linked. – a relatedness experience for boys

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ABSTRACT
Social exchange, intimacy and relatedness are a basic human need. Not surprisingly, there is a number of means to mediate relatedness over a distance, such as the telephone, Skype or Facebook. However, each of these imposes a particular way of communication, constrained by the employed technology rather than deliberately shaped by the designer. In line with an experience-driven approach to technology design, we suggest *linked.* as a communication device for teenage boys. An ethnography-inspired study revealed that teenage boys tend to "squabble" to express and fulfill their need for relatedness and physicality. *linked.* draws upon this. It is a modular pillow-like device, enabling boys to squabble over a distance, thereby providing a means to experience relatedness in a novel, emotional, but socially appropriate ways.

Author Keywords
User experience, experience design, non-verbal communication, social interaction, relatedness, industrial design, emotion.

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
Social exchange and according feelings of closeness and relatedness are a basic human need [1]. Technologies, such as the telephone, Skype or Facebook, play an important role in mediating relatedness over a distance. Obviously, technology addressing such a crucial aspect of life has to be designed with care. In this paper, we advocate an experience-oriented approach to the design of technology. As Hassenzahl [4] put it: "Experience is prime, and the product only a means. Accordingly, one of the basic claims of Experience Design is to consider the experience *before* products ... Experience Design urges us to set the story straight before we start thinking about how we can create this story through a technology." Experience in itself is understood as "an episode, a chunk of time that one went through [...] sights and sounds, feelings and thoughts, motives and actions [...] closely knitted together, stored in memory, labeled, relived and communicated to others. An experience is a story, emerging from the dialogue of a person with her or his world through action" [4]. This implies a focus on psychological needs as drivers of action and central elements of experiences. Experience Design's general objective is to create technology fully aligned with the experience to be created. This goes clearly beyond a task-oriented perspective on technology design, which is prevalent in traditional Human-Computer Interaction (HCI).

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TECHNOLOGY-MEDIATED RELATEDNESS
In an unpublished report Stephanie Heidecker and colleagues reviewed over 144 published concepts of (experimental) interactive products and concepts addressing relatedness (see also "technology-mediated intimacy", e.g. [7]. The review identified central principles, addressing different facets of relatedness, such as *emotional expressivity* or *awareness*. An example of such a concept is *One*, suggested by Ogawa et al. [5]. The device is a sphere, split in half. At the centre is a small rod, which can be pushed in like a button. If one user pushes, the rod at the partner's device comes out. What emerges through this simple setup is a symbolic transaction between two partners, a new form of emotional expressivity and awareness. Another example is the *ComSlipper* [2]. Two pairs of slippers are connected via the Internet. If one partner wears a pair, the connected pair gets warm. Besides awareness, one can "feel" the partner over the distance. This is an example of another facet of relatedness, *physicality* (here, the body heat). Other concepts reviewed addressed further facets, such as *joint action*, *collection and re-experience of shared memories*, and *gift giving*. All concepts offer alternative ways of communicating through an electronic device, which puts experience, emotions and needs at the centre of the design effort.

The present case focuses on technology-mediated relatedness experiences for teenagers (11 to 14 years). The insights available from published concepts so far address predominantly adults in close relationships, and are only in part applicable to teenagers. Hence, we aim at broadening previous conceptual approaches by the present design case.

RELATEDNESS AMONG BOYS AND GIRLS

To explore how teenagers fulfill and express their need for relatedness in their daily life, we ran an ethnography-inspired study (observation, interviews) with five teenagers over several days. This was complemented by a diary and photo diary handed out to the teenagers and their class mates.

The study revealed clear differences in the way boys and girls expressed and fulfilled their need for relatedness. Girls had dyadic, exclusive relationships – similar to a loving couple (see [3]). They were very physical, stroked each other's hair and held hands as an obvious commitment to their relationship (Figure 1, A). Further examples were the mutual doodles on each other's arms (see Figure 1, B) – secret codes, symbols and sweet sentences, displayed like trophies.

