio and some wool type. Photography: Aktaş, May 2017, Finland.

in the 1950s as an expansion of his grandfather's studio. He usually works alone and produces traditional objects, following a conventional craft orientation. He purchases local wool from the people living in the surrounding villages and skirts the wool before cleaning it. Thus, the material preserves its natural features, such as the wool oil, lanolin, that creates a remarkable sensory experience of making. All the treatment is done by him, typically, immediately before starting to make new pieces. Working with wool is a significant part of his practice as preparing the wool takes more time than the felting. This situation generates longer interactions with the material. He uses simple machines for production (Figure 2).

This studio setting was used in the middle of the study to examine the *expert* maker from the perspective of an intern. The first author observed the ways the expert practiced while helping him in executing the practice.

The third studio was Gencer's studio. His studio is located in an artisanal trade neighbourhood in Yalvaç, Turkey. The studio was established as a felting studio in the early 2010s as an extension to his father's studio. He has a team of co-makers with different practices, such as making carpets with traditional designs or treating wool. He also collaborates with designers to produce artefacts. He uses local wool which is sometimes treated

by his co-workers and sometimes by industrial consultants. In both cases, the wool is cleaned and most of its natural qualities are modified. Typically, the making process does not include wool preparation as the material is usually ready to be used. His extremely large studio allows several simultaneous productions. He uses simple machines for production (Figure 3).

This studio setting was used in the middle of the study to examine the expert maker from the perspective of an intern. The first author observed the ways the expert practiced while also helping him in executing the practice.

Research Methods: *Practice-led Research and Participant Observation*

For this case study, we applied two methods: practice-led research and participant observation (Table 1). As described above, the studies took place in different studio settings, and the role of the researcher was different. When the researcher was mainly conducting her own practice, we followed a practice-led approach. When the researcher was mainly observing the expert makers, we employed the participant observation method. Furthermore, the tools we used for documenting and the methods we used for analysing the collected data differed accordingly.



Figure 2. The setting of Ilyas's studio and the wool type he employs. Photography: Aktaş, August 2017, Tire, Turkey.



Figure 3. The setting of Gencer's studio and the wool type he employs. Photography: Aktaş, August 2017, Yalvaç, Turkey.

Table 1. Research design: Three stages.

| Context | Skill stage of the observed maker | Methods of collecting data | Documentation | Methods of analysis |
|-------------------------------------|-----------------------------------|----------------------------|---|---------------------|
| (I) Practising felt at own studio | Novice | Practice-led Research | Diary, photographs, videos | Content Analysis |
| (II) Internship at two felt studios | Expert | Participant Observation | Field notes, photographs, videos, voice recording | Thematic Analysis |
| (III) Practising felt at own studio | Competent | Practice-led Research | Diary, photographs, videos | Content Analysis |

Craft theorist Glenn Adamson (2013) argued that embodied interaction builds the basis for genuinely understanding a craft practice. In our study, we used practice-led research as a method to understand the practice better and to generate relevant questions. Practice-led research is grounded on the idea of a practitioner-researcher who is, on one hand, the executor of the practice and, on the other hand, the one who reflects on the entire process (Mäkelä, 2016). When practice is used as a research method, material explorations can generate information for research through the maker's reflections and observations on the practice (Nimkulrat, Sitamaa-Hakkarainen, Pantouvaki, & de Freitas, 2016).

In practice-led research, systematic reflections that emerge from the practice gain a significant role. According to social scientist Donald Schön (1991), our knowing is embedded in our practice, often in tacit forms. Through *reflection-in-action*, practitioners can evaluate their encounters during the process of making and alter their actions accordingly (pp. 128-136). Through *reflection-on-action*, practitioners can analyse their actions and making processes in relation to other events (pp. 275-283; see also Mäkelä & Nimkulrat, 2018). To fulfil the reflection necessity, documentation becomes a tool for inscribing the process while analytically examining the understanding, knowledge, and experience of making that is embedded in the practice. Documentation can have textual and visual forms and accomplish two purposes: documenting of making artefacts and for making artefacts. These two types of documentation enable to gain an understanding about how reflection occurs during and after making (Mäkelä & Nimkulrat, 2018).

The first author's reflective documentation utilised both reflection-in-action and reflection-on-action. This twofold documentation employed two forms: visual, which included photos, videos, and sketches, and textual, which consisted of diary notes. For reflection-in-action, the first author also followed thinking and talking aloud accounts (see also Groth, Mäkelä, & Seitamaa-Hakkarainen, 2015). Talking aloud while making enabled her to reflect immediately when an unusual encounter occurred, helping her to understand more profoundly the experience and decisions she was making. These were captured by video and voice recordings. While felting, the first author positioned her smartphone near the workspace and talked to herself. Each recording began with reporting the date and what type of an artefact would be made that day. During making, the first author described her steps and mentioned her emotions about felting and her experiences. After each practice session, when the first author wrote her reflections in her diary, thinking aloud accounts were further articulated.

