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Tactile augmentation: A multimethod for capturing experiential knowledge

Keywords

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Abstract

The experiential knowledge of practice resides within the practitioner and is out of the immediate reach for other researchers. Only when practitioners have an intrinsic motivation to research and make their practice explicit can their embodied experiential knowledge reach an outside audience. The present case study is an attempt to access and understand such experiential knowledge in the act of throwing clay on a potter's wheel. To enhance her tactile sensitivity and awareness, one of the researchers has thrown porcelain clay blindfolded for five days. Her experience has been documented and reflected upon through diaries, a Contextual Activity Sampling System (CASS-Query) and videos that include thinking aloud accounts. The findings reveal that the researcher was able to articulate her tactile experiences and share her experiential knowledge to a greater degree than before. Patterns in the making, such as dividing hands into categories of active and

perceiving, and metaphorical language use were identified that may be of value in an educational setting. Feelings were acknowledged as major contributors to risk assessment and decision-making in the material problem-solving process. We propose the multimethod approach developed through this study for researcher-practitioners to capture and analyse their sensory experiences and experiential knowledge of a making situation when researching their practice.

It is in the interest of design research to gain access to the practical knowledge of skilled practitioners and to articulate this knowledge from within the field. The embodiment of skills and materials' knowledge is evident in the practice of professionals, and the theoretical and conceptual work on the issue of embodiment is sophisticated (Varela et al.1991; Merleau-Ponty [1962] 2002; Johnson 1987; Lakoff and Johnson 1999). However, there is still little empirical research applying this work to documenting design practices (Seitamaa-Hakkarainen et al. 2013). Ways of studying the making from the practitioners' point of view have been discussed in the relatively young tradition of practice-led research (Frayling 1993; Candy 2006; Niedderer 2007; Mäkelä and Routarinne 2006; Pedgley 2007; Niedderer and Reilly 2010; Nimkulrat 2012; Wood et al. 2009), and methods such as diaries and thinking aloud accounts are now supplemented by Event Sampling Methods (ESM) (Reis and Gable 2000; Seitamaa-Hakkarainen et al. 2013) such as the Contextual Activity Sampling System (CASS-Query).

The use of practice-led research methods – also referred to as research through design – has become increasingly common among practitioners in art, craft and design who wish to document, reflect on and research into their own practice (e.g., see Rust et al. 2007). The discussion on how to research in art and design is still vibrant (Mäkelä et al. 2011; Candy 2006). One major contribution in the field of experiential knowledge in practice-led research has been made by Niedderer (2009; Niedderer and Reilly 2010.) In this article, we consciously use the term practice-led research when referring to a research setting where the process of making, rather than the artefact, is in focus (Candy 2006).

Practice-led research emphasizes the reflection on experiential knowledge that the practitioner has embodied. In his book, *The Reflective Practitioner*, Schön ([1983] 1991: 76) encourages the practitioner to reflect in action in order to obtain access to this knowledge. Cross (1982: 5) supports this idea in his claim that there is a particular designerly way of knowing that is inherent in the designer, the process and the products themselves, and that access to it can be gained through reflecting on one's own activity. Pedgley (2007) admits that the multiple roles of researcher and respondent are complicated and that the results might be biased through the subjective research setting. Therefore, he argues for the importance of multiple data collection methods in order to triangulate data and results.

In our research, both qualitative and quantitative data, introspection and visual documentation, is collected and triangulated as supported by Denzin and Lincoln (2008: 5). They emphasize the use

of multimethods to secure an in-depth understanding about the phenomena. According to Pedgley (2007), a practice-led research setting provides a suitable platform for investigating areas of interest that the conventional research methods may not be able to access. As practitioners and researchers, we are able to carry out autoethnographic research about our own practice, and in this way we are able to articulate intrinsic knowledge from inside the field of design. This is also the position from which we argue throughout this article – even though from this point onwards, we will call ourselves purely ‘researchers’.

In this present case, one of the researchers challenged herself with a demanding task related to her field of expertise. She used the act of throwing clay on a wheel as a means to create a tactual interface with the material and an event where making takes place. In addition, to enhance the tactual experience, the visual modality was omitted through blindfolding. The main issue for the task was the challenge and control of the throwing process and the awareness of, or ability, to judge the shape and form of the piece solely with her hands. Through this exercise, we have sought to collect data and analyse the embodied experiences of the researcher.