Relatedness among boys turned out to be very different. Boys found it inappropriate to display evident signs of relatedness; they found it "camp." But they nevertheless had a similar desire for physicality and emotional expressivity. A prominent way of fulfilling this desire was "squabbling" (see Figure 1, C). In a prototypical situation, a boy provokes another boy with slight punches until his "opponent" reacts and punches back. They start an intensive and lively "friendly fight", ending always in "stalemate" (see Figure 2).

The interaction between the boys is rough, brief and intense. It can be easily mistaken as an argument or just a way to kill time. A closer look revealed, however, that it squabbling fulfilled a need similar to what motivated the girls' tender touches, but in a more socially acceptable way. This became the starting point for the present design case.

"SQUABBLING" MEDIATED BY TECHNOLOGY

Based on the pattern of squabbling, we explored different means of transmitting force over a distance. A pre-test revealed one of them to be particularly suitable: "the pillow". It consisted of a pair of air bags sewn into pillowcases and connected by a tube. Each pillow was placed on a couch, which in turn were located in separate rooms. The tube was stuck through a hole in the wall and masked. Hugging or punching forced the air forward and backward from one pillow to another, which created a relatively direct and immediate physical interaction.

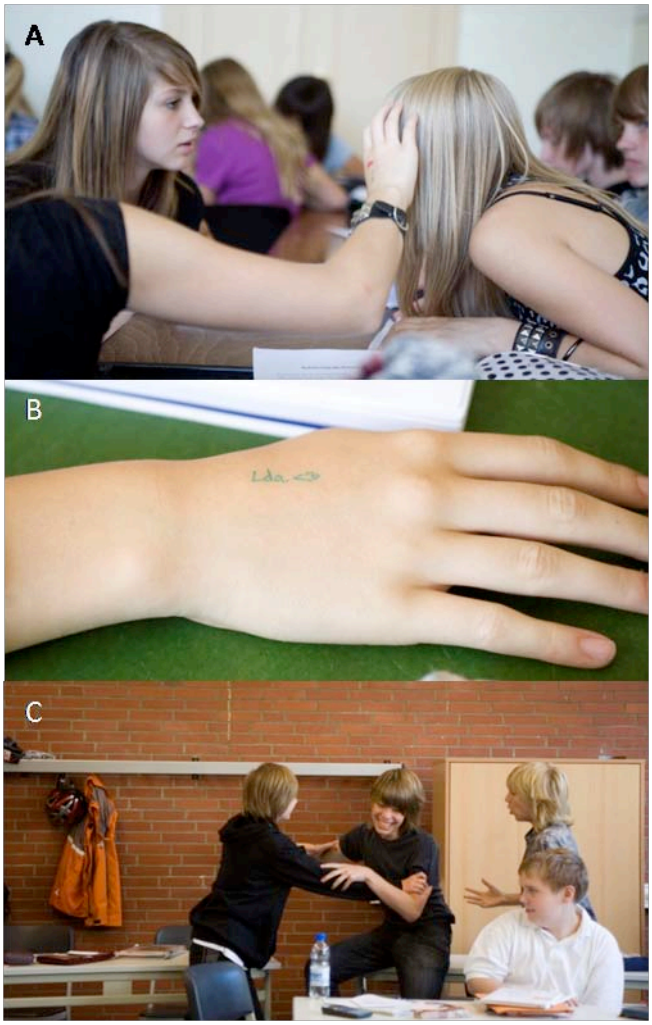

Figure 1: (A) tender strokes; (B) symbolic communication; (C) squabbling

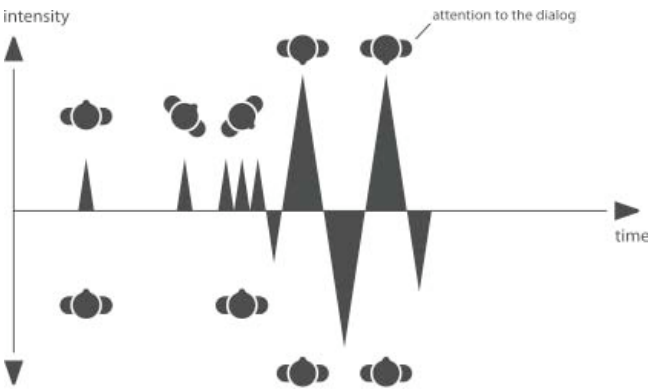

Figure 2: Schematic of squabbling (focus on intensity over time)

