



Hands-on Intellect: *Integrating Craft Practice into Design Research*

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Over the last two decades, craft practice has played a considerable role in practice-led design research, especially as the subject and the vehicle for theoretical inquiry. This article aims to reveal how craft as a way of thinking through material can be incorporated into practice-led design research. The author's completed dissertation exploring the expressivity of materials in textiles is used to demonstrate how craft can drive a practice-led research process and how research can enhance craft practice. The dissertation exemplifies how the author employed her own craft practice as the main method for design research. The method was utilized in relation to Merleau-Ponty's and Heidegger's phenomenology and the method of questioning viewers during two exhibitions featuring artifacts resulting from the author's craft practice. Positioning craft practice in a research context can facilitate the reflection and articulation of knowledge generated from within the researcher-practitioner's artistic experience, so that the knowledge becomes explicit as a written text or as a means of visual representation. Research can not only transform ways of designing or making artifacts, but also theoretically inform practice so that the practice can develop the practitioner's aesthetic intelligence, the results of which are craft objects that can be understood more easily by viewers.

Keywords – Material, Phenomenology, Practice-Led Design Research, Reflection, Textiles.

Relevance to Design Practice – This research demonstrates how craft as a way of thinking through material can be positioned in a design research context and facilitate the reflection and articulation of knowledge generated from within the researcher-practitioner's creative practice.

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Introduction:

Craft, Design, and Practice-led Research

Craft disciplines such as ceramics, glass, and textiles might fall into the category of applied arts, industrial arts, decorative arts, fine arts, or crafts.¹ They have been understood as “medium-designated” practices, the values of which are correlated with material objects and their production (Rowley, 1997). In Finland, due to the growth of design for industrial production in the 1950s,² the term “design” was adopted to call these craft disciplines (Nimkulrat, 2009a, p. 19). Finnish craft practitioners working with materials and hand tools may create non-functional objects and call their work “art” (e.g., ceramic art, textile art, etc.) and themselves “artists” (e.g., ceramic artists, textile artists, etc.), regardless of their positioning in the design context. In the field of textiles, in which the author is involved professionally, practitioners tend to consolidate both art and design in their occupation (Niedderer & Townsend, 2010, p. 5; Svinhufvud, 2006, p. 145). In Finland, no single form of contemporary Finnish textiles exists. The field is multifaceted and stands independently between industrial design and fine arts. A Finnish textile practitioner is usually called “textile artist”, although he or she has manifold characteristics as an artist and a designer, and creates both art and design objects (Svinhufvud, 1998, p. 202).

In textiles as well as other material-designated disciplines, craft is understood not only as a way of making things by hand, but also as a way of thinking through the hand manipulating a

material (Nimkulrat, 2010, p. 64). Craft is thus “a means for logically thinking through senses” (Nimkulrat, 2010, p. 75) This understanding follows the notion of craft as “a way of thinking through practices of all kinds” (Adamson, 2007, p. 7) and “a dynamic process of learning and understanding through material experience” (Gray & Burnett, 2009, p. 51). Hence, the process of making material objects by hand can be identified as one way of thinking intellectually (Sennett, 2008, pp. 149-153). Since the knowledge of craft, or how a material constructs an artifact, is not necessarily available in words or illustrations, practitioners are required to perform individual practices and observations while working with materials (Rowley, 1997). Similarly, design knowledge exists in designing activities, in which designers, their creation processes, and resulting artifacts are involved – it is considered a “designerly way of knowing” (Cross, 1982, 1999). Knowledge of a creative practice thus lies in and can

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be acquired from within the practice itself. In other words, thinking and knowing are inseparable from making in any craft or designerly practices.

Since the 1990s, creative disciplines including art, design, architecture, and performance have increasingly engaged with academic research. The practitioners' creative practices are employed as vehicles of theoretical inquiry and subjects for scholarly research, which has often been labeled practice-led or practice-based research³ (Nimkulrat, 2009b, p. 484; Rust, 2007; Scrivener, 2009,⁴ p. 69). This approach encourages the inclusion of the researcher's creative practice. Its main concept concerns the researcher who simultaneously takes the role of an artist or a designer and carries out the creative process and production of artifacts as the target of the reflection. According to Rust (2007, p. 75), for artists and designers to be considered researchers, they must prove the ownership of their research by: (1) indicating the research problem and its rationale; (2) demonstrating a good understanding of the research context; (3) acquiring research methods and consolidating them in an explicit way that is understandable by other researchers; and (4) verifying the results and contribution of their research. Unlike historians or philosophers, practitioners are in the position that enables the study of creative artifacts in progress. (Daichendt, 2012, p. 55). Gray and Malins (2004, p. 30) identify practice-based methodologies in art and design as involving "making art/design/creative work through specific project frameworks or as a body of work exploring the research questions". According to Gray and Malins, social science methods can be adopted and adapted to supplement creative work. The methods include case study, participant-observation, interviews, questionnaires, and surveys for seeking the opinions of others (Gray & Malins, 2004, p. 30). However, the recent focus on practice-based or practice-led methodologies has shifted from the supplementary adopted or adapted social science methods or other fields of inquiry to the intellectual development of creative practice as a basis for theoretical questions and as a place for undertaking artistic, cultural, and scholarly studies (Sullivan, 2009, p. 62). The shifted emphasis on what could be called *knowing in practice* implies: Firstly, the implementation of methodologies operating from the "unknown to the known" rather than the "known to the unknown" in more established research methodologies (Sullivan, 2009, p. 48), and secondly, research processes involving data that are "created" rather than "collected" in traditional research (p. 50). The creation of artifacts thus comes into play as the "driving force

behind the research" and also "the creator of ideas" (Mäkelä & Routarinne, 2009, p. 22). Within the practice-led methodological framework, practitioner-researchers address themselves to the challenge of theorizing their practice (Sullivan, 2009, p. 62).

