MOVING IN MYSTERIOUS WAYS: USERS' RESPONSES TO AN EXPRESSIVE ARTEFACT

NINA HUIJBOOM
UNIV. OF SOUTHERN DENMARK
NIHUI13@STUDENT.SDU.DK

MICHELLE DE LOURDES CASTAÑEDA QUINTERO
UNIV. OF SOUTHERN DENMARK
MICAS13@STUDENT.SDU.DK

HELLE TAANQUIST
UNIV. OF SOUTHERN DENMARK
HETAA10@STUDENT.SDU.DK

JOHANNES WAGNER
UNIV. OF SOUTHERN DENMARK
JWA@SDU.DK

ABSTRACT

This paper describes an expressive artefact - a tablecloth that responds to sounds in its surrounds - by a complicated pattern of movements. The cloth has been exposed to users in two different settings and different types of user responses were observed. Some users were mainly interested in the technical setup. Others responded interactively to the movements of the cloth. The paper investigates whether and how users appreciated the complex behaviour of the cloth and the conditions under which expressive artefacts are responded to.

ACKNOWLEDGEMENT

WE ARE GRATEFUL TO DENNIS DAY AND MAURICE NEVILE FOR HELFUL COMMENTS TO AN EARLIER VERSION OF THIS PAPER.

INTRODUCTION

In this paper we describe how users treat a mundane, usually stationary object that has been equipped with the ability to move. The movement is triggered by incoming sound from the object's surroundings. We expect that the movement of the object will provoke the users to reflect about the conditions that make the object move.

We are not interested in just any kind of incoming noise, but focus on human interaction. Our goal is to make an object move in various ways, depending on the verbal interaction around it and hereby visualize features of the interaction. In our considerations we follow Hummels, Overbeeke and Klooster (2006) who argue that adding the ability of movement to an ordinary object will create new user experiences and provide rich data to explore and study interactions among users.

As our point of departure we needed to choose an ordinary object that by definition sits square in the middle of interactions between people, so we would be certain that movements are triggered by voices and not by ambient noises in the surrounds. Conversations often happen around a table, and dinner table conversations have been a field of study in interaction research (c.f. Blum-Kulka 1997). Dinner conversations come in different forms: they might happen as part of a formal or informal dinner, a get-together or a casual talk. A part of the material environment for dinners - that is for the rich variety of social activities happening throughout dinners - are plates, cutlery and tablecloths. This makes them suitable objects for our purpose

We decided to create an expressive tablecloth that in its movement responds to and represents features of a conversation around the table. Our aim was to provoke the participants to reflect on their behaviour and on the dynamics of the conversation. We did only modify the inner part of the table since we had to avoid that participants would put heavy objects in the middle of the table which would have jeopardized our setup.

By adding movement as a layer of expression to a tablecloth, we expect to change the users' experience of what a tablecloth is and does. Gaver et.al. refer to ambiguity, understood as something that "can be frustrating, but it can also be intriguing, mysterious, and delightful" (Gaver, Beaver and Benford, 2003).

For this paper we have analysed how people respond to the modified tablecloth and the meanings they might ascribe to its movements. We explore how users experience, interact with and accept the tablecloth in different settings. (McCathy and Wright 2004).

This paper will start by explaining the design process and the set-up of the expressive tablecloth. In the analysis of user responses we will discuss five transcribed extracts from the interactions. The analysis of the data led to the conclusion that participants treated the expressive tablecloth in two different ways. In the first approach they aimed at understanding the technical aspects of the artefact by creating hypotheses and testing them out. In the other approach, participants gave the artefact a personality, when trying to understand what was going on.

THE SETUP

The Expressive Tablecloth is an interactive cloth that responds to audio frequencies from two sides of the table. The input from the audio sensors triggers four servomotors that translate the input into movement patterns. The movement patterns depend on the strength of the sound signal that the sensors pick up.