Two boys from the original group were invited to explore the functional prototype. They were unaware of the actual location of their counterpart, which created the illusion of a much greater physical distance than actually given. Both boys easily caught on to the type of interaction offered by the pillow and found it positive: "It was really funny. I could give him a real punch" or "It is like a friendly squabble." Both exchanged soft punches, harder hits, but also surprisingly tender strokes (Figure 3). In the latter case, the boys sometimes even put their faces to the pillow. Such closeness would be nearly impossible in a face-to-face situation. This supports the notion of squabbling as a socially acceptable way to be physical with each other in a face-to-face situation.

Figure 3. A selection of observed interactions

A subsequent interview revealed further requirements.

Identity. The boys spontaneously interacted with the pillow as expected. However, they later described the initial interaction as rather "creepy," because of not knowing, who or what was causing the punches. The moment it was revealed that his friend was at the other end, the pillow turned into something unconditionally positive. One boy stated: "The moment I knew it was Lars, it became really funny". This inspired a design, where each pillow is associated with only one definite counterpart.

Group instead of couple. Boys preferred a small group to dyadic relationships – the latter appeared as too "romantic". Thus, the final concept must accommodate a small circle of friends (typically no more than five people) while the dyadic interaction of squabbling and the clear identity of the counterpart must remain intact (see Figure 4 for an example).

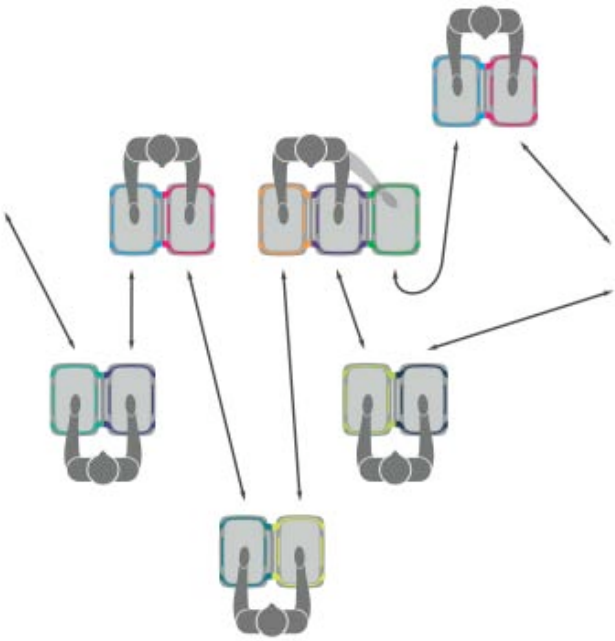

Figure 4. An exemplary network of friends

Expression. The boys insisted on a great variety of ways to express themselves through the pillow, ranging from hard hits and punches to soft strokes. This reflects real squabbling, which also consists of a wide range of more or less intense interactions. Squabbling is subtle and requires the constant regulation of the intensity of hits, punches and strokes to avoid escalation (and everybody knows himself/herself an example, where a lack of "empathy" led to a serious fight).

Consistency of action and reaction. The boys explicitly asked for a consistency between input and output, i.e. action on one end and the resulting reaction on the other. A hit as an input must appear as a hit at the receiving end. This consistency of action and reaction is a general interaction design principle (e.g. [8]) and the current example reiterates its importance. The quality of a punch has to be preserved. This rules out design solutions, where movement on one end is translated into, for example, a blinking LED on the other end.