The aforementioned characteristics of practice-led research accord with the British Arts & Humanities Research Council's definition of research (2012, p. 10) – research is concerned with the definition of processes rather than outcomes, and must specify the research problem, context of inquiry, and methods employed. Mapped in relation to this definition, Niedderer and Roworth-Stokes (2007) suggest the following uses of creative practice in research: (1) practice posing a *research problem*; (2) practice providing a *context of inquiry*; (3) practice serving as *method* to gain new knowledge and understanding; and (4) practice as providing evidence to support *outcomes of research*. Purposively utilizing creative practice to conduct research demonstrates its rigor and general criteria of objectivity, reliability, and validity that research entails. It also reflects Cross's (2000, p. 98, 2007, p. 126) criteria for best design research conduct that includes "purposive, inquisitive, informed, methodical, and communicable" attributes. However, it does not mean that creative practice always constitute research. Any practice can do so "only if it is 1) a systematic investigation, 2) conducted intentionally, 3) to acquire new knowledge, understanding, insights, *etc.*, that is 4) justified and 5) communicated 6) about a subject," as Scrivener (2009, p. 71) points out.

Accordingly, design research or the production of design knowledge is involved in creative practice or the production of material artifacts. Craft as a means of thinking through making things by hand (Nimkulrat, 2012) has played a considerable role for over two decades in practice-led design research, especially in Europe including Finland. Most practice-led design research projects especially in doctoral education have focuses on topics arising from within the creative production of craft practices, such as ceramics, jewelry, and textiles.⁵ Framing the research project in relation to the nature of practice and the researcher's expertise as a practitioner is one of the major strategies for developing craft-based design research methodologies (Malins & Gray, 1995, p. 9). Other important strategies includes, for example: constantly outlining and sharpening the research question to allow methodologies to emerge; maintaining openness, rigor, accessibility, transparency, transferability, all being attributes that distinguish research from routine creative practice; and observing and reflecting on practice to inform research. The emergence of craft in practice-led design research confirms that design has not taken over the making of material objects from craft. Rather, craft making has been included in design research carried out in academia that in return enables practitioners' voices to be heard and the implicit knowledge embedded in the making to be reflected.

This article aims to reveal the way in which craft thinking can be incorporated into a practice-led design research process. It addresses how the author as a design researcher carried out a research project using craft as a way of thinking

Nithikul Nimkulrat is a lecturer in textiles at the School of the Arts of Loughborough University. She earned a Doctor of Arts from Aalto University in Finland in 2009. Her research interest is rooted in her textile practice, reaching across experiential knowledge in art and design, especially the role of creative practice in research and that of materials in creative processes. Having situated her work at the intersection of art and design, and at that of the academic and art worlds, her creative artifacts have received awards and been exhibited internationally, while her research has been published in international academic journals and publications. She is co-editor of the book *Reflections and connections: On the relationship between creative production and academic research* (2009) and *Journal of Research Practice's* special issue *On Reflecting and Making in Artistic Research Practice* (2011). Nithikul is convener of DRS Special Interest Group on Experiential Knowledge (EKSIG).

through material. The author's completed doctoral research (Nimkulrat, 2009a) is used to exemplify how craft can facilitate a practice-led research process and how research can enhance craft practice. The study utilized the researcher's own textile creations within the framework of practice-led research, as a method to gain experiential knowledge about the subject of the expressivity of materials in textiles. This subject concerns the meaning of material beyond its physical, touchable qualities. The investigation of a material's expressive qualities suggests that the research ought to look at an actual textile practice employing that particular material as medium. The research project was then tailored in response to this nature of the subject and the researcher's expertise as a practitioner. Having expertise as a textile artist, the author was able to employ craft thinking and skills to work with the material in question and adopt the role of a "reflective practitioner" (Schön, 1983) to scrutinize and reflect on the making processes and resulting works. The viewpoint of the reflective practitioner informed the conduct of practice and that of research throughout. On the one hand, craft practice forms the body of practice-led research and leads the process of it. On the other hand, research informs the practitioner-researcher how to proceed with the craft practice.

Role of Craft in Practice-led Research Process

[T]ouch delivers invasive "unbounded" data, whereas the eye supplies images that are contained in a frame. ... [A] neural network of eye-brain-hand allows touching, gripping, and seeing to work in concert. (Sennett, 2008, pp. 152-153)

The above account illustrates a view similar to Dewey's (1934, pp. 89-91) insight on "Art as Experience", which addresses the mutual relationship between hands and eyes operating both the doing and the perceiving – "[a]s we manipulate, we touch and

feel; as we look we see; as we listen, we hear". This statement affirms the importance of craft practice and the actual making of work in contributing to knowing through immersive sensory experience.

The author's textile practice was purposively used to approach and to refine the research problem – *the relationship between a physical material and artistic expression in the creation of textiles*. For the knowledge about this relationship to arise, a pragmatic engagement with the material, tools, and idea of practice was performed. This way of gaining an insight into a particular practice from within the practice itself followed Heidegger's (1962) notions of "handling" and "handability". According to him, knowledge or the way of understanding "the world" comes into being from the process of "handling" things around us, not from a detached contemplation of those things. Carter's (2004) conception of "material thinking" offers a view on *active* materials in creative processes. According to him, materials are not passive nor are instruments, but interact with the maker's artistic intelligence when his or her hands, mind, and eyes are connected in a creative process. Through handling materials in practice, a form of tacit knowledge arises, providing a particular way of understanding the practice that is grounded in the hands-on practice itself.

With the aim of uncovering the "active" role of a material in a creative process, the study attempted to understand the influence of a physical material on (1) the maker's formation of thoughts during creative processes and (2) the viewers' thoughts during contemplation. Paper string was used as the material in artistic productions specially carried out for this investigation. It was formed into two series of artifacts which were then publically displayed in two exhibitions (Figure 1): *Seeing Paper* (a) and *Paper World* (b). These exhibitions together with textual analysis or explanation demonstrating critical reflection and supporting the creative practice's position constructed a complete whole of this research.