The reflective diary was utilised to interpret and analyse the experience of making via reflecting on the process to facilitate the construction of knowledge (Evans & Maloney, 1998). These diary notes mostly mentioned ideas regarding the transformations in the material in response to hand movements. While writing her reflections, the first author was also making decisions for the next practice sessions, for instance, which experiences to pay attention or what type of an artefact to make. These parts constituted the reflection-on-action. The reflective diary notes were written in the first author's studio in the beginning and at the end of this study, and these notes together with the visual documentation (Figure 1) built the basis for this part of the research.

Evidently, in the first stage, when felting in her own studio, the first author's skills in felt making was limited. Although reflective notes enabled her to understand the dynamics of the making process, she was still an outsider to the practice. To gain a better understanding about making processes, a field trip to two felt studios in Turkey was organised. Through these field trips, the practice setting was shifted to the studios of expert makers. These field trips were designed in a way that the first author would become a participant observer in the studios.

The participant observation method enabled to investigate making processes and observe material transformations while participating in the transformations per se. We used participant observation to investigate the culture of felting by partially-immersing into the field (Muratovski, 2016) and to understand the intuitive knowledge that is attached to the practice (Bernard, 2006). By becoming a member at the studio, and a co-maker with the craftspeople, the first author was able to gain material experience in felting and observe how the expert makers were interacting with the material.

In this stage of the study, the first author became an *observing participant* by positioning herself as an intern for four days in each studio. Without setting up any experiments, the first author observed the naturally occurring situations that took place at the studios. Her role as an intern included helping the expert makers with their everyday responsibilities and, as much as possible, to blend in (Muratovski, 2016). Her duties included helping with felt making, organising the work space, generating ideas for the artefacts, and contacting with customers. When she had free time, she wrote her notes while still at the studio, but mostly field notes were made after the workday, to prevent missing the practice and creating an artificial feeling about her participation (Flick, 2009). These field notes involved descriptions of the daily happenings as well as the reflections emerging from interacting with the

makers and the materials. One week after the field trip, she wrote her reflections in more detail, first using this week as a transition period to contemplate on her experiences (Muratovski, 2016).

The field notes included two kinds of information, reflections on observations and reflections on her own making that involved interacting with the material, makers, and making space. These two kinds of notes were not separately taken since the division between the knowledge gained from observing the makers, following the flow of the material, and making overlapped and entangled. The textual documentation was enriched with visual documentation, including video clips, photos, and sketches, which also enabled the researcher to revisit the making process even after the field trip (see also Mäkelä & Nimkulrat, 2018).

The videos captured various stages of making felt. In general, they were not constructed, however, by asking questions about the making techniques, the maker's knowledge was revealed when necessary either by nonverbal demonstrations or verbal explanations. The videos and questions were formed in a way that the information would be openly presented to the viewers (Pink, 2007). Accordingly, the frames were designed to position their hands and the material in the centre. During seven days of the field trip, several short video clips were recorded, which showcased an approximately two-hour long practice, and later analysed. In this stage, the focus was on the ways the makers worked with the wool and how they produced the artefacts. Next, we discuss how we studied the documented material and what type of insights they have provided for the study.

Insights from the Studios

We examined the reflective diaries, produced by the practice-led method, to identify the role of the material experience and the significant effects of the material engagement. The notes were iteratively read in a content analysis (Flick, 2009) manner to understand the significant notions that were repeatedly emerging from the reflections. As the first author continued practising in her own studio after the field trip, she internalised her observations from the felting studios in Turkey by recalling the experiential knowledge she gained while working there. Her reflective working diary notes indicate that after the field trip her approach to the practice changed, and she started examining material transformations while making more consciously:

I started making everything the masters told me [...] I folded the sides or sometimes pulled them to bring them in line. Thus, the sides became straighter [...] And when it is half-felted [...] if the fibres are stretched with the finger, [...] you can reposition the removed wool to wherever and continue felting. (Working diary, 29 September, 2017)

The above diary entry is part of the findings that encourages us to support the idea that the material has an agential capacity to change the maker. In our case the first author became *competent* in felting as she knew how to handle the making process (Dreyfus, 2004). Through examining the practising process, she gained a better understanding of what happens while making and how it contributes to the embodied knowledge of the maker.