RELATED TABLECLOTHS

Some earlier studies of experience designers have modified tablecloths and reported their findings. This work adds technological features to a tablecloth as a mean to change everyday life experiences with it. *The History Tablecloth*, for instance, creates light traces of objects that had been placed on the table over some time. It is a provocation for interpretative reflection about technology and serves according to Gaver et al., (2006) as an "asset for social interaction." The same goal has *The Ambient Tablecloth*. It uses non-emissive display technology to "display different patterns triggered by the messages from the interaction process" (Wei J. et al., 2011). The technology produces visual feedback to shape new experiences in a dinner environment. In our project the tablecloth represents the loudness in the social interaction through movement. Giving the tablecloth the ability to move gave us the possibility to play with a broad range of variables, such as speed, direction, delays, and composition.

FORM EXPLORATION AND PROTOTYPE

We investigated a wide range of textiles and technical solutions in order to determine which one would provide us with the most feasible implementation. We were looking for a solution that would allow us to manipulate movements in quite diverse forms. We tried to keep the appearance of the tablecloth as close to ordinary tablecloths as possible to draw attention only to the expressive movements of the cloth. For this reason, we did experiments with flexible textiles that would provide us with opportunities to generate a rich array of movements. After an evaluation of several mock-ups, we decided to use a nylon thread and soft white fabric attached to a piece of aluminium foil. The foil helped to reinforce the strength of movements and guaranteed a quality that was needed to create clear distinctions between different movements.

To create the functionality of the tablecloth, we built the contractible part of the tablecloth in the centre of the table and independently from its outer part. In the centre of the tablecloth, a 25 by 25 cm piece of fabric and aluminium foil contracts and expands. We used four servomotors to pull and push four pieces of transparent nylon thread. The four pieces of thread were connected to each extreme of the square, having as a result 8 points to manipulate in order to create the different movements (c.f. Figure 1).

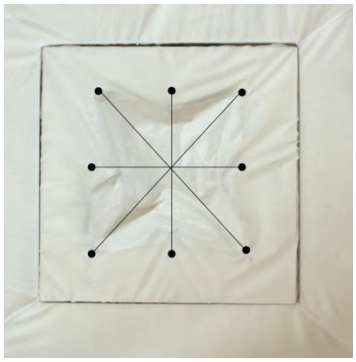

Figure 1. The tablecloth's system

By connecting four points in the central piece, we were able to contract and expand the aluminium foil into 15 different expressions based on the audio input from the sensors. We decided to focus on the interaction between two people. For that reason we placed two audio sensors at each end of the table to capture the audio signal from each participant. After studying the average sound levels of a prototypical environment, we defined 6 levels of loudness. The tablecloth's system takes the input from the two audio sensors and translates the differences of loudness into movement. A new movement is generated every 3 seconds, since the sensors capture the audio input in a time lapse of 3 seconds and then, the servo-motors generate the corresponding movement. A shorter timespan would not be sufficient for the servomotors in order to create the full contracting and expanding movement.

DYNAMICS OF CONVERSATION

Our original intention with the modification of the tablecloth was to give feedback to the participant about their interaction and to provoke them to reflect about their own interactional behaviour and about the conversation they are part of. The engagement of participants will often vary during the course of the interaction and for example, people may speak more loudly or more softly. Our expressive artefact should give visual feedback to the participants about their way of talking with respect to the loudness of their talk.

We assume that speakers align to each other in the increase or decrease of loudness, for example when laughing together (loud) or exchanging sensitive and delicate issues (soft). In other situations speakers may align to each other in inverse proportion such that one speaker speaks loudly while the other speaker is rather quiet. This happens for example in situations where one speaker engages in story telling interspersed with laughter while the other speaker in recipient position

provides minimal responses to keep the story going. Or it could be one speaker shouting at the other and the other getting more and more silent.

With this in mind, we developed a pattern of expressive movements assigned to different sound levels in a conversation. We intended to let the cloth respond in a complex, non-obvious pattern that would not be easy to decode hoping that this would make the response interesting for the participants. To create the pattern, three situations were thought through:

- When one participant speaks very loudly and the other one is quiet, the tablecloth crumbles to the centre as a suggestion that something might not be in balance.