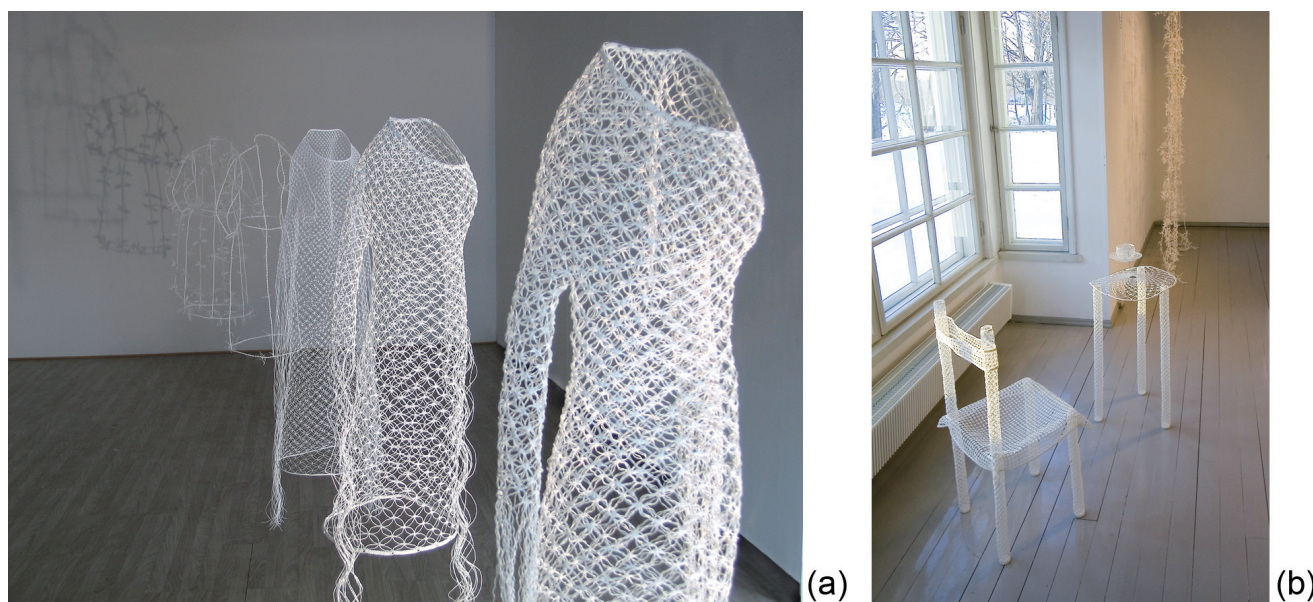


Figure 1. Two artistic productions and exhibitions: (a) *Seeing Paper* (2005) and (b) *Paper World* (2007).

The researcher’s own textile practice or *making* material artifacts played its role as the main method and “way of investigation”, to use Niedderer’s and Roworth-Stokes’s term (2007, p. 15). Intentional, methodical creative productions can test a variety of ideas in practice and openly demonstrate the researcher’s way of improving his or her professional practice, i.e., what and why an action takes place in a creative process, and the result of it (Scrivener & Chapman, 2004). In addition to *making* artifacts, other supportive methods included *reading* literature, Heidegger’s (1962) and Merleau-Ponty’s (1962) phenomenology in particular, and *questioning* the audience using questionnaires (Figure 2). Phenomenology examines the ways in which physical and social environments shape our experience, understanding, and intersubjective interactions⁶. It highlights the role of embodiment in perception and cognition, exploring emotional, aesthetic, and action-related experience as informed by environmental elements and by actual bodily movement. For this reason, phenomenology is directly relevant to the design discipline, which involves the

invention of creative outputs in various formats (e.g., products, interfaces, systems, etc.) that influence how people experience their surroundings.

In this research, *reading* and *making* mutually supported each other. While literature brought about ideas to be experimented in creative practice, creative productions suggested relevant literature to be discussed in relation to the productions. The questionnaires aimed to record the viewers’ response to the exhibitions and exhibits and to investigate the material’s influence on the viewers’ interpretations.

As can be seen in Figure 2, the three methods interacted one another, demonstrating the integration of practice in a consistent research process and the creation of data for analysis over time (Sullivan, 2009, p. 62). When implementing different methods, various means of documentation (e.g., diary writing, diagram drawing, sketching, photographing, and questionnaires) were utilized to record the data created (i.e., research activities throughout the study). Methods regarding how key forms of documentation were used can be described as follows:

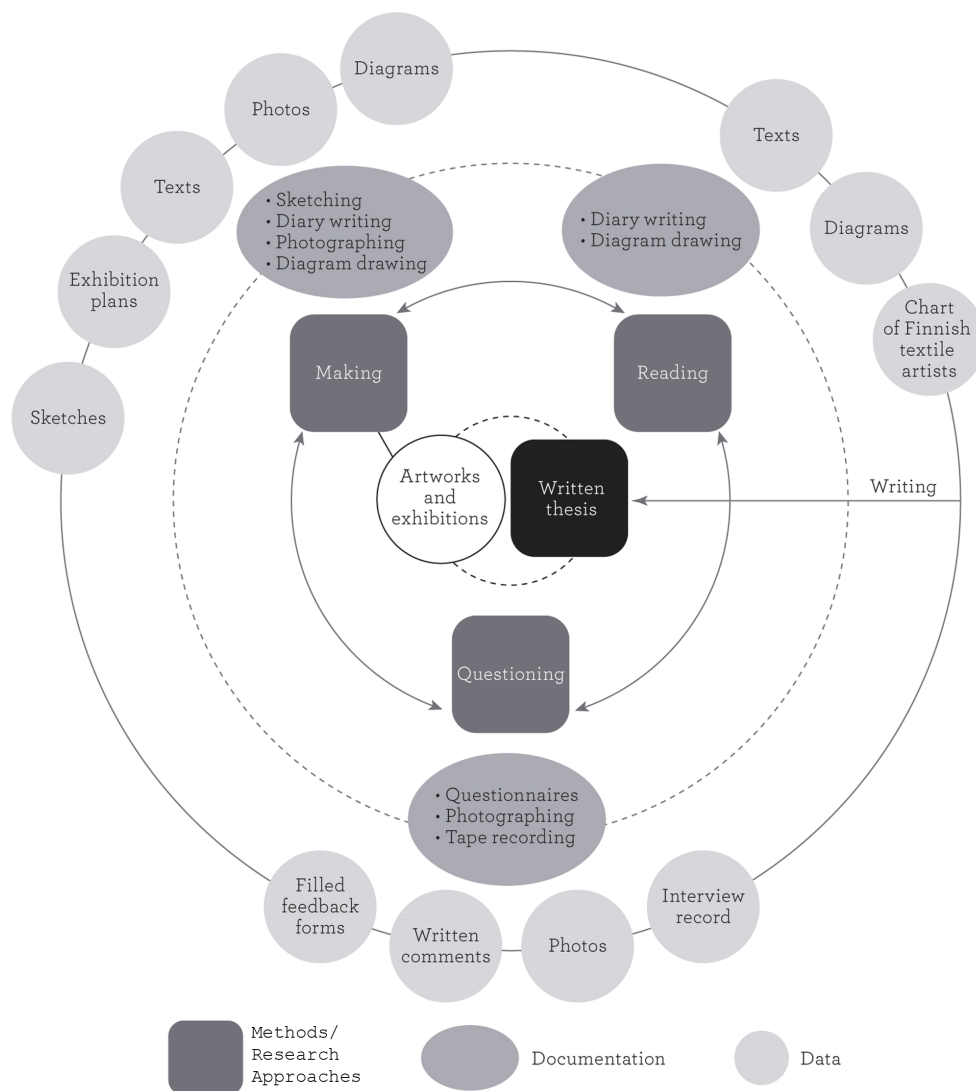


Figure 2. Interaction between methods, documentation, and data (adapted from Nimkulrat, 2009a, p. 52).

Diary writing was carried out at the end of everyday after *making* artifacts in the series *Seeing Paper* and *Paper World* and when a problem occurred in the making, as well as when *reading* literature related to the research problem. The diary entries contained chronological events which were both objective facts and subjective interpretations. A diary entry calls for reflection on experiences before or during the writing which makes the writer become more conscious of his or her experiences (Holly, 1984, pp. 5-10). In this study, diary writing enabled the consolidation of experiences through a textual interaction between *reading* and *making* artifacts within the overall research process.

Diagram drawing was employed as a visual tool to illustrate the creative process, especially when experiences were too difficult to be articulated, and also to facilitate the researcher's understanding of literature read in relation to the creation of artifacts. Diagrams clarified the sequence of thinking and later guided the written explanation of what had not earlier been put into words.

Sketching, an ordinary activity involved in design practice, was used in this research to support the conceptualization of creative productions.

Photographing captured each artifact in progress and when completed. The gradually materialized artifacts were photographed to depict the process (Figure 3). Photographs together with diaries supported the researcher's "reflection-in-action"⁷ (Schön, 1983) in evaluating and solving problems in the creative process, and facilitated written communication in the stage of writing up the thesis. Photographing was also implemented during the exhibitions to document the visitors' actions and positions in relation to the displayed artifacts (Figure 4).

*Questionnaires*⁸ were used to collect opinions from the viewers of the artifacts and exhibitions. For this study, they were designed to be small in size to give the impression to visitors that filling in their comments would not take much time. The feedback forms used in both *Seeing Paper* and *Paper World* were in "open-answer" format (Bradburn, Sudman, & Wansink, 2004, p. 153),



Figure 3. Photographs of an ongoing work later entitled *Breathe Easily* in the *Seeing Paper* series.



Figure 4. Photographs of visitors in the exhibitions: (a) (b) *Seeing Paper* and (c) *Paper World*.

smooth and gentle (Figure 8). The second type was untwined from the robust, straight, and smooth five-ply string. The visual and tactile characteristics of the untwined paper string changed due to the untwining. The material became weak, wavy, and coarse (Figure 9). The third type was a fine single paper yarn. It looked fragile but was in fact physically strong (Figure 10). The research hypothesis that the different tactile qualities of paper string express different things was tested in the production of this series. Translated from the hypothesis, the concept of *Seeing Paper* that a material metaphorically “lives” in the world was presented as dress-like objects shaped in similar forms and structures (Figures 8, 9, & 10). Each unwearable dress was made using a knotting technique and a distinct type of paper string to represent a metaphorical living individual. To represent different individuals, different kinds of paper string were expected to embody the meaning of dissimilar personalities and temperaments.

Through the act of knotting, meaning was embedded in the physical material gradually transformed into an artifact, which in turn articulated this meaning through its physicality back to the maker (Nimkulrat, 2007b, pp. 17-24; Nimkulrat, 2009a,

pp. 105-128). The maker’s experience and action to resolve creative pressures in the medium manifest the material object’s expressiveness (Dewey, 1934, pp. 60-69). The materialization of an object, i.e., craft making, can be considered the “subject-matter and sustainer of conscious activity” (Dewey, 1925, p. 393). Similarly, Merleau-Ponty (1962, pp. 365-378) points out that human perception and consciousness tends to seek association between the current tactile phenomenon and the prior one the touching person has experienced.

I am able to touch effectively only if the phenomenon finds an echo within me, if it accords with a certain nature of my consciousness, and if the organ which goes out to meet it is synchronized with it. The unity and identity of the tactile phenomenon do not come about through any synthesis of recognition in the concept, they are founded upon the unity and identity of the body as synergic totality. (Merleau-Ponty, 1962, p. 369)

According to the above statement, a tactile phenomenon concerns touching as physical contact. When one touches an object, the touch searches for a connection between the object