This case study builds on our previous work which investigated the role of the body in knowledge-making processes (Groth et al. 2013). In the previous work, one of the researchers arranged ceramic workshops with deafblind adults and, working with them, she collected interviews and video recordings on their enhanced tactual sense-making process. The ceramic processes included a high degree of tactual experiences, in particular the throwing process that was found to be very interesting from an embodied cognition point of view (Groth et al. 2013). The same theme is also the focus of the research at hand. However, in the present research the practitioner was also the researcher. Through blindfolding, we aimed to enhance tactual awareness and make tactile sensory experiences more explicit.

The researcher documented and analysed her own activity, experiences and emotions through the combination of three methods: (1) video recordings for visual data and thinking aloud accounts (Ericsson and Simon [1984] 1993); (2) a diary method for qualitative data; and (3) a CASS-Query (Muukkonen et al. 2008) for contextual and quantitative data. In the following, we will introduce the research setting. Then, we explain the methodological framework and present the case. Finally, we discuss the analysis process.

Research in a studio setting

One of the researchers spent five days working blindfolded in her studio, recording one clay-throwing event daily. Each event consisted of throwing 12 kg, and later when confidence grew, 24 kg of porcelain clay on a potter’s wheel and lasted 1 1/2–2 hours. All the events were video recorded, which also enabled thinking aloud accounts made by the researcher while working. In addition to

video and related thinking aloud accounts, the researcher made a diary entry just before and just after each of the throwing sessions. The CASS-Query was also used in connection to the event: the query consisted of twelve questions to answer before the event and nine questions to answer after the event.

Using thinking aloud accounts, it is thought to be possible to track the cognitive processes of an individual during an activity, as the method provides content-rich information about, for example, solving a design task (Akin 1986; Goel 1995: 217; Seitamaa-Hakkarainen and Hakkarainen 2001). In our case, thinking aloud accounts were combined with video documentation as the researcher spoke to the video camera while performing her task. In this research setting, the method also enabled capturing various aspects of the tactual activity and later analytically reflecting on tactual experiences. Especially critical incidents (Flanagan 1954) were actively captured in the talking aloud accounts. To enable triangulation, the data were supplemented with the diary and the CASS-Query.

The diary method is a well-established way of collecting autoethnographical data (Bolger et al. 2003; Chang 2008). The value of the method has also been recognized in the art and design field, especially within the context of a practice-led research approach. It allows the researcher-practitioner to document features related to her creative process and, in addition, provides a medium for analytically reflecting on her process (Mäkelä and Nimkulrat 2011). The diary has been used in diverse ways (e.g., see Pedgley 2007; Mäkelä 2003; Mäkelä and Routarinne 2006; Turpeinen 2005; Nimkulrat 2009; Mäkelä and Nimkulrat 2011; Kosonen and Mäkelä 2012). Usually, the diary is updated regularly alongside the working and thinking process, documenting the entire creative process from initial thoughts to the final outcome – including drawings, images and text, test results, personal experiences and feelings. In our case, we utilize the method in a more formal way as the researcher updated the diary before and after the throwing events, answering a set of questions (Table 1). The questions before the event encouraged describing the challenges faced and the emotions related to the upcoming event. The questions after the event encouraged describing the success or failure of the event and elaborating on the critical incidents that facilitated or hindered the process and related emotions.

The CASS-Query is a research instrument under development that uses mobile phones for sampling various aspects of learning, designing or making in their actual context of occurrence. Event Sampling is a generic term and refers to the research strategy for studying ongoing daily experiences as they occur in everyday life (Reis and Gable 2000). The richness of the data collection captures occurring events, experiences, emotions or social activities at specified time intervals, depending on the focus of the study. ESM are new in the study of design practices (Seitamaa-Hakkarainen et al. 2013). For our case, we developed a specific set of questions that were answered during the actual event through responding to the CASS questionnaire that was sent twice daily to the researcher's mobile phone.

Table 1: List of diary questions.

<p>Morning diary questions:</p> <ul style="list-style-type: none">- What are you going to do and how?- What are the challenges with this work?- What are you thinking now?- How do you feel now? <p>Afternoon diary questions:</p> <ul style="list-style-type: none">- Did you manage to do what you intended?- Did your plans change? Why? How did you react?- What were the critical points?- What facilitated / hindered you in your process?- How do you feel now?

The query consisted of 21 Likert-type structured questions (Table 2) that called for ratings according to a seven-step scale, as well as open questions and instructions for taking photos (Table 1). Questions 1, 3 and 4 related to the context of physical space. The researcher was requested to respond to questions concerning the environment in which she was working, to evaluate how well it supported her work and to photograph the space. Questions 2, 5 and 6 were related to physical tools and instruments as well as the materials used. For Questions 7–14 and 20, we utilized part of Jackson and Marsh’s (1996) ‘Flow state scale’ as we were interested in the mental states that the researcher passed between during the events. Questions (15–19) were related to the particular interest of this research, i.e. embodiment and the ability to control the material and to augment the tactile ability. Questions 20 and 21 enquired about the possible collaboration the researcher had, with whom she was interacting and how or if it supported her work. Ultimately, this question was not relevant. The entire set of questions was designed to be completed in five to ten minutes. The results are sent via the mobile phone to a server collecting all the answers in a database.