- When participants use the same level of loudness or quietness, the tablecloth creates a "star", a visually appealing shape. As both participants get louder and louder, the "star" shapes becomes more evident.

- When both participants are very quiet, the tablecloth makes small contractions in a steady pace, resembling a soft and calm breathing.

Based on this, we mapped alternatives to other possible situations depending on the level of loudness of each participant. (Figure 2).

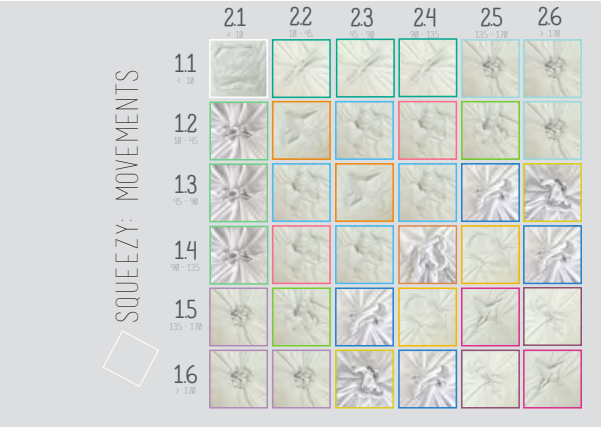

Figure 2. Pattern of movements

TWO TYPES OF USER TESTS

As part of the development process we facilitated user tests in two different settings with different user profiles: dinner table conversations and the exhibition of the table at two conferences.

In the conversational settings we created scenarios in which we invited people with different relationships to participate: colleagues, friends, strangers and family members. We did not tell the participants about the functioning of the tablecloth to encourage them to have a regular conversation around the table. In total, we conducted four user tests where two people in each scenario were sitting around the table drinking coffee and eating cake. The table was placed in the coffee room of the department. After each test the participants recorded a two minutes video clip in which they told us about their experiences with the tablecloth, a so-called experience clip (Isomursu, Kuutti and Väinämö, 2004).

In one of the conference situations we placed the table with the expressive tablecloth as part of an exhibition where we, as the designers, explained how the object worked and invited people to explore its use. In the second case we placed the table outside of a conference room. In the breaks, conference participants were invited to approach the table and explore how it worked.

All tests were videorecorded which allowed us to analyse in detail people's responses to the expressive object. Both, the experience clips and semi-structured interview afterwards, gave input to the analysis.

RESPONSES TO THE EXPRESSIVE TABLECLOTH

The user tests gave us an interesting variety of responses. In one rather extreme case in the conversational setting, the users only responded minimally to the movements of the cloth. At the first instance where the cloth moved, both users started to laugh and one of them pointed with a finger towards the cloth.

Figure 3. Participants pointing at the moving tablecloth

In the subsequent conversation, however, both participants occasionally glanced towards the moving cloth, but neither referred to the cloth in any way verbally nor talked about its movement or the principles behind it.

Two other ways of responding will be described in more detail below. The first one could be characterized as the *investigative* approach (*How does it work?*). We found this approach in the conference and in the conversational setting, but the participants behaved differently in each setting. The conference participants were mainly interested in understanding how the movements of the cloth were triggered and achieved. When they thought that they had understood the technical principle they were often quite content. In the conversational setting, the participants sometimes engaged in *investigative* talk about the workings of the cloth. However, the participants in the dinner conversation setting responded sometimes, but not

always, to the cloth as if it were a participating entity. We refer to this as the *interactive* approach.

THE INVESTIGATIVE APPROACH: TESTING HYPOTHESES

In the conference situation, users followed a simple principle to test the cloth, but used various stimuli to make the tablecloth move. They created a stimulus and observed whether the cloth responded. If it did, the users were content. If it didn't, they used a different stimulus. They touched the cloth, knocked on the table and used loud and soft voice. When the cloth eventually moved, the participants went on to the technical details and tried to get a closer look at the technical setup.