In the middle stage of the research, the participant observation method produced textual and visual data, which were in the form of field notes, videos, photos, and sketches. The documented material was analysed in complementary ways with a focus on the material encounters and the processes of making. In this phase, the field notes were repeatedly and iteratively read from the material agency perspective, and the significant moments that reflected the embodied knowledge of the maker were marked. After that, the parts that involved information about the material interaction and the making processes were grouped and studied to better understand how material becomes a part of everyday felting. Grouping these notes aimed to identify discussions relevant to the material engagement to set a reference point for the next stages of the analysis (Ryan & Bernard, 2003). The field notes reinforced the idea that spatial context can significantly contribute to the practice, due to the agency of the environment and bodily interactions with it (Barrett, 2013; Mäkelä, 2016; Malafouris, 2013; Siukonen, 2010).

Ilyas's studio had its own identity and existence, and you had to attune to it ... Everything had its own place, and it was obvious that those places were selected through experience, functionality. The studio on its own had a strong meaning. (From the reflection on the field notes after the field trip was completed, 1 September, 2017).

Therefore, we employed a holistic approach and examined the entire experience of making to understand how the artefact emerges slowly from the interplay of the maker and the material. We also combined the textual and visual documentation, which was mostly video recordings, to gain contextual knowledge (Knoblauch & Schnettler, 2012). The visual documentation was employed as a supportive tool to break-down the steps of making and engaging with the material.

Step 1: Describing the Content in the Videos

The video videos were carefully watched several times. While watching, the content in the videos were transferred to written form, which mainly described the actions and the bodily movements to reveal what was happening while engaging with the material. These notes sometimes included drawings to visualise the co-operation of the body and the wool. At this stage, we sought for patterns of actions that occur while making to identify the overarching bodily movements. Accordingly, the written descriptions focused on the happenings in the videos, and information with no direct effect on certain actions, such as conversations about the weather, were not transferred.

Step 2: Studying the Descriptions to Generate the Actions

After that, the notes were carefully read, and thematic analysis was conducted to generate patterns, or, in our case, bodily actions (Braun & Clarke, 2006; Ryan & Bernard, 2003). At this stage, reading the notes and watching the videos happened simultaneously. Transitions in the videos were the key factors while transferring the information (Ryan & Bernard, 2003):

Table 2. The movements of the body and wool fibres. This information was revealed from the videos.

| Movements of the fibres | Disentangling | Entangling | Dis/Entangling | Methods of analysis |
|--------------------------------------|--|---|--|---------------------|
| Movements of the maker's body | Cutting into small pieces; Fluffing up the wool; Un-felting. | Wetting; Rolling; Whirling around putting pressure. | Pulling; pushing and sliding the wool; Ruching the felt; Tugging the felt. | Content Analysis |

whenever there was a pause in the practice, followed by a slight or major discontinuity, this was perceived as one action. Following the transitions, the researcher initially developed thirty-four actions from the first studio and twenty-five actions from the second studio, with thirteen of these actions involving additional tools that effectively contributed to making. By studying the similarities and differences among these actions (that are patterns), we refined them to overarching bodily movements (that are themes; Ryan & Bernard, 2003). Based on the purpose of the action, the bodily movements were grouped and denominated with names, which resulted in ten bodily movements that can occur in various situations. At this stage, the careful analysis revealed the movements of the wool fibres, which also referred to the purpose of a specific action: when the body acts in certain ways, material reacts, and fibres can entangle or disentangle. When all actions were exposed, ten bodily movements and two fibre movements were linked together, and three categories were created (Table 2).

Step 3: Studying the Role of the Actions in the Process

We initially constructed a progress-oriented relationship between the bodily movements and fibre movements (Fereday & Muir-Cochrane, 2006; Ryan & Bernard, 2003). The videos were watched again to uncover the formation of this relationship, and from the fragments with actions, we first generated a series of extracts with the help of the descriptive text. Then, we mapped them to generate the essentials of the actions and their relation to each other (Heath & Hindmarsh, 2002).

The mappings involved the extracts, drawings of the hand and fibre movements, descriptive information of what happens in that extract, and the form of the relationship between hand and material. As our video data usually did not include verbal parts, we did not generate video transcriptions. This analysis was done manually for ten actions in 16 situations. Table 3 is exemplary of this manual analysis, which shows the movements involved in ruching felt. The purpose of the actions in ruching the felt is to bring the fibres together to create a curved shape in the half-felted stage. In the presented example, the maker transforms the edgy corners to curved ones by ruching and pulling the corners. He also places additional wool to balance the thickness throughout the surface. Once the maker has given the piece new form, the piece is rolled and further felted in a machine to entangle the fibres in newly-shaped corners.