The CASS-Query is generally designed to capture occurring experiences and emotions and their context – in this case, the ability to control the material and to augment the tactile ability. CASS-Query data include quantitative data and can be presented in flow charts; however, due to the small sample size we were here unable to perform any larger statistical analysis. Essentially, it allowed for more rigorous data collection, including different kinds of response formats. The context, space, materials used and images of the work made were documented in the CASS application alongside describing text and numerical values.

Table 2: List of CASS-Query questions.

CASS questions before each session:

Environment		Type of answer
1	Take a picture of the space where you are.	image
2	Take a picture of the tools/work in front of you.	image
3	What are the working conditions like?	text
4	How well does the location support your work?	1-7
Tools and materials		
5	Which tools are you using?	text
6	What material are you using?	text
Emotions		
7	How excited do you feel?	1-7
8	How challenged do you feel?	1-7
9	How worried do you feel?	1-7
10	How much mental control do you feel?	1-7
11	How concentrated are you?	1-7
12	How much do you enjoy this moment?	1-7

CASS questions after each session:

Embodiment		
13	How comfortable did you feel to work blindfolded?	1-7
14	How much physical control did you feel while working?	1-7
15	How well did you find your tools?	1-7
16	How clumsy did you feel?	1-7
17	How well did you feel the shape of the work while working?	1-7
18	How much did you enjoy your working session?	1-7
19	Take a picture of the result of your session	image
People (if external video-assistant.)		
20	Did you interact with someone? Who?	text
21	How did it affect your work?	text

Throwing clay blindfolded

Although the researcher is a proficient thrower, throwing blindfolded was a new experience for her (Figure 2). Except for the pilot study related to this case (Groth et. al 2013), the researcher had not tried to throw blindfolded, and the event was at the limits of her skills. The main challenge of throwing a large amount of porcelain on a wheel in general is the fact that porcelain is not very plastic and therefore difficult to throw. The researcher had chosen porcelain as her material for this experiment in order to further enhance the tactual experience. For judging the result of the event, the researcher aimed at throwing a straight cylinder that would meet the aesthetic and technical criteria commonly used within the community of potters (Dormer 1994: 18).

In this section, we give an account of how the chosen exercise proceeded. It is based on the data collection, as explained in the previous section. By triangulation of the collected data, we aim to reveal the embodied experiential knowledge of a craft process, in this case throwing clay. We seek to articulate some of the tacit knowledge involved in the making process, and we explore tactile augmentation and its benefits in connection to knowledge-making. We will begin with excerpts from the diary.

Insights from the diary

On the first day, before starting her first throwing task, the researcher reported her feelings in the diary before the event: 'I must admit I'm a bit nervous. I don't really want to fail in throwing a 12-kilo porcelain cylinder on my potter's wheel, which is my task today and every day of this week' (First day morning diary). Over the period of five days, the events went smoothly, with some disruptions in the process. The CASS-Query application had a few technical difficulties, but all events were successfully documented with all three data collection methods. On the first day, the requirements of the task were not met, and the result was recorded as a failure of controlling the making process as the clay collapsed during the throwing session (Figure 3).

As the researcher reflected on her activity in the diary, she was able to provide a quite exact account of what had happened with the clay, even though she had been blindfolded during the entire process. Mistakes were analysed and problem-solving occurred both in the making and in the reflection on the making. Tactual memory (see Nicholas 2010: 13) became a tool in the attempt to *see* through the hands. It was important to remember the felt sensation of the shape in order to judge how to act in the next movement. There was also a new sensation in the way that her hands conveyed a *false* size of the piece to her mind. Before starting her second day task, she notes in the diary:

I'm ready for today's challenge and am determined to concentrate better and to respect the material and the centrifugal power. I will strive to see the piece better through my hands, try to sharpen my tactile memory if possible.