Awareness. The boys wanted to be able to recognize incoming pulses without direct contact to the pillow.

Latencies. Ideally, punches have to be transmitted without any latency. This requirement was met for the functional prototype, however, for a later realization – e.g. through a connection via Internet – the avoidance of latencies becomes an important requirement.

FROM THE FUNCTIONAL PROTOTYPE TO THE DESIGN MODEL

Figure 5 shows the final design model for the pillow

dubbed *linked.* (Figure 6 shows a setup for two separate friends; one represented by the orange the other by the blue pillow).

Figure 5. *linked.* design model (single pillow with charging cable)

The final prototype is a non-functional design model. As designers and in accordance with the general approach of Experience Design, we primarily focused on the experience the concept may deliver – the story to be told – but to a lesser extent on its technological realization. However, preliminary tests with simple servo motors and pressure sensors were already promising.

linked. is situated in each boy's room, specifically on or at the bed. The exploration showed the bed to be a central and the most private place in a teenagers' room. We, for example, asked the teenagers and their classmates to name three objects they really like. Seven of fifteen mentioned their bed. Only close friends, parents or siblings are allowed to enter the room and to linger on the bed. Given that *linked.* provides a sort of intimate interaction under the disguise of squabbling, the bed appears the most appropriate place, also confirming the decision to use a pillow-like form (see Figure 5).

Other than common communication devices, such as mobile phones, each pillow represents a particular friend. This meets with the general dyadic nature of squabbling (i.e., one-on-one) and the requirement of identity. Each pillow, thus, becomes a placeholder, a symbol of the person connected – an aspect central to the creation of relatedness.

The connection between two pillows is managed by a "button" (see Figure 6, in the front). The physical act of exchanging the buttons and attaching them to the according pillows is a ritual, emphasizing the personal relevance of this connection – a blood brotherhood.

A small ribbon attached to the button amplifies the movement of the pillow and signals incoming punches (see Figure 6). Although the boys suggested lights or ringtones to be made aware of activity, we decided for a more ambient and subtle signaling. This is also to avoid embarrassing moments – imagine the boy and an unsuspecting guest, when suddenly a pillow on the bed rings and flashes. "Oh it's nothing, only my best friend wants a little squabble."

Although squabbling is essentially dyadic, the boys required the concept to accommodate a small group. Thus, the pillows are a part of a modular system. They can be connected by a zipper to build little "islands" (i.e. groups or clusters of friends, see Figure 4 and 6). This maintains the dyadic interaction; however, piling the pillows enables a 1-to-many communication. A punch into the uppermost pillow also affects all pillows underneath.

Figure 6. *linked.* design model (modular design)

CONFRONTATION

Both boys were confronted with the final design model. Specifically, they were asked to imagine ways of using the pillows in their daily lives. The boys dreamt-up a number of personally meaningful scenarios, which were acted out and documented (see Figure 7). An example is the "wake-up call" (Figure 7, bottom image). Although one boy could sleep in, the other wakes him up early in the morning before he leaves to school. Who needs enemies with friends like this?

This example also demonstrates that *linked.* is perceived rather as an extension of existing communication technologies, offering new possibility, than a substitute, solely counteracting the problem of not enough face time. Waking up a friend – a situation that teenage boys only share rarely – is a new and additional chance for a positive relatedness experience (for more information on the concept see http://wp.me/pR04b-83).

Figure 7. (A) cannon ball; (B) wait for impulse; (C) asleep next to the pillow

DISCUSSION

linked. offers a new channel for technology-mediated communication, especially designed for teenage boys. It is not a substitute for face-to-face contact or a replacement of existing communication technologies. It is a further *possibility* for positive, technology-mediated relatedness experiences rather than a solution to a prevalent *problem*.