In the presented movements in ruching the felt, two hands co-operate and directly encounter with the fibres, with no tools. The hands direct the movement of the fibres, replacing them to their new form. This step-by-step analysis of the making process has provided a renewed understanding of the practice, revealing movements of the body in relation to movements of the wool

fibres. Next, we discuss the dynamic relationship between material transformations and the bodily movements, and how we employ negotiation as a conceptual tool to describe this process.

Understanding the Interrelations between the Maker and the Material

The flexibility of the wool fibres generates a movement similar to crawling of a worm (Burkett, 1979, p. 1). When the elasticity of wool fibers and their spiral molecular structure is met with warm water and acidity of soap, the fibers in the mass become tightly entangled and form a homogenous layer of felt. The in-depth studying of material transformations in response to the bodily movements unveiled that, by its nature, wool advances its own entanglements whereas the maker aims to create her/his own entanglements. The way how these two movements contribute to the emergence of the new artefact can thus be understood as a negotiation as the movements of the material and the maker come to an agreement to create the final form. Both during the preparation process and actual making of felt, various bodily movements essentially share the same purposes: disentangling and re-entangling the wool fibres. Utilizing the wool’s main material quality as an active agent in the making enables examining the transformations of the fibers in the meta-level and proposes a renewed understanding for the practice: felting is a way of disentangling the wool fibres to re-entangle them into the form of the maker’s intentions that are concurrently re-evaluated as making continues.

We identify this interaction as a *negotiation*, a self-explanatory word that refers to a dynamic relationship in which both parties participate in a discussion and agree on a conclusion. Previously, *dialogue* has been proposed to describe the relationship between maker and material during the process of making (Sennett, 2013, p. 167). Instead of dialogue, we propose negotiation since dialogue refers to an exchange of any kind while *negotiation refers to an exchange that proposes an agreement between the stakeholders by blending their responses*. Within the context of artificial intelligence, negotiation has been perceived as a mechanism to facilitate the interaction between multi-agents that have inherent interdependencies (Amgoud, Parsons, & Maudet, 2000). In this conceptualisation, negotiation is grounded on three major components: “(a) there is a two-way exchange of information, (b) each party to the negotiation evaluates the information from its own perspective, and (c) final agreement is achieved by mutual selection” (Davis & Smith, 1983, p. 71).

We perceive the concept of negotiation from a similar perspective, and argue that in the negotiation in felting, the bodily movements and the fibre movements couple together to realize an action. This coupling varies throughout the process of making. In three steps, through various coupling, the artefact is produced (Figure 4).

Table 3. Analysis of the movements involved in ruching felt. The drawings illustrate the movements of the hands and the wool.

The first step is to prepare the wool for making by disentangling the wool fibres through three bodily movements. The aim is to separate the fibres from each other. When ready to be used, the wool is placed on a work surface, typically in smaller lumps. The second step mainly concerns felt making. In felting, the wool fibres are compressed through a source of force to unify the fibres and create a surface. These actions of compressing aim to entangle the wool fibres into the initially intended shapes.

The third step mainly concerns moving the fibres to generate the final shape of the artefact. When half-felted, regarding the rate of the unification or entanglement, the piece can be still manipulated through three bodily movements: by pulling, pushing and sliding the fibres, by ruching the fibres, or

by tugging them. All three movements aim at changing the fibre directions and intensity. In this stage, the wool fibres are both entangled and disentangled at the same time to create the intended entanglement. For instance, if the form is not symmetrical, the entanglement of the wool fibres can be recomposed by pulling and pushing the fibres.

These three steps illustrate that while felting, similar to several other craft practices, a dynamic action-reaction situation occurs between the maker and the material. The bodily movements of the maker continuously transform the material into new forms. The next movement of the maker's body is determined by the transformations in the material. Pickering (1993) has reminded us that in the process of realising the intended designs, the maker