Figure 4. Participants exploring the tablecloth during an exhibition

We noted that in their investigationns, conference participants were content when they thought they had understood the technical setup. But they did not discover at all that the cloth created different shapes depending on different sound input levels. In this way, they missed the very point of expressive tablecloth. We will not discuss any further how conference participants investigated the tablecloth since it rarely lead to longer interactions. The conference setting was not a good environment for users interacting with the installation.

In the conversational setting, however, things run off differently, partly because the participants did spend more time with the artefact sitting at the table and having their coffee and cake. In the course of this enjoyable activity, the cloth started moving and the participants responded in various ways. A number of participants engaged in very systematic procedures to understand how it worked, however without sticking their head under the table to understand the mechanics. In all cases they were not in doubt that their conversational activities triggered the movements of the cloth but none of them fully appreciated the complex movement pattern of the cloth.

We will discuss in some detail how two participants, Kristine and Cho, proceeded. They went systematically through several possibilities to explain the movements of the cloth. At the beginning of the recording, Kristine wondered how the cloth 'is working' since she had noticed that it showed different patterns. Cho, who had been sitting with her hands in her lap, now leaned with both hands on the table. Immediately after her touching the table, the cloth moved strongly and Cho retracted her hands as if she had touched something hot or dangerous. Her response indicated that she took the movement of the cloth as occasioned by her own touching of the table and responded by removing her hands - and therefore the reason to further movements of the cloth. Cho hereafter touches the table carefully while visually scrutinizing it for response. At this point Kristine formulates her understanding of Cho's activities as the first part of a hypothesis *Every time we touch it* (c.f. Extract 1, line 1), while she herself and Cho are touching the table.

```
1  KRI: a:h↘ every time when we +touch ↑it↗
        CH0 touches table sides          +KRI touches table
2       (.)
3  CHO: u:hhu
        CH0 removes hands
4  KRI: a:+::::+h↘
        CH0 touches table very shortly +puts palms on table
5  KRI: maybe evry +                              no:↘
                   + CHE touches table for 1 sek
6  CHO: n+o::↗
7         + CHO touches and retracts hands
```

Extract 1. Participants test touch

In line 1, Kristine projects a second part of her hypothesis as for example *then the cloth moves*, but this second part is never delivered, possibly because the cloth is not showing another response to the touch. Cho indicates in line 3 that she agrees with the hypothesis and keeps touching the cloth carefully. However, the cloth does not respond to her touch.

In line 4, Kristine starts on another parallel formulation of a possible hypothesis, this time more hedged than in line 1 (*maybe*). But she abandons her turn at talk and observes Cho doing more testing. Cho places very controlled and deliberately both her palms on the table. This is done differently from her touching the table in line 1. Now she is not only touching the table, indicated by her controlled movements she is displaying to her participant that she is testing. However, the cloth does not move and Kristine marks her unsaid hypothesis – and Cho's activities - as not appropriate at the end of line 5 (*no*) to which Cho agrees (line 6). We see both participants very deliberately testing hypotheses about the working of the cloth. Compared to the conference setting, they do this not only manually but share the labour of testing. They cooperate in the talk and the activity, they formulate joint hypotheses, and they do in their talk joint evaluations of what they find.

When the first hypothesis - according to which the cloth would respond to touch - is not confirmed, they venture to another one and start testing sounds. This is shown in Extract 2.