(Second day morning diary)

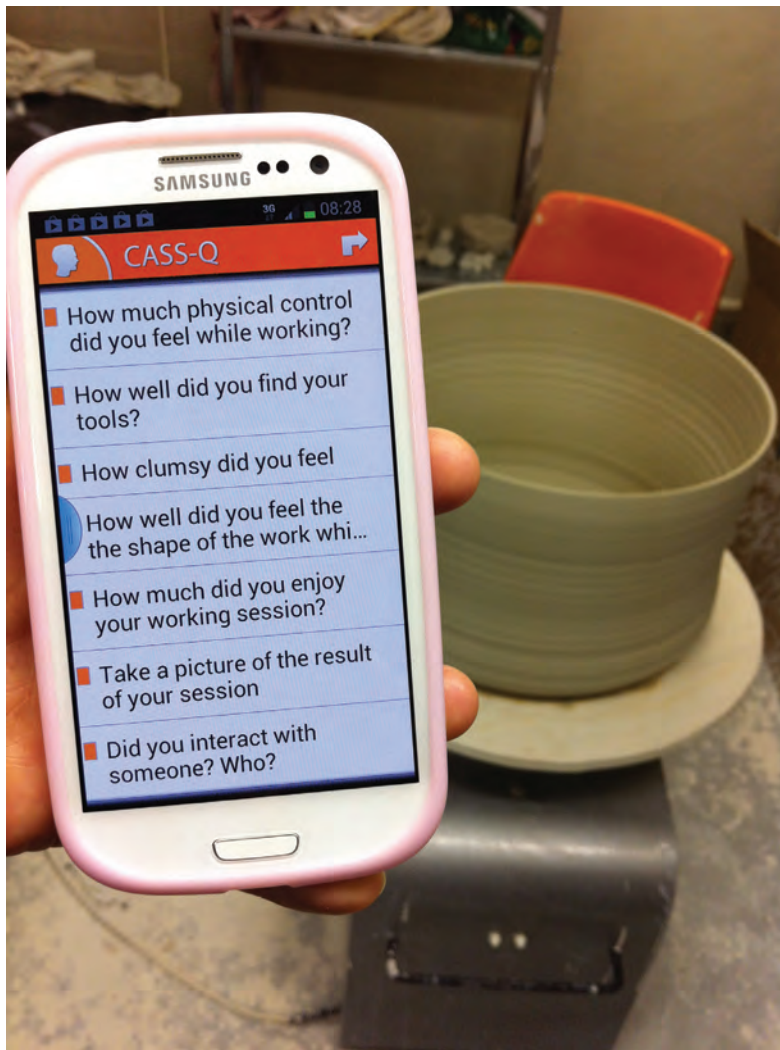


Figure 1: CASS-Query application on mobile phone, 8 April 2013. Photo by Camilla Groth.



Figure 2: The researcher throwing blindfolded. Screenshot from video.

Already on the second day, the researcher found herself to be more comfortable with the situation of not seeing what she was doing while working on the wheel. There was still a gap revealed between her tactual perception of the shape and the actual shape of the pot when taking off her blindfold. The thinking aloud accounts, taken during the video recording of the event, provided a description of what the researcher was doing and what she was thinking at the different points of making. Although at first it was a step out of the researcher's comfort zone to start talking in the empty studio:

About talking to the camera while working, it feels much more natural now than yesterday. I feel that it is useful because I would otherwise never remember exactly afterwards what I was thinking while I was working. It also keeps my mind with me as I am aware of what I am doing all the time.

(Second day afternoon diary)

After succeeding with her task on the third day, there was a clear increase in confidence and positive spirit. The researcher was redefining her goals as she felt confident that she could master an additional challenge, and decided to double the amount of clay for the next day.

On the fourth day, the added challenge affected the researcher's feelings and added an equal amount of nervousness and slight discomfort. Now that the challenge was to throw an even larger amount of clay, the additional challenge of keeping aesthetic preferences at a high level seemed overwhelming. But for motivation reasons it was still essential, as the researcher would not be content with simply meeting technical criteria. In her fourth day diary, she referred to the aesthetic criteria in the context of good craftsmanship:

I managed what I set out to do, to centre and to throw an amount of clay weighing 24kg into a shape that I felt was aesthetically pleasing and met technical requirements of skill. But the shape was not the intended cylinder.

(Fourth day afternoon diary, Figure 4)

The event was hindered by several critical incidents that followed one another, for example, the breaking of the throwing board, and these complicated the successful end to the event. But the feeling of being able to handle the material blindfolded was still reflected on in a positive manner. The challenges for the fifth and last day of the case study were laid out in the morning diary:

I'm excited but fear that I am not feeling concentrated enough at this point. But taking it bit-by-bit, concentration may build up later through the centring process. I just have to remember



Figure 3: First day, 8 April 2013. Photo by Camilla Groth.



Figure 4: Fourth day, 11 April 2013. Photo by Camilla Groth.