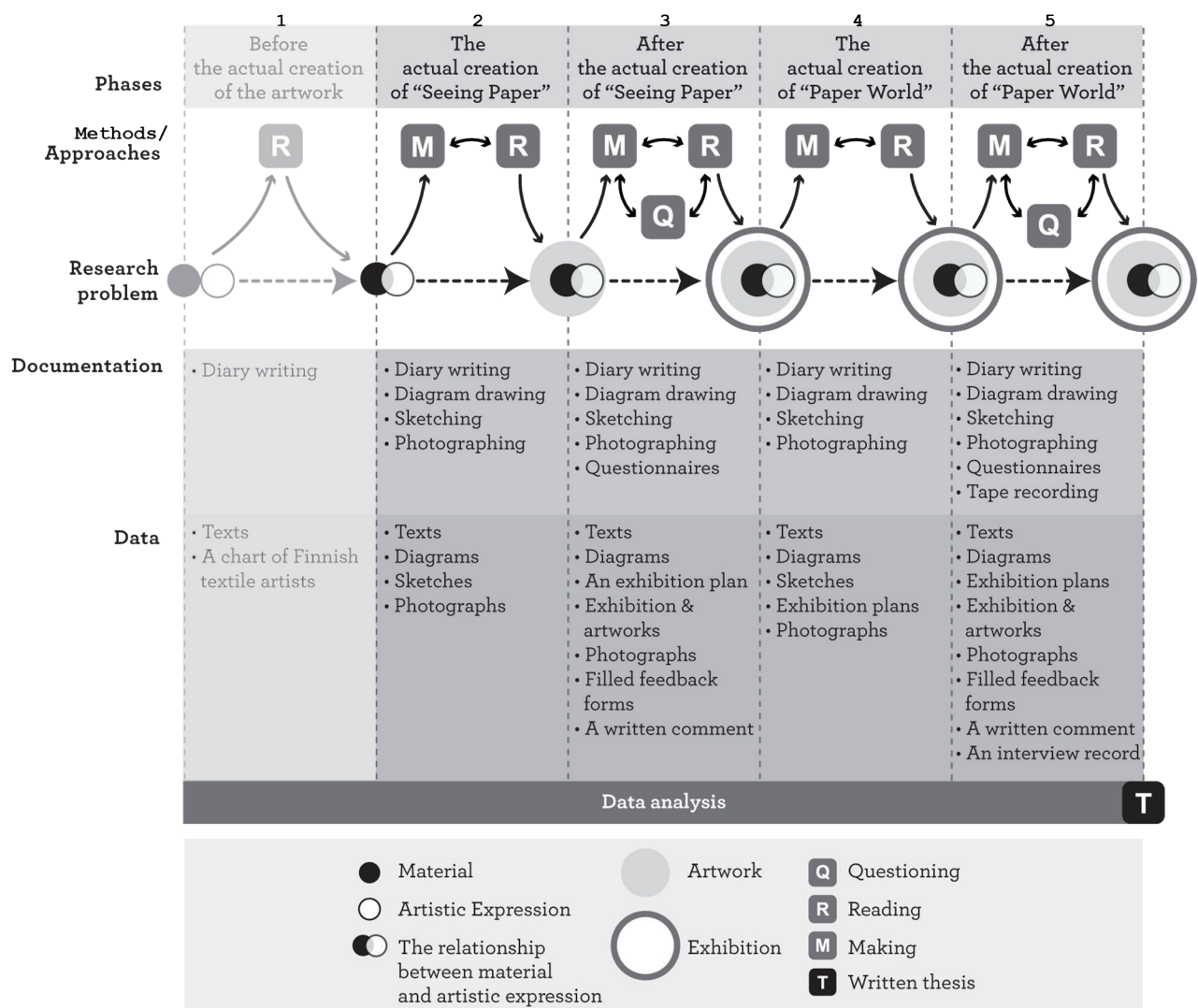


Figure 7. Five phases of research (adapted from Nimkulrat, 2009a, p. 57).



Figure 8. (From left) the first type of paper string used to make *Let Go* and *Private Garden* in the series *Seeing Paper*.

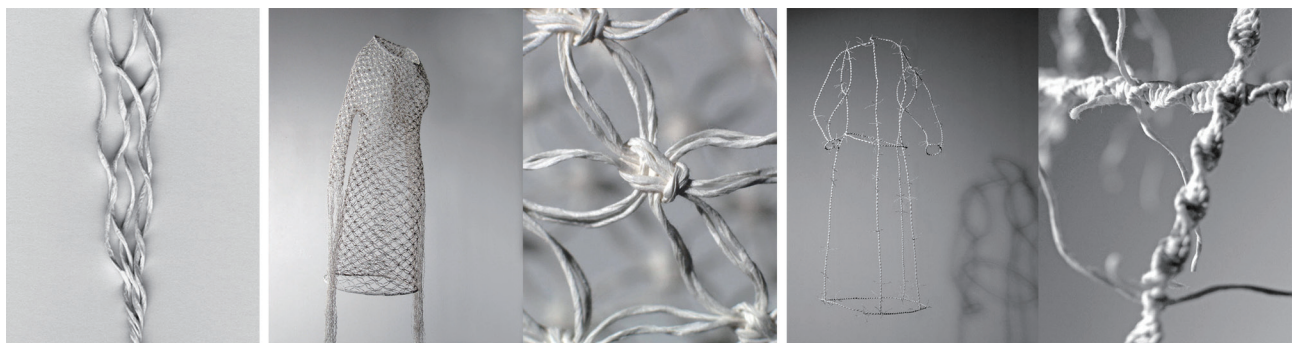


Figure 9. (From left) the second type of paper string used to make *Get Sorted* and *Private Area* in the series *Seeing Paper*.

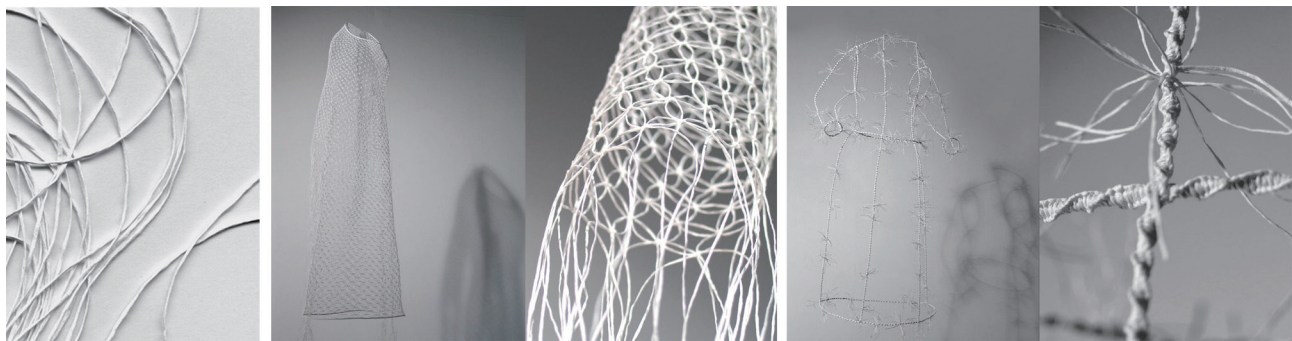


Figure 10. (From left) the third type of paper string used to make *Breathe Easily* and *Personal Joy* in the series *Seeing Paper*.