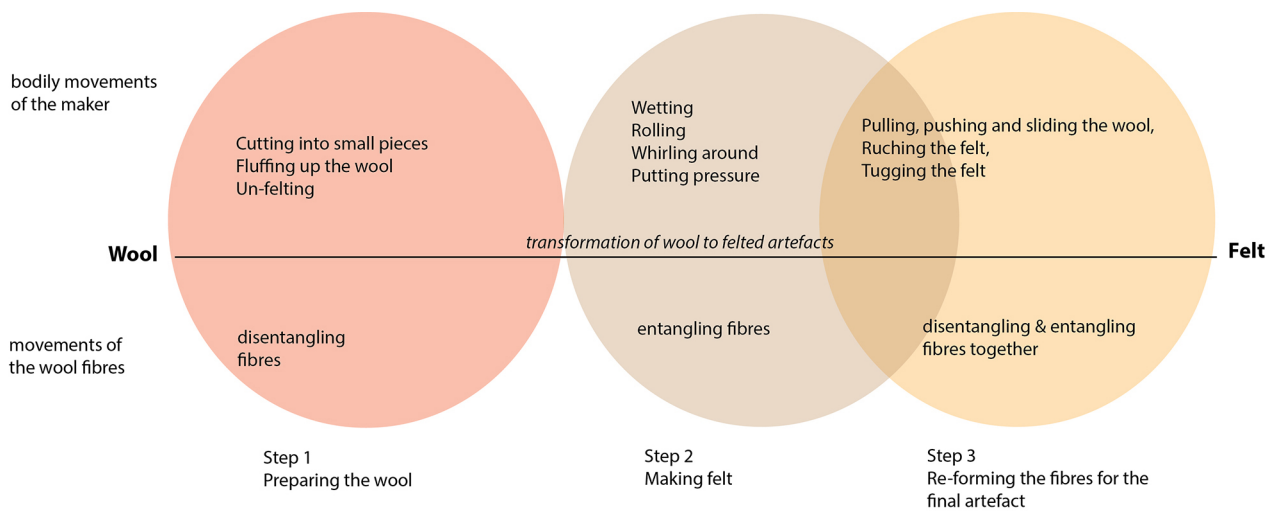


Figure 4. Steps involved in coupling the bodily movements with the fibre movements.

may encounter obstacles related to the material resistances and may need to reformulate the goal or the practice. He perceived this iterative process as a co-operation between the humans and nonhuman entities in the practice. Since the participating entities can have the capability of influencing the practice, Pickering proposed that both human and nonhuman participants have an agency in the process, and the result is realised through tuning those agencies. In Pickering’s (2005) approach a “reciprocal coupling of the human and the nonhuman” (p. 179) occurs, and the knowledge and practice co-evolves through this coupling. According to Sennett (2013), the embodied knowledge of the maker, along with the co-operation between mind and hand, enables her/him to analyse the situation in action and perform the next movement in the process of making. We also argue that, when the practice is perceived as a collaborative action, the ability of influencing the process is not attributed only to the humans but also to the nonhuman participants of the practice, in a way that distributes the agency.

We understand material as an active participant and respondent in creative making that reveals its agency during the practice. Thus, the new artefact evolves through a negotiation process where both the maker and the material have important roles. The negotiation to realise the artefact is based on understanding the transformations in the material and performing the next steps of the practice accordingly. As the maker builds her/his embodied knowledge and gains the ability to understand the process of making, she/he also gains the insight to evaluate material behaviour under various conditions. This ability can enhance the bodily movements to develop ways to realise the artefacts.

In the case of felting, negotiation occurs through iteratively examining the entanglement of the wool fibres and re-entangle them to realise the design or to alter the initial design. As the maker examines her/his making process through reflection-in-action, the practitioner makes quick decisions to adopt in coherent ways with reactions of the material (Schön, 1991; Mäkelä & Nimkulrat, 2018). By following Malafouris’s (2008) framing of intention-in-action, detailed analysis of the practising process

enabled us to observe how this interaction between the maker and the material occurs through reflecting. Malafouris (2014) argued that material forms are created through “situated engagement of thinking and feeling with things” (p. 144). This form creation occurs through a constructive dialogue, in which a perception-action loop exists *in-between* the maker and the material. Figure 5 illustrates our understanding of intention-in-action and how it occurs through the negotiation between the maker and the material in the context of felting.

Figure 5 illustrates that the material exists in its entangled form before making begins. In the first encounter, the maker examines the fibre entanglement and decides what to do. In the second encounter, the maker starts disentangling the fibres, their bodily movements and intentions are developed in action based on the various entangled forms that wool lumps have. Once the fibres are ready to be felted, the third encounter aims to entangle the wool fibres into a specific form. In this stage, due to the flexibility of the wool fibre, the material entangles in various forms and the maker has to re-evaluate her intentions in accordance with the material behaviour. The fourth encounter occurs when the piece is partially felted, with an aim to manipulate the existing form and create the final one. The maker should employ their bodily movements both for entangling and disentangling and continuously examine the fibre forms to decide which action to take and how to move the body in a way that will change the form. When the maker is satisfied with the form, the piece is completed and is a product of the negotiation. In this dynamic relationship, the material’s agency re-formulates intentions of the maker. Based on this examination, we propose that the negotiation emerges through re-evaluating the intentions while making.