Figure 5: Fifth day, 13 April 2013. Photo by Camilla Groth.

to keep feeling actively with my hands and fingers and keeping the overall memory of the piece present in my tactual understanding. And enjoy.

(Fifth day morning diary)

Although the aesthetic criterion of throwing a straight cylinder was not achieved during the last day, the technical criterion was met (Figure 5), and although there were critical incidents, these did not hinder the outcome of the event. Feelings caught up with the process of making, and confidence grew during the unfolding of the event.

Reflections on the analysis process

In the analysis of the diary, *skill* emerged as the dominant theme, and second was *challenge* followed by *material* and *emotions*. Evaluation of the *process*, *critical incidents* and *problem-solving* constituted the bulk of the text, with some room for *environment* and *conditions*. The reflections in the diary revealed little detail concerning particular actions and even less about the sensory experiences as such, but highlighted the emotional aspects related to each theme. The challenges, decision-making and problem-solving were at the forefront in these reflections, indicating that the emotions were initiators for adjusting actions and behaviour in a more beneficial direction.

The CASS-Query was also a good tool for capturing feelings and moods during the events. Two CASS questionnaires, ten in total, were answered each day. Some of the results of the mental state (i.e., feelings, emotions) of the afternoon queries are displayed in Figure 6, showing, for example, positive and negative feelings, comfort in working blindfolded and feelings of clumsiness, over the five days of events.

The result of the first day's throwing session was a failure, and this was captured in the low mood of the afternoon CASS questionnaire responses. Despite this, both the orientation and the ability to find tools around the throwing wheel were experienced as surprisingly positive. On the fourth day, the added challenge of doubling the amount of clay is shown in a dip of spirits. Otherwise, there is an overall synchrony in the curves over the five days, with a tendency towards more positive experiences at the end of the time period. The feeling of clumsiness is higher as the challenge grows and demands are higher, but nonetheless the ability to feel the shape is still at a high level on the last day.

As we collected reflections in action and reflections on action – together with diary notes after the event – the analysis was partly situated within the knowledge production process. Analysis is often an evolving process, beginning in the mind of the researcher already in the midst of collecting the data, as the researcher starts to see patterns of knowledge-forming. Especially in the case where the researcher is already an expert in the practice she is researching, it is impossible to exclude the embodied knowledge of the subject of research. In this research, this is an asset as we aimed at

exposing exactly this insider's knowledge. The video recordings of the events serve as a 'living' memory from which the researcher may also reactivate sensory experiences and embodied knowing about the time of collecting the data. It may be hard to differentiate the real memory of that particular event with countless other memories from similar experiences. On the other hand, the embodiment of a skill is dependent upon this bulk of information processed through the body countless times (Sennett 2008: 38), and since a video of one event can make the researcher recall the sensory experiences she usually has in a similar situation, these reflections may also be of interest.

For the purpose of creating rigorous research also from autoethnographic and self-analytic processes, it was still important to find a suitable analytical frame that included the messiness of self-reflection, the particulars of sensory experience and at the same time facilitated a credible and systematic analysis. Therefore, in addition to the reflective analysis of the researcher's diary, part of the thinking aloud accounts are described through protocols (Ericsson and Simon [1984] 1993). We analysed the first and last video and related thinking aloud accounts by transcribing the accounts and making notes on the actions and sensory experiences connected to them.

Thinking aloud accounts have been criticized for affecting the performance of the subject and being incomplete or irrelevant (Cross et al. 1996: 2). Through this case study, we found that these verbal accounts, situated within the making process, were valuable in capturing, in particular, the emotions that were not seen in the actions of the video. The accounts gave detailed explanations on what the researcher was thinking and doing, and why it was necessary to take those actions. Together with the CASS-Query data and the diaries, our research included multiple types of data that shed light on the studied activity from many directions. The resulting artefacts are documents of the events and as such part of the research data (Figure 7).

While transcribing the thinking aloud accounts that were expected to consist mostly of references to the actions taken, text material describing sensory experiences began to accumulate. Although the verbal account had not yet even started, the reflections on actions and particularly on sensory experiences were already filling the transcript page. Since the researcher herself had been the actor in the situation, her experiential knowledge was recalled by viewing the video. When she looked at the video-recorded data, she could detect her breathing rhythm in connection with muscle straining in the actions. Where the thinking aloud accounts only states 'Mmmmmph' at the same time the following sensory experience account emerged: 'Pushing the clay hard from the sides with both hands, arms stretched unsupported in the air, straining belly and upper back. Keeping the breath until the release of the pressure' (Sensory experience account 18: 38 minutes into throwing on the fifth day).