1 CHO: I think it have a sensor of some som-
2 some sensor or what ⌜xx
3 KRI: ⌊yeah
CHO holds and moves hands above the table
4 KRI: A:h you think its so- its not about
5 +touching but a:bou:t
+KRI touches table before her

6 (0.3)
7 CHO: sound about the sound↘
KRI touches carefully middle of table
8 (1.9)
CHO claps 5 times
9 (0.4)
CHO claps 5 times
10 (1.2)
11 KRI: you have really good ide:as↘ ⌜actually
12 CHO: ⌊hhe hhe hhe
13 (0.4)
CHO claps 1 time
14 (1.7)
15 CHO: ¯oy don't ⌜mo⌋ve¯
16 TBL: ⌊ZZ⌋

Extract 2. Participants test sound

Again, the participants cooperate closely in their procedure: Even the formulation of the hypothesis is shared by both speakers as Kristine says *Ah you think it's not about touching it's about* and stops before finishing the construction which is finished by Cho with the word *sound* (lines 4-6). Lerner (1993) has described the high degree of cooperation necessary to produce one turn by two speakers as it happens in this case. The second speaker, Cho, starts with little delay, that means she must have projected the form of Kristine's incoming turn, and she times her own talk in such a way that she herself can produce the final word at the right time and in the right pace. This collaborative completion illustrates beautifully for the close cooperation of Kristine and Cho in solving the puzzle before them.

In Extract 2, Cho is moving towards a different explanation (*sound*) while Kristine still tests the cloth's response to *touch*. Kristine touches the cloth (line 7) and waits (line 8). Cho is clapping her hands five times, waits, claps five times again and waits again. In none of these cases is the cloth moving - but it does a little later when Cho in a high-pitched voice directly addresses the cloth in line 15 *oy don't move*. Both participants now respond with laughter (not shown in the transcript). Have they been tricked by the cloth that did not respond when they tested it, but mocked them by moving when they asked it not to move?

The relation between the testing activity and the response is sequential. Sequential means more than that one activity just follows another activity. It is the quality of the relation between both activities that is crucial. The motion of the cloth is understood as being occasioned by an earlier action of one of the participants (poking, clapping, touching). Kristine and Cho try to specify this relation, to understand if and why the cloth moves. Building this qualified chain of action and response is the base for forming and testing hypotheses. But Kristine and Cho do not succeed in understanding the mechanism of the cloth fully which has to do with the time delay, as we will argue later. In the next paragraphs we will illustrate the work participants do when they take an interactional approach to the artefact.

THE INTERACTIVE APPROACH: TREATING THE CLOTH AS A PARTICIPANT

In the introduction to Extract 1 we reported that Cho reacts frightened when the cloth moves shortly after she had placed both hands on the table. In her action, Cho demonstrates for us that she has understood the movement of the cloth as a response to her own action of leaning on the table. Withdrawing her hands is a reflex to avoid further unexpected activities of the cloth.

In Extract 3, Suz talks about a summer party. The cloth moves during her talk and immediately after she has finished her turn. In line 4 she takes the cloth movement as a comment to the topic of her turn, as if the cloth would be excited about an upcoming party.

1 SUZ: den de:⌜:r uh⌋ sommerfest↘
this one summer party
about this summer party
2 TBL: ⌊zzzzzz⌋
3 TBL: zzzzzz
4 SUZ: uh ja +sommerfest
oh yes summer party
+SUZ points at cloth


Extract 3. Participants ascribe sense to the movement of the cloth

Suz' contribution in line 4 is again a notable sequential achievement. It illustrates nicely one of the key findings of Conversation Analysis: human actions are sequentially organized in the way that a specific action is followed by a specific next (or second) action: questions are followed by answers, displays of understanding follow explanations, and a second story follows a preceding story (Levinson 2013, Stivers 2013). Cho had taken the movement of the tablecloth as a response to her leaning down on the table; Suz takes the activity of the cloth in line 2 and 3 as a comment to her previous turn.

However, actions cannot follow a previous action at any point in time. Timing is a central issue here as CA has demonstrated with respect to turn taking. Sacks, Schegloff & Jefferson (1974) argue that any turn will reach a point where the unit is finished. This is called the transition relevance place. Turn-units – roughly equivalent to sentences in written language - are created according to the grammar of the language. Sentences and turn units have a beginning and an end and both are conventionally regulated by syntax. Due to their knowledge of syntax, participants in a conversation are able to monitor an ongoing turn and are able to project when the turn will reach its end. The further a turn unit has progressed, the better can be projected what kind of element would create its end.