Conclusions

In this article, we have examined how craft making occurs by studying bodily movements of the maker and movements of the material in the case of felting. By employing the Material Engagement Theory as a frame, we studied the process of

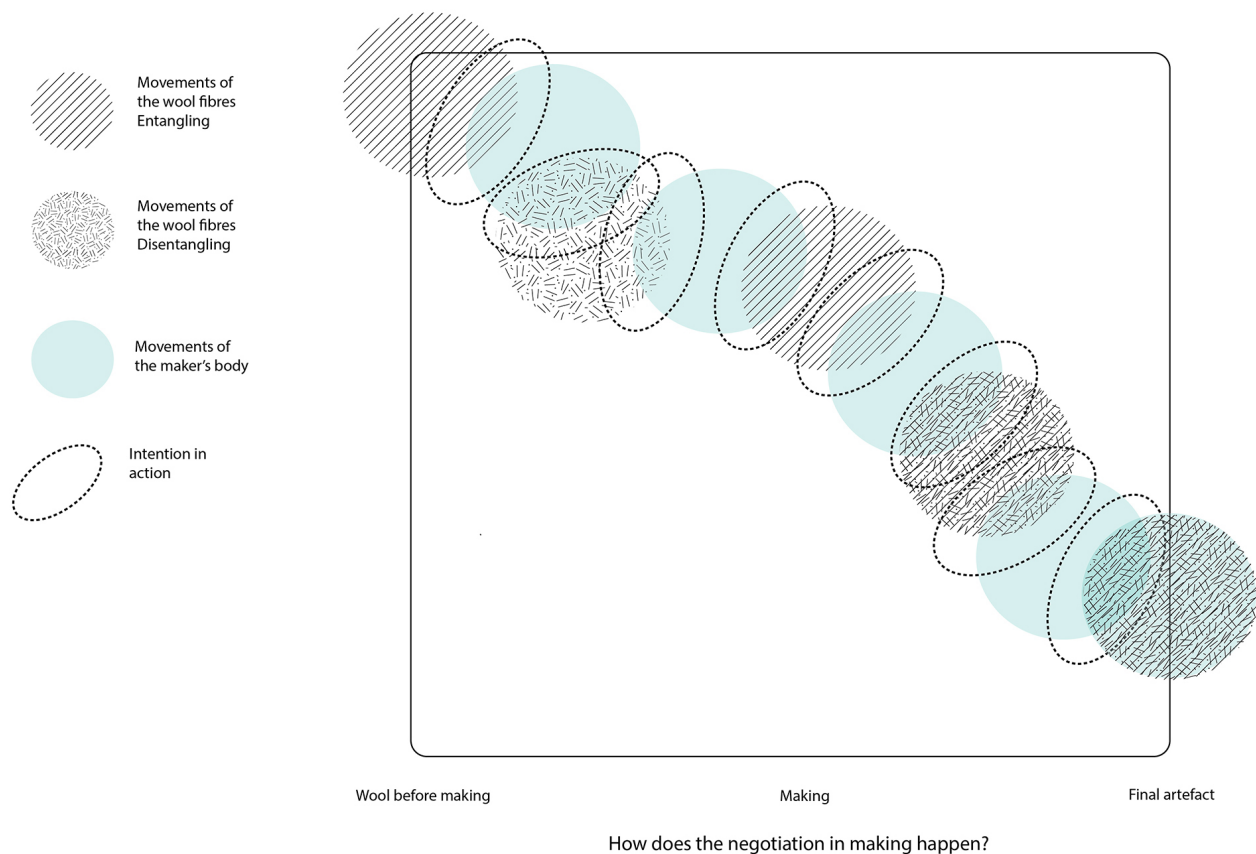


Figure 5. The essence of how making occurs and how intentions are re-evaluated in each material encounter.

practising felt from the perspective of material agency in relation to the material qualities and making space. To gain a comprehensive understanding, we studied material engagement in three skill stages and employed practice-led research and participant observation as methods of collecting data. We documented this data mainly through videos, field notes, and reflections of the first author.

Our detailed investigation on the process of making felt indicates that while making, the maker constantly examines material transformations to evaluate their bodily movements and decides on the next steps. We propose that the process of making is a form of negotiation that occurs between the maker and the material. Redefining the relationship between the maker and the material as a negotiation can generate new perspectives within which the material's role as an active participant in the making process is clarified.

Although, it is obvious that material is a significant element in making, our research contributes to understanding how exactly material gains its significance in the emergence of the artefact. The practice-led research approach provided rich empirical evidence to study the how question that tackles the process. Also, it enabled us to study the implicit relationship between the maker and the material more explicitly by employing the researcher's reflections to contextualise existing theories. As practising builds on direct contact with the research subject, practice-led research can become a significant method to understand agency of nonhumans, and how they impact human experiences.