Although Human-Computer-Interaction (HCI) and user-centered design places the user at the centre of their design effort, both still focus too much on the effectiveness of the interaction itself. The conceptual assumptions and limitations implicit to a certain form of technology are questioned only rarely. Accordingly, the telephone, for example, remained essentially the same over the last century. Whether one has to dial, punch in number keys or use a touch screen to make a connection does not impact the basic concept much. Research on technology-mediated intimacy and Experience Design in general, challenges the traditional HCI approach. Experience Designers shape meaningful experiences through an interactive product. The results of such an approach, such as *linked.*, *ComSlipper* or *One*, highlight the limitedness of commercially available communication technologies and tap the largely unexplored design space of human-driven rather than technology-driven innovation.

It remains an open question, whether *linked.* would impact the boys' day-to-day communication behavior. To study the process of appropriation in detail would be certainly interesting. However, this requires a fully functional prototype that can be studied over a longer period outside the laboratory. Unfortunately, design cases only rarely go this far, mainly because of limited resources. In the confrontation, we explored open-ended scenario-building (through play acting) as a technique to forecast the potential impact of *linked.*. Other ways of predicting appropriation with a more explicit long-term focus would be certainly a valuable methodological addition.

This case illustrates an alternative approach to design. It focuses on the experience created and shaped through a product rather than the product. *linked.*, thus, should not be construed as a solution to the *problem* of physical distance, but as an *opportunity* for a range of novel, meaningful, positive, and socially appropriate experiences based on the fulfillment of the psychological need for relatedness.

FINAL REFLECTION ON THE VALUE OF DESIGN CASES

The HCI community – especially those with a social science background – is often critical about design cases such as the present. Cases seem to lack evaluation and scientific proof. This critique, however, assumes that the quality of a design concept is foremost expressed through its acceptance by potential users. However, more important first level indicators of a concept's quality are plausibility and justification. The designers' task is to make conscious, comprehensible, and justifiable design decisions. It is not about whether an underlying assumption is right or wrong. It is about having an assumption at all, being able to describe it, and to explain how a particular feature of the concept is able to satisfy this assumption. What is needed to do justice to design cases is certainly a practice of "interaction criticism" [1], i.e., the careful review and theoretical analysis of a concept according to shared criteria and standards.

To avoid a potential misunderstanding: We are strongly advocating to ground design concepts on empirically derived insights or on empirically validated insights of others. However, empirical work in the context of design is

generative rather than validating. It is informal, often messy and operates largely on anecdotal evidence gathered from a small number of informants. The present design case, for example, is based on five teenagers in the exploration phase and only two boys in the later stages of design. It used a multi-method approach, with a purely interest-based, impartial analysis, all geared towards generating an understanding of the domain at hand. This does not live up to scientific standards and is clearly not sufficient to validate a concept. But this is no reason to discount such empirical insights, in fact, this would be even more 'unscientific'. *linked.* is based on a proper understanding of the informants included in the design process and was approved by them. Admittedly, it lacks a field trial, exploring long term effects of the concept when introduced into daily life. Nevertheless, *linked.* is surely an empirically grounded case. The apparent scientific problem is one of generalization. The concept seems to work for the two boys, but does it generalize to other teenagers? The question is valid; but it appears overly skeptical to assume that other teenagers are completely different from our informants. Thus, as long as not falsified, we may optimistically suppose that our case study produces valuable, archetypical insights, which hold for a much larger group than actually studied. Only given reasonable doubt (and according data), one may dismiss this general assumption. In addition, we believe that is not primarily the task of design, to demonstrate mass acceptance and compatibility. As designers, we design for people, no matter if there is only one potential user or a large group.

Design cases, like the present, may appear questionable from a scientific point of view. They are not. They are important contributions to interaction design's body of knowledge. Each concept is a hypothesis and introduces an alternative practice of technology use. They materialize underlying assumptions; open them up to criticism, which in turn advances the field. Admittedly, a fully-fledged culture of interaction criticism may not been established yet. However, this will certainly remain only a transitional phenomenon.

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