The researcher felt that she knew more than she could say at the time of making, partly because of the physical strain she was under and partly due to her attention being fully occupied with the work. Consequently the transcription process elicited the need to add a third column that contained

CASS chart over afternoon query result emotion and embodiment

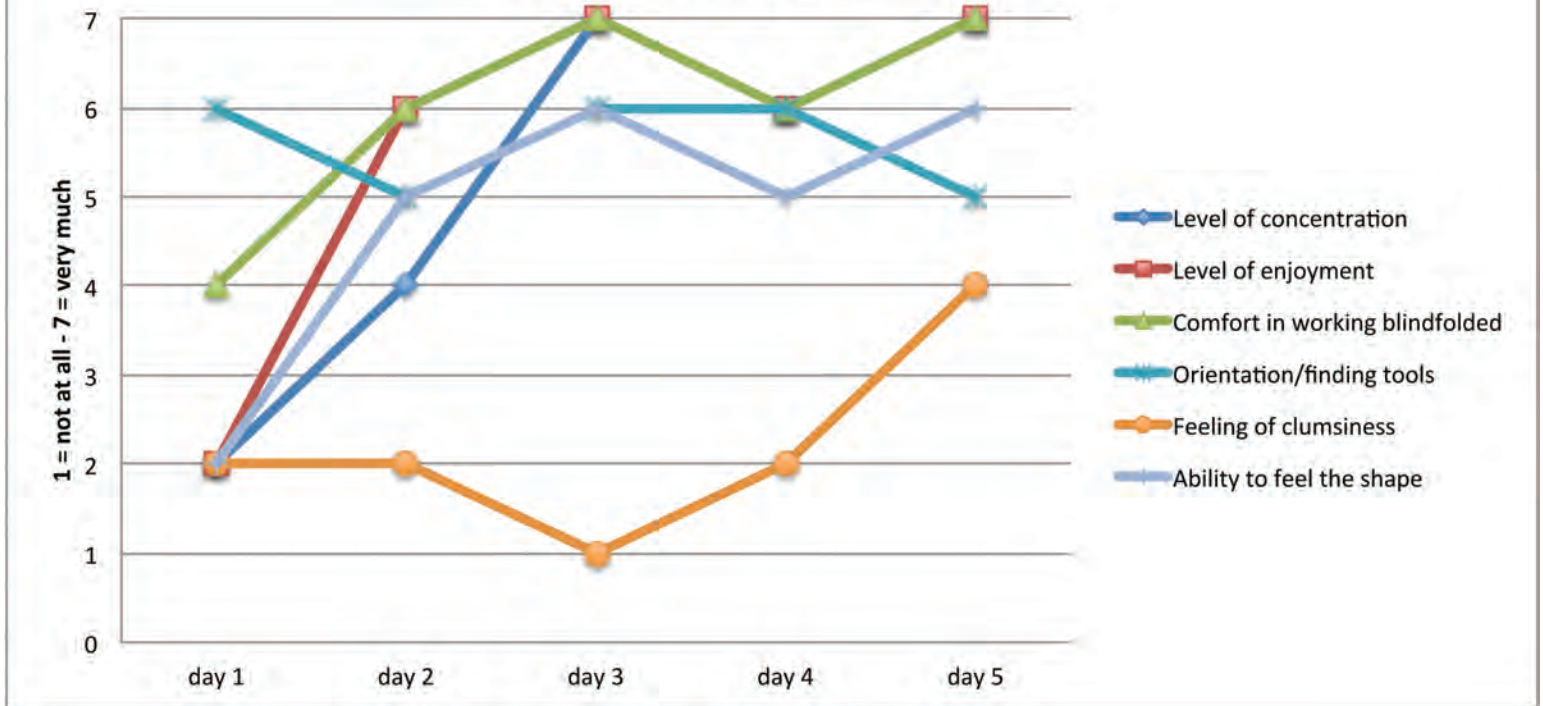


Figure 6: CASS-Query data: Result of the afternoon questionnaires.

the researcher's reflection on the actions. The third column deepened the transcript process to include more specific sensory experiences, such as orientation, temperature, sounds, wetness, stickiness of the clay surface and muscle pressure that would not be known to any other researcher than the researcher-practitioner herself (Table 3).

The protocol provided the possibility to reflect on the events in slowmotion, following each second of the video and writing out all the information the researcher felt she had about that instance, without simultaneously having to control the material in a making situation.