If no other rules for turn-taking are in place, for example if the conversation is not regulated by a moderator, any other speakers may start to talk at a transition relevant place and routinely, the next speaker's talk will be understood in relation to the

preceding turn unit. These transitions are usually fluent and follow what Schegloff (1987:75) has called the principle of 'no-gap no-overlap.' Levinson (2013: 103) sums up the research when he writes "on average the gaps between turns are around 200 ms, depending a bit on the language." The standard delay of 0.2 seconds becomes a resource for the participants to deviate from by starting their turn onset earlier or later. Variation in time becomes hereby a resource that the other participants can use as a meaning making device.

The basic rules of turn taking affords Suz to treat the motion of the cloth as a relevant response to her own turn. In her response in line 5 she gives it meaning. She actually treats the cloth as a social agent –one who is incompetent in terms of language, but less so in terms of sequential action.

Another way how Suz and Bettina give the movements of the cloth meaning is illustrated in Extract 4.

1 TBL: zzz
2 (0.5)
3 SUZ: ja:
yes
4 (.)
5 TBL: zz
6 (1.1)
7 TBL: zzzzzzz
8 (0.7)
9 TBL: z⌈ zzzzz
10 SUZ: ⌊vil den ha vores (.) mad simpelthen
will it have our food simply
does it plainly want our food
12 SUZ: ⌈det ⌉vil den jo nok
that will it well PARTICLE
I guess it will
13 BET: ⌊mmh⌋

Extract 4. Participants ascribe sense to the movement of the cloth

The cloth may move erratically and accidentally at a transition relevant position in the talk. This creates a potential for ascribing meaning. Suz and Bettina use the movement to ascribe sense to the cloth' behaviour. They both are eating while the cloth is becoming very active. In combining the two activities, their own eating and the cloth' high activity, they treat the cloth as something with an intention, in this case the intention to eat cake.

Especially Suz' ways of ascribing sense to the cloth's activity reminds of the ways in which parents respond to very small children by normalizing and making interactional sense of what could be erratic behaviour of the infant. Activities of children are sequentially normalized. Extract 3 could happen between two mothers and a baby. In our final extract we show a similar piece. Suz and Bettina have been talking about their work as secretaries when the tablecloth becomes quite active at the end of Suz' turn in line 2. Although it turns out that Suz has more to say (line 3), she could have ended her turn after saying *who use Mac* in line 1, so the cloth moves actually when her turn reaches a transition relevant place. As we mentioned above, starting the next turn precisely at or even before the previous turn end is a resource which human participants may use to secure their speaking right or to show eagerness. When Suz has finished for good, the cloth moves again and Suz treats this (line 7) in a jokingly way as if the cloth wanted to participate in the talk without making clear what it wants to contribute with. We note that she is actually addressing the cloth directly which is more than what she did in extracts 3 and 4.

1 SUZ: og der efterhånden er der nu rimelig mange der ⌈bruger Mac⌉≈
and there gradually are there now quite many who use Mac
and there are nowadays quite many who use Mac
2 TBL: ⌊ ZZZZ ⌋
3 SUZ: ≈oss på universitetet
also at university-the
also at the university
4 BET: ja⌈:↗
yes
5 TBL: ⌊ZZZZZ
6 (.)
7 SUZ: hvad er det du vil, hn↗
what is it you will eh
what do you want, hein
8 (1.0)
9 SUZ: Hhn
10 (1.3)
11 SUZ: hh hhe

Extract 5. Participants ascribe sense to the movement of the cloth

Those participants who take the interactive approach understand the workings of the cloth as little as those who followed the investigative approach. We will discuss possible reasons for this in the next chapter. But we can notice that participants with an interactive approach engage with the cloth more seriously. They even ascribe intentional behaviour to it. We can conclude that the conversational setting in the coffee room at the department worked far better as the conference setting where people did not take the time to engage properly with the expressive objects. They did not take the time to explore the table fully before they ran away. But the real puzzle for us was why the intricate setup with a larger number of possible reactions of the cloth to sounds in its environment did not work out.