In this article, we presented one example of unpacking the making process, that is in the case of felting. However, we believe that this approach can be applied to other studies when exploring certain material qualities and how to work with those materials to produce artefacts. Considering the increase in generating new materials as a result of the depletion in natural resources, this approach can propose ways of understanding recently invented materials while finding application areas for them.

References

1. Adamson, G. (2013). *Thinking through craft*. London, UK: Bloomsbury Academic.
2. Aktaş, B. M. (2018). Material as the co-designer: Exploring a new practice in the nature and at the studio. *SYNNYT/ORIGINS*, 2018(3), 332-348. Retrieved from https://research.aalto.fi/files/31481177/Material_as_the_Co_designer.pdf
3. Aktaş, B. M., & Mäkelä, M. (2017). Craft dynamics: Empowering felt making through design. In *Proceedings of the 7th Conference of Nordic Design Research* (pp. 15-17). Århus, Denmark: Nordic Design Research.
4. Amgoud, L., Parsons, S., & Maudet, N. (2000). Arguments, dialogue, and negotiation. In *Proceedings of the 14th European Conference on Artificial Intelligence* (pp. 338-342). New York, NY: ACM.

5. Atiş-Özhekim, D. (2009). Keçenin hikayesi ve sanatsal ürünler [Story of felt and artistic productions]. *Journal of World of Turks*, 1(1), 123-133.
6. Barrett, E. (2013). Materiality, affect, and the aesthetic image. In E. Barrett & B. Bolt (Eds.), *Carnal knowledge: Towards a 'new materialism' through the arts* (pp. 63-72). London, UK: I.B.Tauris.
7. Bennett, J. (2010). *Vibrant matter: A political ecology of things*. London, UK: Duke University.
8. Bernard, H. R. (2006). *Research methods in anthropology: Qualitative and quantitative approaches* (4th ed.). Walnut Creek, CA: Altamira.
9. Bolt, B. (2004). *Art beyond representation: The performative power of the image*. London, UK: I.B.Tauris.
10. Bolt, B. (2007). Material thinking and the agency of matter. *Studies in Material Thinking*, 1(1), 1-4.
11. Bolt, B. (2013). Introduction: Toward a new materialism through the arts. In E. Barrett & B. Bolt (Eds.) *Carnal knowledge: Towards a 'new materialism' through the arts* (pp. 1-14). London, UK: I.B.Tauris.
12. Burkett, M. E. (1979). *The art of the felt maker*. Kendal, UK: Abbot Hall Art Gallery.
13. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
14. Davis, R., & Smith, R. (1983). Negotiation as a metaphor for distributed problem solving. *Artificial Intelligence*, 20(1), 63-109.
15. Dreyfus, H., Dreyfus, S., & Athanasiou, T. (1986). *Mind over machine: The power of human intuition and expertise in the era of computer*. New York, NY: Free Press.
16. Dreyfus, S. (2004). The five-stage model of adult skill acquisition. *Bulletin of Science, Technology & Society*, 24(3), 177-181.
17. Evans, G. C., & Maloney, C. (1998). An analysis framework for reflective writing. *Australian Journal of Teacher Education*, 23(1), 29-39.
18. Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1), 80-92.
19. Flick, U. (2009). *An introduction to qualitative research*. London, UK: Sage.
20. Glăveanu, V. (2012). What can be done with an egg? Creativity, material objects, and the theory of affordances. *The Journal of Creative Behavior*, 46(3), 192-208.
21. Glăveanu, V. (2014). *Distributed creativity: Thinking outside the box of the creative individual*. New York, NY: Springer.
22. Groth, C., Mäkelä, M., & Seitamaa-Hakkarainen, P. (2013). Making sense: What can we learn from experts of tactile knowledge? *FormAkademisk*, 6(2), Art. 2. <https://doi.org/10.7577/formakademisk.656>
23. Groth, C., Mäkelä, M., & Seitamaa-Hakkarainen, P. (2015). Tactile augmentation: A multimethod for capturing experiential knowledge. *Craft Research*, 6(1), 57-81.
24. Groth, C. (2017). *Making sense through hands: Design and craft practice analysed as embodied cognition* (Doctoral Dissertation). Aalto University, Espoo, Finland.
25. Heath, C., & Hindmarsh, J. (2002). Analysing interaction: Video, ethnography and situated conduct. In M. Tim (Ed.), *Qualitative research in practice* (pp. 99-121). London, UK: Sage.
26. Ingold, T. (2010). *Bringing things to life: Creative entanglements in a world of materials* (National centre for research methods, working paper No. 15). Manchester, UK: University of Manchester. Retrieved from http://eprints.ncrm.ac.uk/1306/1/0510_creative_entanglements.pdf
27. Ingold, T. (2012). Toward an ecology of materials. *Annual Review of Anthropology*, 41, 427-442.
28. İnalçık, H. (2011). *Studies in the history of textiles in Turkey*. Istanbul, Turkey: Türkiye İş Bankası Kültür Yayınları.
29. Johnson, M. (2007). *The meaning of the body*. Chicago, IL: Chicago University.
30. Knoblauch, H., & Schnettler, B. (2012). Videography: Analysing video data as a 'focused' ethnographic and hermeneutical exercise. *Qualitative Research*, 12(3), 334-356.
31. Malafouris, L. (2008). At the potter's wheel: An argument for material agency. In C. Knappett & L. Malafouris (Eds.), *Material agency: Towards a non-anthropocentric approach*. (pp.19-36). New York, NY: Springer.
32. Malafouris, L. (2013). *How things shape the mind: A theory of material engagement*. Cambridge, MA: MIT.
33. Malafouris, L. (2014). Creative thinging: The feeling of and for clay. *Pragmatics & Cognition*, 22(1), 140-158.
34. Mäkelä, Maarit (2003). *Saveenpiirtyviä muistoja. Subjektiviisen luomisprosessin ja sukupuolen representaatioita*. [Memories on Clay: Representations of subjective creation process and gender.] Helsinki: University of Art and Design.
35. Mäkelä, M. (2016). Personal exploration: Serendipity and intentionality as altering positions in a creative practice. *FormAkademisk*, 9(1), Art. 2. <http://dx.doi.org/10.7577/formakademisk.1461>
36. Mäkelä, M., & Löytönen, T. (2017). Rethinking materialities in higher education. *Art, Design & Communication in Higher Education*, 16(2), 241-58.
37. Mäkelä, M., & Nimkulrat, N. (2018). Documentation as a practice-led research tool for reflection on experiential knowledge. *FormAkademisk*, 11(2), Art 5. <https://doi.org/10.7577/formakademisk.1818>
38. Muratovski, G. (2016). *Research for designers: A guide to methods and practice*. London, UK: Sage.
39. Nimkulrat, N. (2010). Material inspiration: From practice-led research to craft art education. *Craft Research*, 1(1), 63-84.
40. Nimkulrat, N. (2012). Hands-on intellect: Integrating craft practice into design research. *International Journal of Design*, 6(3), 1-14.
41. Nimkulrat, N., Seitamaa-Hakkarainen, P., Pantouvaki, S., & de Freitas, N. (2016). Experience, materiality and articulation in art/design and research practices. *Studies in Material Thinking*, 14, 3-9.