As the video transcript advanced, the researcher discovered a pattern in relation to her way of using her hands. She named her left hand the 'looking hand' as she used it for keeping track of where the clay was on the board and seldom let go of the clay to use it for other purposes. She named the right hand the 'acting hand', as it would be the one used for taking more water, using tools like the sponge or the needle, reaching for new clay or adjusting the speed of the throwing wheel. Other metaphors for how the clay felt and how the clay should be treated also emerged: 'It feels like a pregnant belly that should not be pressed too hard' (Transcript of thinking aloud account 06: 35 minutes into throwing on the fifth day). These insights may be developed into an account for teaching through metaphors and visual language in an educational setting.

The ability to *see* through the hands grew in only five days. A verbal account from the first day video transcript reveals some of the sensory experience of throwing clay blindfolded at the beginning of the event:

I know what the shape feels like but I have no idea what it looks like. I cannot see with my hands. It's a different world. It's a different ... I don't know ... perception. Just feeling. I guess the feeling does only exist in the feeling world, or something, and the visual world is now not here. But I know what it should feel like when it's done.

(Transcript of thinking aloud account 20: 43 minutes into throwing on the first day)

On the last day, the diary account reveals a different attitude: 'I felt almost full control of what I was doing, only sometimes I really felt like taking the scarf off my eyes to do a reality check. But then my hands convinced me I had sufficient information to continue blindfolded' (Fifth day afternoon diary).

Discussion

Blind touch has been a topic of interest in many different professions, not least in philosophy (Merleau-Ponty [1962] 2002: 267) but also in anthropology (Ingold 2004). In architecture, blind touch and awareness of the space and atmosphere may be helped by the knowledge of the blind, who take the tactile experience into consideration in a more concrete manner (Vermeersch et al. 2011;



Day 1

Day 2

Day 3

Day 4

Day 5

Figure 7: Finished pieces each day, 8–13 April 2013. Photos by Camilla Groth.

Talking aloud accounts

Actions

Sensory experiences

	00:00 Walking slowly from the camera to the throwing wheel, blindfolded feeling the way around the throwing wheel and the wooden board not to hit these with the legs.	00:00 Walking blindfolded, the air is a bit cool against the arms. Bending back forwards and down a bit and reaching for the kitchen bench to navigate around the throwing wheel. Feeling the wooden board with the edge of the clothes and slightly hitting the knee on the board when passing. Feeling the board with one hands fingers and the bench with the other, then turning and feeling the chair on the outside of the right leg.
00:19 I should probably start with changing the water.	00:19 Reaching across the chair and throwing wheel, over to lift up the full and dirty water bucket with both hands. Finding it straight away. Lifting it up and towards the body, turning towards the bench.	00:19 Reaching straight in front and finding the cold and wet water bucket. Grabbing hold of the sharp edges with the fingers on the outside and dipping the thumbs into the cold water and the soft excess clay on the inside and lifting the heavy bucket that is far from the body. Turning to the opposite direction and walk slowly passed the chair to the bench.
00:25 Because it is full of soft clay.	00:25 Pouring out the water and looking for a sponge by the bench (with difficulty) and start washing out the soft clay from the bucket.	00:25 Pouring out the water into the sink. Looking for a sponge on the bench but finding a towel, realizing that the body position is further to the right from what imagined, the water had been poured mistakenly into the bucket for recycle clay and not into the sink. Feeling of mistake. Finding a sponge and cleaning out the soft excess clay, into the bucket, that is now swimming with water.

Pallasmaa 2005: 20). We have also sought to understand that special skill of accumulated sensuous awareness, in the making process of a clay vessel thrown on a wheel. The questions this has posed is whether we are able to reach a heightened tactile awareness, what the benefit of this might be? Generally, the sensory awareness needed for one's skill is accumulated through everyday practice under normal conditions. In this experiment, we have enhanced sensory awareness of the much taken-for-granted tactile sense. In addition, the challenge of throwing an unusually large amount of clay on the wheel was used to enhance the tactile experience and to reveal more clearly the special events and critical incidents occurring.

In the process of working with the material, from centring the clay on the wheel to pulling up the sides of the cylinder, the researcher unexpectedly felt that there were not that many choices to be made. The concept of affordances, based on Gibson's (1979) ecological psychology, involves possible actions in the environment and the situation that the actor may recognize as opportunities. The affordance of the throwing situation guided the explorative progression of the events in a manner that left only a small space for other opportunities. From previous encounters, the researcher knew what was at stake in each situation, and she performed according to the best of her skills, concentrating to the fullest on the contact point of the fingertips and the soft and wet, moving and constantly changing, clay surface. Many times, there was only one action possible at that specific time, any other action would have been risking the successful continuation of the process, for example, pulling the clay wall outwards at a stage where the clay is too soft to support itself will immediately make the pot crumble. It was a game of staying on the right track to avoid mistakes in order to be able to continue.