DISCUSSION

During the user tests, the participants sometimes produce emotional evaluations of the cloth. Kristine says that the cloth is scary, Suz talks about its soul: 'det er et bord med en sjæl' *it is a table with a soul*.

What makes the cloth mystic and scary and gives it a soul? We see these assessments as an outcome of the users never understanding the working of the cloth. However, Suz and Bettina were never in doubt that the cloth responded to their talk. Kristine and Cho reached evidence for their hypothesis that was there was a sound based sensor system 'of some kind' which provided the cloth with input. Neither of the two groups, however, came close to an understanding how exactly the movements of the cloth were achieved.

The reason why the participants in the user test never reached full understanding of the cloth's mechanics and

none of them understood why the cloth formed different patterns has to do with timing. Jefferson (1989) has in a paper described timing in interaction. She analysed her large corpus of transcriptions and found that there was a 'standard maximum silence' in talk that stretched up to about a full second. If silence has reached one second, usually one of the speakers would start talking again. Jefferson's work has laid the foundations for the understanding of timing in conversation.

Now, Jefferson and the early CA literature did nearly exclusively work on recordings of phone calls where sound is the only channel between the speakers. In face-to-face interactions this is different. Although a participant may not talk, he or she might be visibly engaged in other activities. A silence of more than one second may be unproblematic in face-to-face interaction since the participants may just be busy with activities that do not involve talk. Still, there is little tolerance for long delays where nothings happens as we see in Cho and Kristine's treatment of the cloth's response in Extract 2.

The tablecloth is obviously not talking and has no other resources than moving in mysterious ways. As we noticed, the movement of the cloth in transition relevant spaces affords for the participants to ascribe meaningful action to it because it seems to be (visibly) responsive to the talk. As we have shown in Extract 3 and 5, the cloth moves in overlap with Suz' turn and directly after she has finished her turn. This affords Suz to treat the cloth as an eager participant who responds in overlap and then again with proper timing for a next turn. In this case Suz treats the cloth as a non-talking participant whose actions can be given sense by the talk of the others.

The cloth rarely moves in precise relation to conversational actions. As we have said earlier, the timing is set to be delayed about 3 seconds. Possibly because the sensors do not always pick up a sound signal, the delay between a noise and the cloth' movement is in several instances much longer. In Extract 2, Cho is clapping her hands several times. This is apparently not registered by the system because the cloth first moves 9 seconds after.

The delay of the possible response makes it obviously impossible for the participants to understand the relation between their actions and the movement of the tablecloth. The huge delay of the responding movement seems to be the reason why the participants never happen to get a sufficient understanding of this relation that therefore becomes 'scary' and 'magic.'

As a secondary effect, the participants never understand the intricacies of the response patterns (c.f. Figure 2, above) i.e. the meaning of the different shapes that the cloth is able to form. When the relation to the input is lost, qualifications in the response are equally lost. So neither Cho, Bettina nor Suz came any further than observing the different shapes of the cloth.

Our earlier expressed hope that the complex pattern of the cloth's movement would be interesting to the participants and open for interpretation did not pay off. The participants did not understand the complex movement well enough to speculate about the basic principle behind the different patterns although some of them perceived that the cloth responded with different movements. But our user tests gave us something else. It showed us a way in which an expressive artefact could become so interesting for users that they may address it as a participant of the interaction. Obviously, if the response of the expressive artefact to signals from its environment could be timed more precisely, it could create an even more intriguing object for users to play around with and to and to explore aspects of their conversation.

CONCLUSION

In our concluding remarks we will point what can be learned from our experiments with the expressive tablecloth. The first point is about the difference between the two settings. In the conference setting, bypassers didn't really engage with the table and did not notice its complex response pattern. In the conversation setting, people were placed around the table and did what people do at tables with tablecloths: they were having coffee and cake. In these circumstances most of them engaged with the table. Obviously, the best environment to study interactions around an expressive artefact is to use it in the environment where it has been found as an ordinary object.