touched and the consciousness of the person who touches it. In the *Seeing Paper* case, when handling a type of paper string, the author sought a connection between the material in her hands and her consciousness. Combined with the author's prior life experience, the influence of each material's physical qualities shaped the interpretation of the work. As a result, each work was given a title that reflected the author's thought during the action-oriented experience of craft making. For example, the first type of paper string was employed to create *Let Go* and *Private Garden* (Figure 8). In the production of *Let Go*, hand knotting around the mold of the female body form was the only manipulation technique applied to the material. The strings were left unknotted on both arms of the unwearable dress. The action of letting the strings hung freely was interpreted as giving the material the freedom to *speak*. The interpretation of this action-oriented experience was reflected through the artifact's name, *Let Go*. The author learned while making this work that the material was easily open, exposing the long strip of the raw material. When

this material was used again to create *Private Garden* on a wire skeleton shaped into the form of a dress, it was untwisted to be even more open. The untwisted string appeared similar to the shape of a leaf. After manipulating the material at certain spots, the association of the open strings with leaves generated the idea of a garden. The piece was then named *Private Garden*.

The same technique and process of making *Let Go* was applied to the second type of paper string (Figure 9), which was paper string untwisted from five-ply string. The messily tangled, curly material was easily broken if the pulling force was too strong. Frequently breaking strings interrupted the repetitive action of knotting the lacy structure around the mold. The interruption caused the maker to pay more attention to the material and to seek a way to fix the broken strings in order to continue making the artifact. "Reflection-in-action" came into play when the maker tried to understand the situation and to make a decision in the creative process. The messiness and fragility of the strings was controlled in the completed artifact that was then

named *Get Sorted*. The disturbance caused by broken strings gave rise to the association between the broken strings and barbed wire the maker had experienced in life as her embodied memory. “For if a thing perceived were made up of sensations and memories, it would depend for its precise identification on the contribution of memories...”, says Merleau-Ponty (1962, p. 24). According to Heidegger (1962, pp. 406-412), when a tool or piece of equipment breaks and stops serving to support actions, its properties or characteristics become more salient than when it functions properly. Disturbance leads us to notice the aspects of the tool and turns it into an object to be thought about. In this case, the second type of paper string temporarily ceasing the knotting actions revealed its visual aspect as similar to barbed wire that was not earlier noticeable. This visual aspect illuminated an idea for the subsequent artifact that used the same material. When strings were knotted around the skeleton wire of the same shape as *Private Garden*, they were intentionally pulled so strong that they were broken. This artifact was later titled *Private Area*.

Despite the author’s distinguishable experience with each material, the viewers’ experience seemed to be the same with all materials. When *Seeing Paper* was exhibited in a modernist gallery, the majority of filled feedback forms (Figure 5a) showed the same word given for all three artifacts produced with the same technique. This implied that the different materials hardly had influence on the viewers’ interpretation of the exhibits or the differences between the materials were not as apparent to the viewers as they were to the author since touching is generally prohibited in exhibitions. The viewers’ interpretations contradicted the author’s. This was considered a weakness of the craft practice that required some actions to be made in

order to prevent it to reappear in subsequent creative productions. The author’s “reflection-on-action”⁷ was that *Seeing Paper*’s visitors experienced the exhibition as a whole rather than each individual exhibit and its details. Moreover, the modernist gallery or “the white cube” did not actually give the neutral effect to the artifacts, but instead influenced the visitors’ experience while contemplating them (O’Doherty, 1999). The reflection was confirmed by Merleau-Ponty (1962, pp. 3-9, 77-83) and Heidegger (1988, pp. 69-70) who assert that people experience a thing within a spatial ephemeral context, as “the thing in the world” in Heidegger’s term. In other words, an artifact is seen together with coexisting artifacts in the same space, all referring to one another and creating a significant whole.

The overlooked variations of the materials used in *Seeing Paper* introduced the question of the influence of an exhibition space on its exhibits. This contributed to a reformulation of the research problem for the fourth phase to include the exhibition context as part of the exploration.

Designing Experience through Craft in *Paper World*

This section presents the research process carried out to solve the reformulated research question in the fourth and fifth phases of research (Figure 7). Having received input from phenomenological thinking, the author’s craft practice was redesigned. The creative process of the second craft production, namely *Paper World*, was structured differently from that of *Seeing Paper* (Figure 11). Unlike *Seeing Paper* in which context, in particular the type of exhibition space, was barely considered, the exhibition space and