By writing these actions out and looking at the process in detail even on the sensory experience level, and in slow motion, the protocol helped in gaining a clearer understanding about how certain choices were made and why they were inevitable. In the process of transcribing the sensory experiences of the throwing sessions, a pattern of anticipating the next stage emerged. In the end, the thinking aloud accounts were only the tip of the iceberg when it came to describing the meaning of the actions involved in the process. The sensory experience given as reflections on actions provided the real dimension of the events: 'The sponge puts something in between the skin and the clay, but as it numbs the fingers' sensitivity it also provides protection and a tool for handling the situation with a new means' (Reflection on sensory experience 09: 31 minutes into throwing on the fifth day).

A subjective standpoint has traditionally been looked down upon in the field of research, especially subjective self-analysis of one's own activities (Cross et al. 1996: 2; Pedgley 2007). In the field of practice-led research, however, it has been noted that the combined profession of the researcher and the practitioner allows access to the inside knowledge of a practice (Pedgley 2007). This intrinsic motivation to reveal the particulars of the actions and to visualize and articulate them has an

advantage over interviewing experts as an outsider of that practice. In this exploration, experiential knowledge plays a large role. The previous experiences gathered through working with clay – the tactile memory collected over time in the researcher’s body and particular muscles and sensors, situations encountering this particular material countless times, the feeling of a change in a situation before it is understood explicitly – all play a part in the decision-making process that carries the event towards its successful or unsuccessful conclusion. This is further considered in the following:

When throwing clay walls, the only part that touches the clay surface is the tip of the fingers. Through these, the practitioner receives sufficient information on the orientation of the work, the temperature, the resistance of the material and the wetness or softness. These haptic experiences directly provide a feel or a feeling of the working conditions and the possibilities available in working the material. These conditions and affordances may change within seconds, so an update of the conditions at hand is continuously made through the sensory points of the fingertips.

When conditions begin to become unfavourable, for example, when the clay is getting too wet and soft, this is experienced as a negative feeling; the practitioner knows that the available choices for action are cut down and decisions have to be made concerning whether or not to pursue certain actions or if these can be considered too risky. The feelings evoked by the sensory experiences thus instantly affect risk assessment and the decision-making for the next steps.

As a conclusion of this case study we think that making in a material can be seen as a continuous risk assessment, including constant decision-making and problem-solving and that feelings play a key role in the assessment of risk. As a result of this research, we believe that feelings need to be further investigated in connection with decision-making in material problem-solving.

Conclusion

In this case study, we experimented with methods of data collection within a practice-led research framework. We acknowledged the difficulty in researching practitioners’ activities through single data collection methods. To overcome this we explored a multimethod that included sensory experiences in the data collection, and this allowed us to investigate the experiential knowledge involved in the event researched.

Together with the diary method, we found thinking aloud accounts and video protocols very useful, especially in the study of embodied and experiential knowledge as the researchers experience was relived when revisiting the video data. The video protocol also enabled a slow motion analysis and reflection in detail that was impossible during the act of making. CASS-Query data was in this case relatively small, and therefore limited, but it was found to have good potential as a rigorous data collection tool and enabled us to collect quantitative, as well as multiple types of data. CASS may be used as such, but the tradition of CASS builds on a range of experience-capturing

data collection methods that may also be used regardless of the CASS system (see Muukkonen et al. 2008; Reis and Gable 2000).

We worked with the assumption that sensory experiences are key in the formation of knowledge in a making process. As a result we found that sensory experiences affect emotions that initiate decision-making processes. Our analysis also revealed unexpected patterns of behaviour and language used when describing sensory experiences. These may be developed to facilitate teaching through metaphors and visual language in an educational setting, as words describing tactile experiences are relatively underdeveloped and metaphorical language might be a way to describe tactile experiences better. We propose that this multimethod can be utilized in cases where researcher-practitioners are recording an event to gain detailed and articulated information of the embodied tactile knowledge they possess. Although this research was conducted within the special case of ceramic practice, we believe that the research design can be transferred to many other fields where practice-led research is taking place, due to the focus on sensory experiences.

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Clothing Cultures

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We all wear clothes. We are all therefore invested at some level in the production and consumption of clothing. This journal intends to embrace issues and themes that are both universal and personal, addressing [and dressing] us all. Following the rise of fashion theory, on an everyday level, we all understand that our clothes 'say' something about us, about our times, nation, system of values. Yet clothing is not fashion; clothing is a term derivative from 'cloth', to cover the body, whereas fashion alludes to the glamorous, the ephemeral and the avant garde. We wear clothes, but imagine fashion – an unattainable ideal.

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