42. Pallasmaa, J. (2009). *The thinking hand: Existential and embodied wisdom in architecture*. Chichester, UK: John Wiley & Sons.
43. Pickering, A. (1993). The mangle of practice: Agency and emergence in the sociology of science. *American Journal of Sociology*, 99(3), 559-589.
44. Pickering, A. (2005). Practice and posthumanism: Social theory and a history of agency. In T. Schatzki, K. Knorr Cetina, & E. von Savigny (Eds.), *The practice turn in contemporary theory*. (pp. 10-23). London, UK: Routledge.
45. Pink, S. (2007). *Doing visual ethnography: Images, media and representation in research*. London, UK: Sage.
46. Risatti, H. (2007). *A theory of craft; Function aesthetic and expression*. Chapel Hill, NC: The University of North Carolina.
47. Ryan, G. W., & Bernard, A. R. (2003). Techniques to identify themes. *Field Methods*, 15(1), 85-109.
48. Schön, D. (1991). *The reflective practitioner: How professionals think in action*. New York, NY: Basic Books.
49. Sennett, R. (2013). *Zanaatkar [Craftsman]*. Istanbul, Turkey: Ayrıntı Yayınları.
50. Siukonen, J. (2010) Silence and tools: (Non)verbalizing sculptor's practice. *The Journal of Modern Craft*, 3(3), 279-292
51. Splawa-Neyman, T. (2015). Discussion with three jackets: Making a material ecology. *Nordes Design Ecologies*, 6, 1-10. Retrieved from <http://www.nordes.org/opj/index.php/n13/article/view/376>
52. Yin, R. K. (1981). The case study as a serious research strategy. *Knowledge: Creation, Diffusion, Utilization*, 3(1), 97-114.