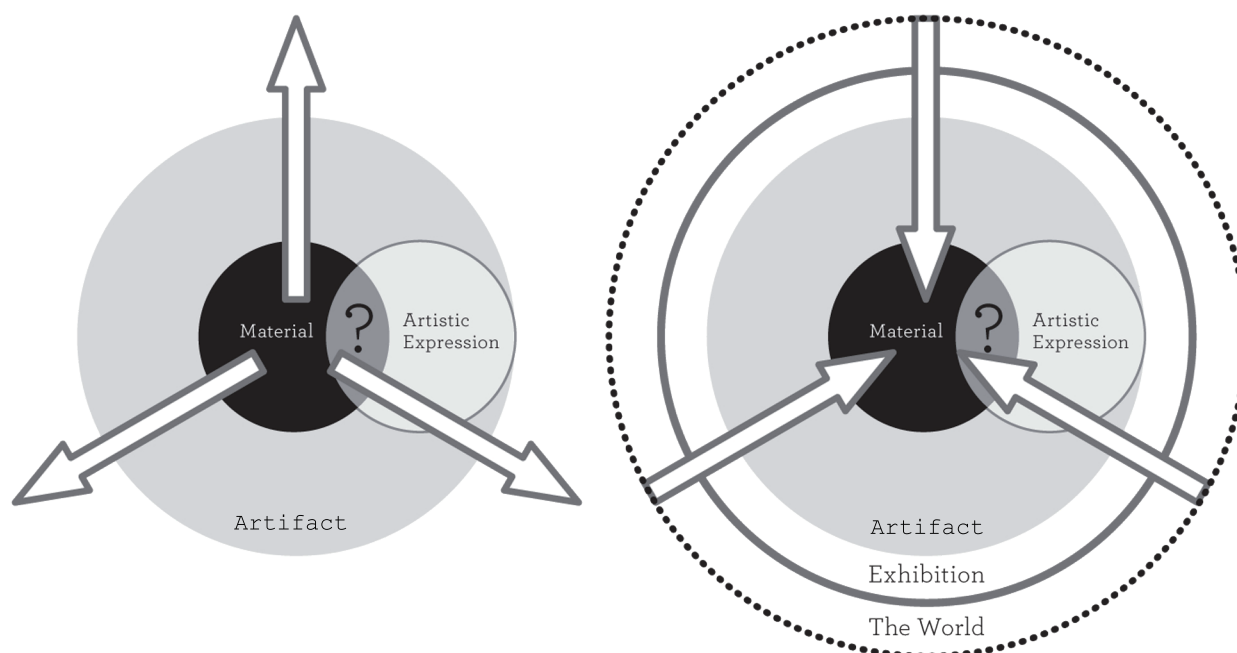


Figure 11. The creative process of *Paper World* (right) in comparison to that of *Seeing Paper* (left) (adapted from Nimkulrat, 2009a, p. 129).

elements in it became the starting point of *Paper World*. This was to emphasize a person's actual activities that take place within the world or *being-in* the world in Heidegger's sense (1962). The artistic production of *Paper World* thus broadened the research problem to encompass the topic of paper string's expressive potential in a specific exhibition context (Nimkulrat, 2009a, pp. 128-150). In other words, the material's expressivity was comprehended in a context, not as an individual entity secluded from its overall settings.

Dewey (1934, pp. 48-56) points out that the maker must embody the attitude of a viewer while making an object in order to understand the audience who in return would try to understand the maker's intended message. Adopting the role of a viewer into craft making with the aim of encouraging viewers to experience and interpret artifacts in a particular way, the author imagined herself being surrounded by the exhibits in the same space as other viewers. For the viewers and the maker to have a comparable experience with the exhibits and exhibition, the forms of artifacts and space in which the artifacts would be exhibited ought to be familiar to or have meaning for both. As Merleau-Ponty (1962, p. 292) states, perception is a bodily phenomenon which coexists with movement as an interrelated whole, both grounding the objectivity and subjectivity of experience including the inner feel and intentional grips on the world. The creation of *Paper World* thus attempted to understand the viewers' interpretation as an objective and subjective act of perceiving and bodily engaging with all artifacts as a complete unit.

Further reading the history of Finnish design (e.g., Kruskopf, 1975; Priha, 1999, p. 120-131; Wiberg, 1996) and the history of Finland during and after the Second World War (Singleton, 1986, 1998) illuminated the formation of the *Paper World's* concept and the setup of the exhibition space. Before the outbreak of the war, although Finland was the leader in manufacturing cotton and linen textiles in the Nordic countries, the production was dependent on imported raw materials and machinery (Singleton, 1986, pp. 58-59). After the war, Finland as a defeated country had to pay high reparations to the Soviet Union in the form of industrial goods and materials including wool, timber, paper, and wood pulp (Singleton, 1986, p. 66). Due to poor economics, the import of raw materials, such as cotton and linen, was stopped (Singleton, 1998, p. 147). When textile materials were scarce, paper string as a material of little value (and thus not required to supply to the Soviet Union) became one of the few materials available⁹ for Finnish designers to use between the 1940s and 1950s (Kruskopf, 1975, p. 73; Priha, 1999, p. 124). As a result, people's everyday life around this period frequently included products made of paper string, such as clothes, shoes, curtains, and upholstery. Together with Dewey's attitude of makers as viewers, paper string's everydayness in the Finnish design history led the design of *Paper World* to express the meaning of paper string through the functional objects' forms and to choose a residential home converted into a gallery as the exhibition venue (Figure 12).



Figure 12. Gallery Gjutars in Vantaa, Finland, viewed from outside during the *Paper World* exhibition.

To create a complete whole for all artifacts to be produced, based on the above Merleau-Ponty's thinking, the gallery space and its existing elements guided the creative process. They visually notified the author which useful forms paper string objects could represent. Paper string's fragility, white color, and other qualities constructed the meaning of the *Paper World* exhibition as an imaginary home. All works in this series were created in relation to one another and the exhibition context (Figures 1b & 13).



Figure 13. *The Coal Rake* made to accompany the existing fireplace in the gallery space. *The Coat Rack* and *The Hangers* placed close to the gallery entrance to resemble the way the objects for guests to hang their coats are generally found near the entrance of a house.

The manipulation of paper string became the author's visual and tactile experience. Objects found in the studio served as sources for inspiration and as molds for constructing the works into particular functional forms. During the craft production, the eye focused on the moving hand that manipulated the material according to the image of expression arising in the mind (Figure 14).

"[Thinking] is a craft, a handicraft, and therefore has a special relationship to the hand. ... Every motion of the hand in every one of its works carries itself through the element of thinking, every bearing of the hand bears itself in that element. All the work of the hand is rooted in thinking", says Heidegger (1978, pp. 356-357). The movement of the hand knotting the material into artifacts facilitated the process of thinking and embedded the maker's thought in the artifacts. Merleau-Ponty (1962, pp. 365-378) maintains that when one touches an object, the touch as physical contact searches for a relationship between the touched object and the consciousness of the person who touches it. In the author's craft making, the sense of touch sought a connection between the image in the mind and the material in hand. The connection became information about how to implement the technique in order to actualize the idea in a physical form.

During the *Paper World* exhibition, *questioning* the audience as method was utilized. Feedback forms modified from those used in the *Seeing Paper* exhibition (Figure 5b) were distributed to visitors. The open answer on the form encouraged people to give their nuanced opinions. Their comments showed that they understood the meaning of the overall exhibition and exhibits the author intended to convey. Due to the material used, the viewers experienced the non-functional craft objects in the functional forms differently from the actual useful objects. Paper string hinted that the practical functions were inapplicable to them. This incident suggested the expressive potential of a material in giving new meaning to ordinary forms. By reproducing of the objects' basic characteristics, form, and scale, *Paper World* not only represented the actual everyday objects but also highlighted the meaning of the objects represented. As Heidegger (1962, p. 191) points out, people know how they will interpret things before they actually see them, by relating what they are experiencing to the

meaning of similar things they have earlier experienced. As the visitors to the *Paper World* exhibition knew the outward looks and the materials of everyday artifacts and the fact that a gallery is not an actual home but a place for displaying creative work, they understood that those forms of household artifacts were not objects that can be used, but representational artifacts.