The second point is about timing. All participants discovered – or took for granted - that the movement of the table were responding to something they themselves did – but this revelation took a long time and consequently they never understood the complex response pattern. The reason seems to be the extreme delay between the actions of the users and the responses of the participant. This made it so difficult just to understand the response relation that the response pattern never came into focus. Obviously, expressive artefacts need to be very careful with respect to the timing of the response or otherwise the stimulus-response relation will get lost.

The final point is about the stimulus to the expressive device. Sound is not a very good indicator of what is going on in a conversation. Our aim that users should reflect on the dynamics of conversation has been hampered by the huge delay in the response of the system. But even if the delay had been shorter, we could not have expected that the users would be be able to reflect on anything but loudness.

TRANCRIPTION CONVENTIONS

□→□	Rising, level and falling intonation contour
(.) (0.4)	Pauses
hva-	Cut off (glottal stop)
wo:rd	Lengthening
‾oy‾	High pitched voice
word	Pitch
.h	Inbreath
hhe	Laughter syllable
xx	Unclear talk
□word□	Overlapping parts of speech
□word□	

REFERENCES

Blum-Kulka, Sh.1997. *Dinner talk. Cultural patterns of sociability and socialization in family discourse*. Lawrence Erlbaum Mahwah N.J.

Gaver, W., Beaver, J. and Benford, S. 2003. Ambiguity as a Resource for Design. *Proceedings to the CHI Conference on Human Factors in Computing System.*

Gaver, W., Bowers, J., Boucher, A., Law, A., Pennington, S. and Villar, N. 2006. The history tablecloth: Illuminating Domestic Activity. *Proceedings to the Designing Interactive System conference 2006*.

Hummels, C., Kees C. J. and Overbeeke, S. 2006, *Move to get moved: a search for methods, tools and knowledge to design for expressive and rich movement-based interaction*. Springer-Verlag London Limited.

Isomursu, M., Kuutti, K. and Väinämö, S. (2004). Experience clip: method for user participation and evaluation of mobile concepts. *Proceedings of the eighth conference on Participatory design: Artful integration: interweaving media, materials and practices*. Volume 1, pp 83-92.

Jefferson, Gail 1989. Preliminary notes on a possible metric which provides for a 'standard maximum' silence of approximately one second in conversation. In D. Roger and Bull, P. Eds. *Conversation: An Interdisciplinary Perspective*. Clevedon: Multilingual Matters, pp.166-196.

Lerner, Gene H. 1993. Collectivities in action: Establishing the relevance of conjoined participation in conversation. *Text*, 13, pp. 213-245.

Levinson, S.C. 2013. Action formation and acsription. In Sidnell, J., and Stivers, T. Eds. *The Handbook of Conversation Analysis*.. Chichester, UK: Wiley-Blackwell, pp. 103-130.

McCathy, J. and Wright, P., 2004. *Technology as experience*. The MIT Press: Cambridge, Massachusetts.

Sacks, H., Schegloff, E.A. and G.Jefferson, G.. 1974. A simplest systematics for the organization of turn taking for conversation. *Language, 50*, pp. 696–735.

Schegloff, Emanuel A. (1987) Recycled turn beginnings: A precise repair mechanism in conversation's turn-taking organisation. In G. Button & Lee, J. R. E. Eds. *Talk and Social Organization*. Clevedon: Multilingual Matters, pp.70-85.

Stivers, T. 2013. Sequence organization. In Sidnell, J., and Stivers, T. Eds.. *The Handbook of Conversation Analysis*.. Chichester, UK: Wiley-Blackwell, pp. 191-209.

Wei, J., Wang, X., Peiris, R., Choi, Y., Martinez, X., Tache, R., Koh, J., Halupka, V. and Cheok, A. (2011). CoDine : an interactive multi-sensory system for remote dining. *Proceedings of the 13th international conference on Ubiquitous computing - UbiComp* '11. 21-30.