Conclusion: Craft Can Lead and Be Informed by Design Research

This article has demonstrated through the author's practice-led research project how craft as a way of thinking through the hand can be involved in design research as a research method. Craft practice facilitates and leads the research process into a particular direction in order to tackle the research problem. When the practitioner-researcher is able to pursue a suitable means for connecting creative practice with academic research, research can not only transform ways of designing or making artifacts, but also theoretically inform practice, so that the practice can develop the practitioner's aesthetic intelligence and the results of it (i.e., craft artifacts) can be understood more easily by the audience at large.

The practice-led methodology gives a researcher who is also a practitioner the opportunity to study his or her own work. Practice-led design research tends to center upon craft disciplines, such as ceramics, jewelry, and textiles, because knowledge in these disciplines is rarely articulated although embedded in the practice and embodied in the practitioner. With the slow pace of a craft making process, the practitioner-researcher is able to generate "reflection-in-action" (Schön, 1983) and document the process. Positioning craft practice in a research context can facilitate the reflection and articulation of knowledge generated from within the researcher-practitioner's artistic experience. The procedural and experiential knowledge thus becomes explicit as a written text and/or as visual representations.

The author's research undertook two craft productions (*Seeing Paper* and *Paper World*) to explore whether a physical material had specific expressive qualities. Through this study, the author also realized alternative approaches to craft making:

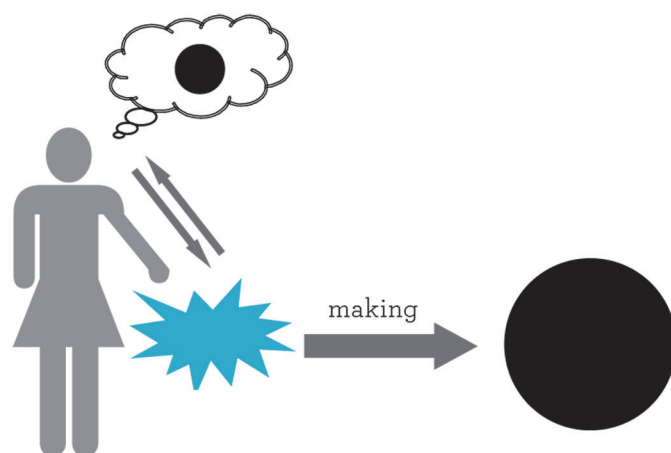


Figure 14. Physical interaction between the material and the maker that stimulates an artistic expression in the maker's mind, which then informs her hands to gradually form the material into an object.

One approach was to start the creative process with the material (e.g., *Seeing Paper*) and another with the overall exhibition (e.g., *Paper World*). The latter approach illuminates a new perspective on craft making, namely, the importance of the exhibition context. The context influences the way one experiences an exhibition, exhibits, and their material. It also affects the craftsman during his or her interaction with the expressive material.

The use of the author's own artistic work enabled her to plan the particular craft productions that focused on the research problem, suggesting a dialogue between craft practice and academic design research. The specially planned craft productions not only led the research process but also made the author's aware of her own artistic processes and temporary experiences while making. Publicly exhibiting the craft objects created in connection with research in galleries made the approach of questioning audiences using the feedback forms possible, i.e., the audiences received opportunities to interpret and comment on the exhibits and exhibitions. The audiences' comments can benefit a practice-led research project. They can function as research material and/or as basis for a subsequent craft production. The viewers' involvement in an exhibition creates a cultural activity where the maker and the viewers can meet and exchange thoughts, generating mutual understanding.

The integration of craft practice into design research presented in this article is neither a definite nor singular way for conducting design research within the practice-led methodological framework. Rather, it serves as an example for other practice-led researchers to learn from and adapt parts of it as they conduct their own research.

Endnotes

1. Craft has often been identified as a discipline in its own right, not as a sub-discipline of art or design. For discussions on this regard, see for example, Dormer, 1997; Jönsson, 2005; Risatti, 2007.
2. For an account of the development of industrial design in Finland, see Valtonen, 2007, pp. 64-74.
3. The array of terminology including practice-led, practice-based, process-led, studio-based, arts-based, practice as research, research by design and artistic research has been used to refer to this form of academic research (Biggs, 2006, p. 185). Although various terms reflect the different roles of creative practice in academic research, their meanings and usages vary among countries, institutions, subject areas, or even scholars within a higher education institution. For example, "practice-led research" is the current term used in most universities in the UK and in the design discipline, whereas "artistic research" is used more extensively in other European countries and in the field of fine arts (Nimkulrat, 2011, p. 60). For debates on the discourse of practice-led research in art and design, see for example, Rust, Mottam, and Till, 2007; Lycouris, 2011.

4. According to Scrivener (2009, pp. 69-80), the contribution of creative production to academic research can be categorized into six categories: intention, subject, method, justification, communication, and goal.
5. For completed practice-led design doctoral research, see for example, Summatavet, 2005 (jewelry); Tooming, 2007; and Nimkulrat, 2009a (textiles), etc.
6. In Heidegger's (1992, p. 188) analysis of 'being-in-the-world', intersubjectivity refers to one's practical engagement in the surrounding world that is not private, but public and communal. Entities one encounters in his or her daily life hold references to indeterminate others, because they are made by others or the work they can perform is intended for others (Heidegger, 1992, pp. 193-194).
7. According to Schön (1983, pp. 128-136), reflection is the center of an understanding of what practitioners do. "Reflection-in-action" suggests a process in which a practitioner encounters an unfamiliar situation that requires a different course of action from which he or she typically does or has initially planned. "Reflection-on-action" entails a critical process in which a practitioner reflects on his or her thinking, actions, and feelings in relation to a specific experience in professional practice (Schön, 1983, pp. 275-283).
8. Questionnaires as a social scientific method were implemented in this research in order to get additional information from people visiting the exhibitions with regard to the expressivity of paper string as a material. However, as the research is not a social science study, the questionnaires were not validated as social science data.
9. All other available materials were from forests, such as birch bark and wood.

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